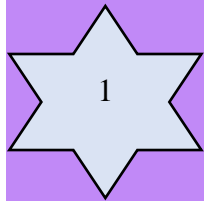


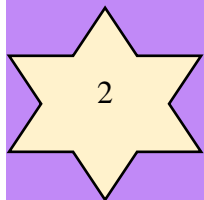
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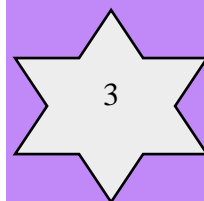
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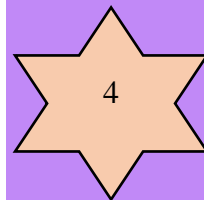
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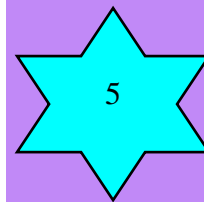
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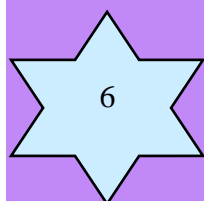
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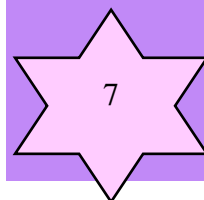
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UNIT # 1: WHOLE NUMBERS

Learning Outcomes:

After completing this section, you will be able to:

- Identify place values of digits up to one hundred thousand (100 000).
- Read numbers up to one hundred thousand (100 000).
- Write numbers up to a hundred thousand (100 000).
- Write numbers in words up to one hundred thousand (100 000).
- Compare and order numbers up to 5 digits.

Topic: Numbers up to One Hundred Thousand

Key Terminology:

Numbers, Digits, Place Value, Compare, Order, Ascending, Descending, Addition, Subtraction, Multiplication, Division, Pattern, Table

Let us write 69273 in the place value chart.

Second Period			First Period		
Thousands			Ones		
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	6	9	7	2	3

Expanded Form: To write the number as sum of place values is called expanded form.

Standard Form:

A way to write numbers by showing the value of each digit.

Expanded Form

In expanded form, we write the number by showing the value of each digit.

Standard Form 7294

Expanded Form

$$7000 + 200 + 90 + 4$$

Date: _____

Day: _____

Activity # 1:

- Write the expanded form of the following numbers. The first question has been answered for you.

10665	$10,000 + 600 + 60 + 5$
23753	
89564	

- Write the following numbers in standard form.

1. $92000 + 6000 + 200 + 70 + 2$ _____
_____.

2. $26000 + 8000 + 500 + 90 + 7$ _____
_____.

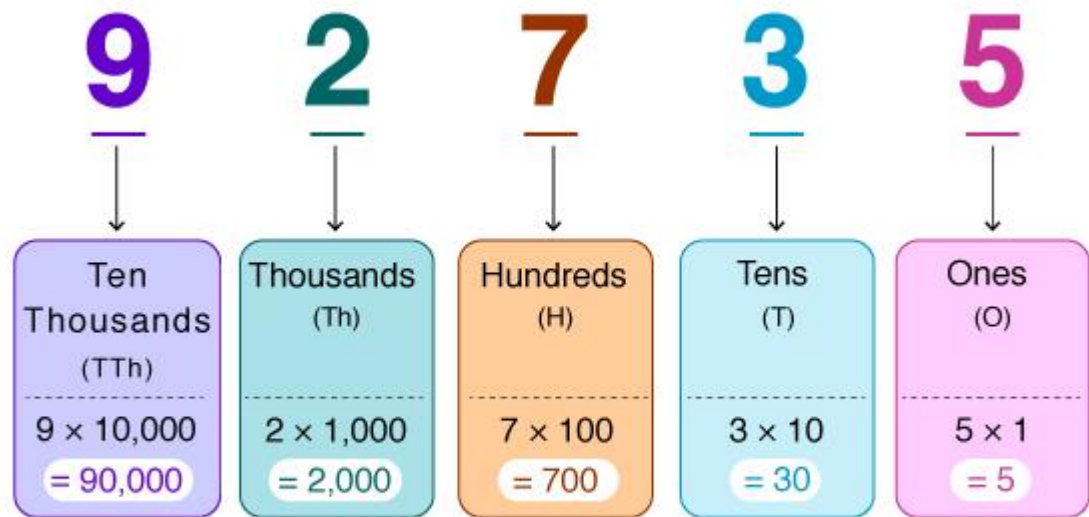
Place Value:

Ten-thousands	Thousands	Hundreds	Tens	Ones
3	1	0	2	7

I say : Thirty-one thousand and twenty seven
I write : 31,027

Date: _____

Day: _____

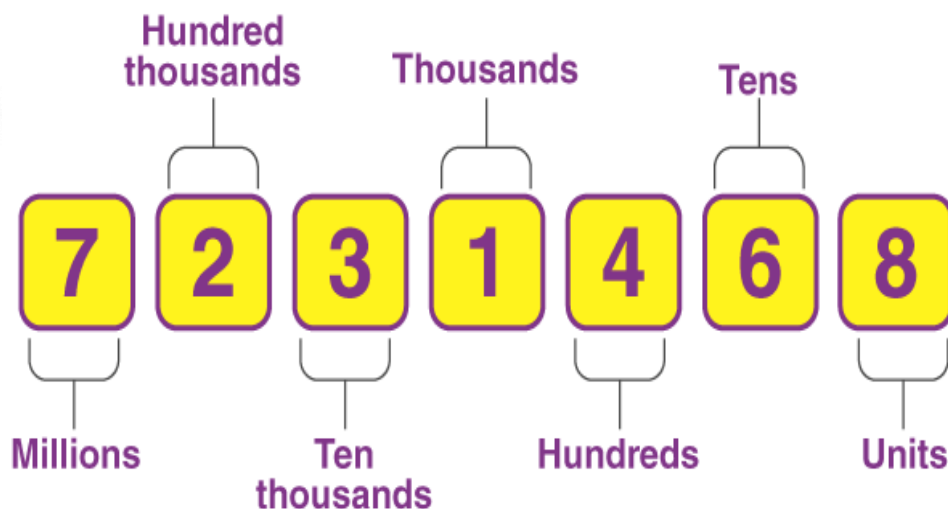


Ninety-two thousand, seven hundred and thirty-five

Do you Know?

Ten thousand are there in one hundred thousand.

Did you know after a Hundred thousand What comes next?



Date: _____

Day: _____

➤ **Solve the following:**

The place value of the digit 7 is _____

56379

The place value of the digit 3 is _____

The place value of the digit 6 is _____

➤ **Write the values of the following digits.**

1. $40000 + 2000 + \underline{\hspace{1cm}} + 80 + 5$: **42685**.

2. $60000 + 7000 + 600 + \underline{\hspace{1cm}} + 6$: **67676**.

3. $20000 + \underline{\hspace{1cm}} + 500 + \underline{\hspace{1cm}} + 1$: **25541**.

4. $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + 200 + \underline{\hspace{1cm}} + 2$: **97282**.

To make the greatest number, arrange the numbers in descending order.

➤ **Make the greatest 5-digit number from 56821 number:**

Number: _____

Write its expanded form: _____

➤ **Write the place and place value of coloured digits in the chart below.**

(a) 76 **1**02

(b) **2**4 360

(c) 9**4** 615

(d) 8**6** 042

(e) **7**3 456

(f) 34 **5**66

Date: _____

Day: _____

Sr.	Ten Thousand	Thousands	Hundreds	Tens	Ones
1					
2					
3					
4					
5					
6					

➤ Write the smallest and greatest 5-digit number.

Smallest: _____

Greatest: _____

➤ Write the following numbers in words.

(a) 74 325 _____

(b) 25 302 _____

(c) 62 897 _____

(d) 67 459 _____

(e) 37 264 _____

Date: _____

Day: _____

➤ **Write the following numbers in numerals.**

- (a) Seventy-eight thousand four hundred two. _____
- (b) Ninety-two thousand three hundred one. _____
- (c) Twenty-five thousand, six hundred. _____
- (d) Forty-eight thousand, four hundred and forty-four. _____
- (e) Eighty-eight thousand, three hundred and twenty. _____

➤ **Make a 5-digit whole number whose sum of digits of ten thousand place and tens place is 8 and the difference is 2.**

Number: _____

Ten thousand	Thousands	Hundreds	Tens	Ones

Number in words: _____



UNIT # 1: WHOLE NUMBERS

Topic: Comparing and Ordering Numbers

Comparing numbers is a method of identifying greater, smaller, or equal numbers.

Ordering numbers: Ordering numbers mean arranging them in ascending or descending numbers.

- In the case of “less than “a sign the format is:

$$29,229 < 92,229$$

$$43,340 < 72,250$$

- In the case of “greater than “a sign the format is:

$$61,266 > 27003$$

$$89,548 > 33,998$$

- In the case of “equal to “a sign the format is:

$$89,548 = 89,548$$



Activity # 2

➤ Compare these amounts by using symbols $<$, $>$, and $=$.

Numbers	Sign	Numbers
52614		50552
67193		67002
37015		37015
80972		89052
63552		63552
78752		76220
58003		55532
23230		23230

The arrangement of numbers from the smallest to the greatest is called an ascending order. The arrangement of numbers from the greatest to the smallest is called descending order.

Date: _____

Day: _____

The price of 3 mobile phone models is Rs 62 870, Rs 78 200 and Rs 75 110, respectively. Compare their prices and write them in ascending order.

Activity # 3:

Ascending order

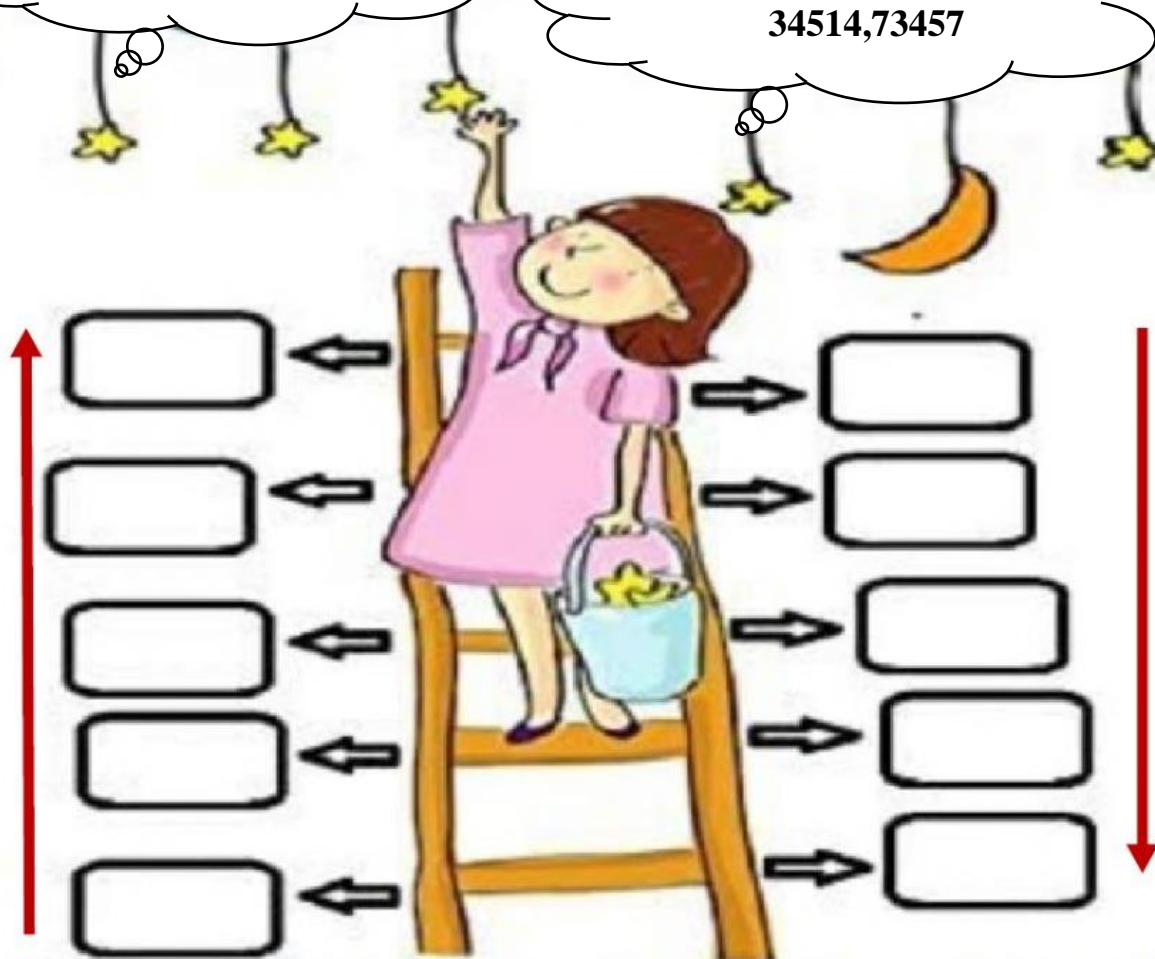
55845, 95485 ,25342

44524,63456

Descending order

25845, 65495 ,15332

34514,73457



Date: _____

Day: _____

Activity # 4:

➤ **Order these numbers from smallest to largest.**

72645

40784

71826

53624

29879

smallest

largest

10738

9825

10465

14532

7994

smallest

largest

65241

58726

60902

71435

59243

smallest

largest

36052

42588

5289

32169

35905

smallest

largest

9816

13204

12965

7285

10978

smallest

largest

58260

52785

49277

53602

47833

smallest

largest

38092

32685

41205

33280

32901

smallest

largest

15265

6824

9031

11825

10563

smallest

largest



UNIT # 1: WHOLE NUMBERS

Topic: Addition and Subtraction

Learning Outcomes

After completing this section, you will be able to:

- Add numbers up to 5 digits.
- Solve real-life number stories involving addition of numbers up to 5 digits.
- Subtract numbers up to 5- digits.
- Solve real-life situations involving subtraction of numbers up to 5 digits.

Addition:

A publishing house published 25 575 story books. Considering the popularity of the book, the second edition was also published. In the second edition, 42 195 books were published. Find the total number of books published in both editions.



Here, we add the number of books published to get the total quantity.

The number of books published in first edition=	Ten Thousand	Thousand	Hundreds	Tens	Ones
	2	5	5	7	5
The number of books published in second edition=	+ 4	2	9	1	5
Total quantity =	6	8	4	9	0

Date: _____

Day: _____

Activity # 5

➤ Solve the following-

(1)	T.th	Th	H	T	O
	6	0	5	2	0
	+ 5	9	7	6	8

(2)	T.th	Th	H	T	O
	9	2	7	4	2
	+ 4	7	3	6	7

(3) $63\,341 + 47\,543$

(4) $48\,764 + 55\,845$

Date: _____

Day: _____

1. Ali purchased a vehicle for Rs. 59425 and spent Rs. 8652 for repairs.
How much did the vehicle cost him?

2. 82317 people watched the semi-final of the World Cup football match, but 31896 more people watched the finals. Find the number of people who watched the finals.

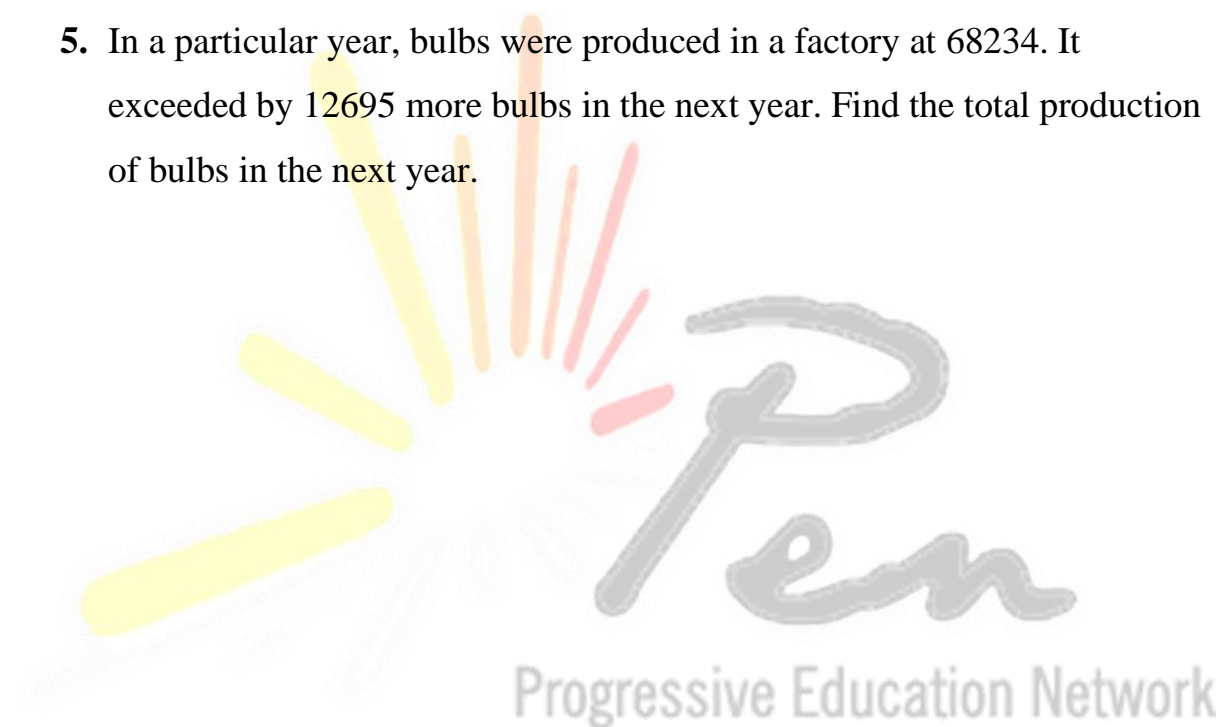
3. Two brothers bought a new television set and gave their old television in exchange. Their old television is valued Rs.7850. They had to pay the dealer Rs. 29375. What was the cost of the new television set?

Date: _____

Day: _____

4. There are 45678 males, 32257 females and 59175 children in town. Find the total population of town.

5. In a particular year, bulbs were produced in a factory at 68234. It exceeded by 12695 more bulbs in the next year. Find the total production of bulbs in the next year.



6. Ahmad played a car game and scored 453 points in the first round and 673 in second round. The game was over after the second round. How many points did he have at the end of the game?

Date: _____

Day: _____

Subtraction:

The animals that have backbone in their body are called vertebrates. If there are 66 178 types of vertebrates out of which 32 900 types are fish. How many vertebrates are there other than fish?

To find this quantity we have to subtract 32 900 from 66 178.

Total types of vertebrates=	Ten Thousand	Thousand	Hundreds	Tens	Ones
	6	5 6	10 1	7	8
Type of fish=	- 3	2	9	0	0
Remaining types =	3	3	2	7	8

So, 33 278 types of vertebrates are there other than fish.

Activity # 6:

➤ Solve the following.

(1)	T.th	Th	H	T	O
	8	5	2	4	5
	- 5	3	7	6	8

(2)	T.th	Th	H	T	O
	7	5	2	4	5
	- 3	3	5	3	2

Date: _____

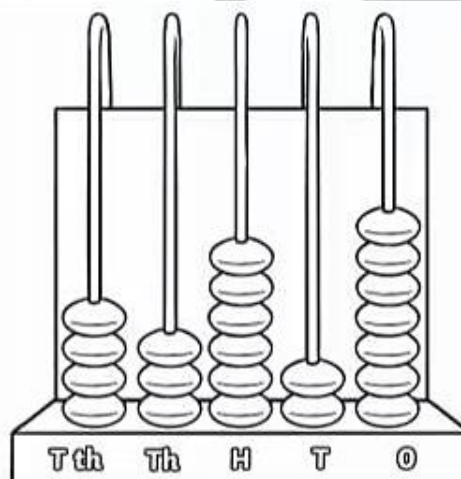
Day: _____

(3) $63\,341 - 36\,543$

(4) $85\,964 - 74\,544$

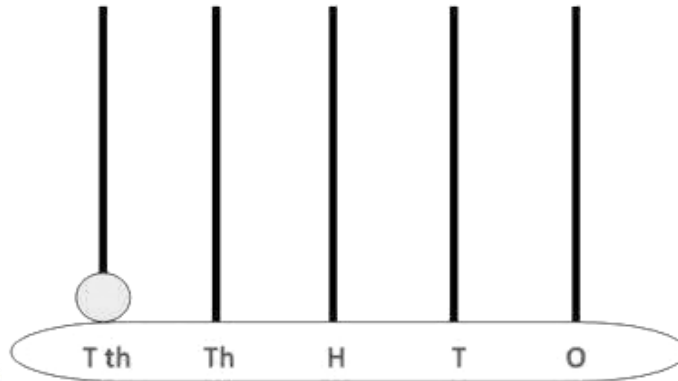
Activity # 7:

- Write the 5-digit number looking at the picture below:



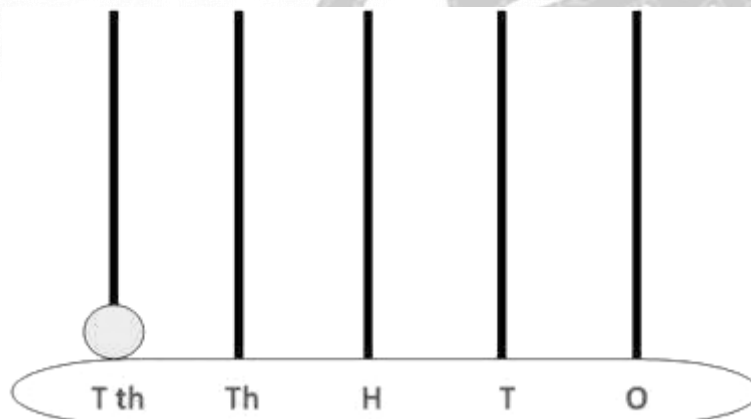
➤ **Answer the following questions and fill in the picture.**

1. There are Rs. 15785 in Maria's account. She leaves Rs. 4898 in her account and withdraws the rest. What amount did she withdraw?



Ans: _____.

2. If Ali spends Rs. 18946 to buy a fridge out of Rs. 37830. How much money is still left with him?



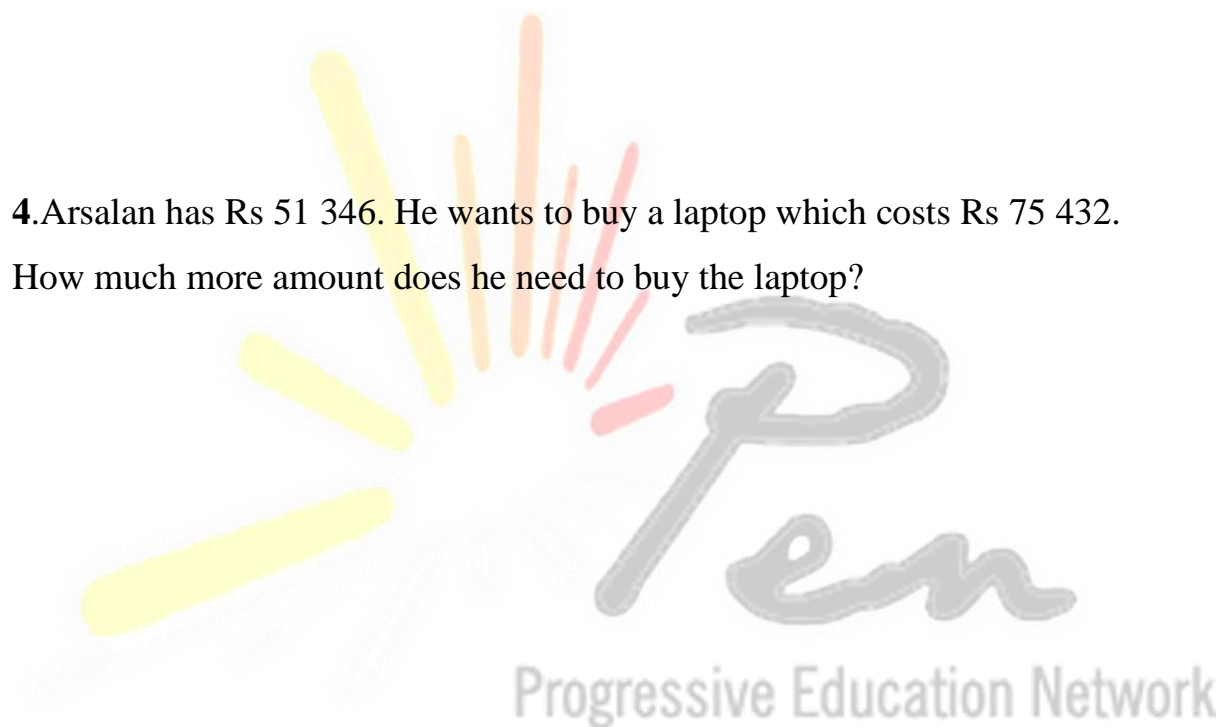
Ans: _____.

Date: _____

Day: _____

3. There are 45 765 trees in a forest. If 32 124 are cactus trees, then find the number of trees other than cactus.

4. Arsalan has Rs 51 346. He wants to buy a laptop which costs Rs 75 432. How much more amount does he need to buy the laptop?



Teaching Point: Make small groups of students and ask them to subtract the greatest 4-digit number from the smallest 5-digit number.



UNIT # 1: WHOLE NUMBERS

Topic: Multiplication and Division

Learning Outcomes

After completing this section, you will be able to:

- Multiply numbers up to 5 digits by numbers up to 3 digits.
- Solve real-life situations involving multiplication of numbers up to 5-digit by 3-digit.
- Divide numbers up to 4 digits by numbers up to 2 digits.
- Solve real-life situations involving division of numbers up to 4-digit by a number up to 2-digit.
- Solve real life situations using appropriate operations of addition, subtraction, multiplication and division of numbers up to 2 digits.
- Recognize a given increasing and decreasing pattern by stating a pattern rule.
- Describe the pattern found in a given table or chart.
- Complete the given increasing and decreasing number sequence.

Multiplication:

The cost of one computer is Rs 88 550. If a company sold 525 computers. Then find out how much amount did he sold all the tablets?

By multiplying the price of one computer with total number of computers, we will get the total amount.

T.th				Th	H	T	O	
8				8	5	5	0	Multiplicand
×					5	2	5	
<hr/>								Multiplier
4	4			2	7	5	0	
1	7	7		1	0	0	0	Product
4	4	2	7	5	0	0	0	
<hr/>								
4	6	4	8	8	7	5	0	

Cost of one computer= 88550

Date: _____

Day: _____

Total Computers= 525

Cost of 525 computers= 1062600



If a person walks 6 213 steps in a day, find out how many steps will he walk in 3 days?

By multiplying 6 213 with 3 we will find out the total number of steps. Multiply every digit of 6 213 with 3.



Step 1

Multiply 3 ones with 3.

Th	H	T	O
6	2	1	3
×			3
			9

Step 2

Multiply 1 tens with 3.

Th	H	T	O
6	2	1	3
×			3
			3 9

Step 3

Multiply 2 hundreds with 3.

Th	H	T	O
6	2	1	3
×			3
		6	3 9

Step 4

Multiply 6 thousands with 3.

Th	H	T	O
6	2	1	3
×			3
1	8	6	3 9

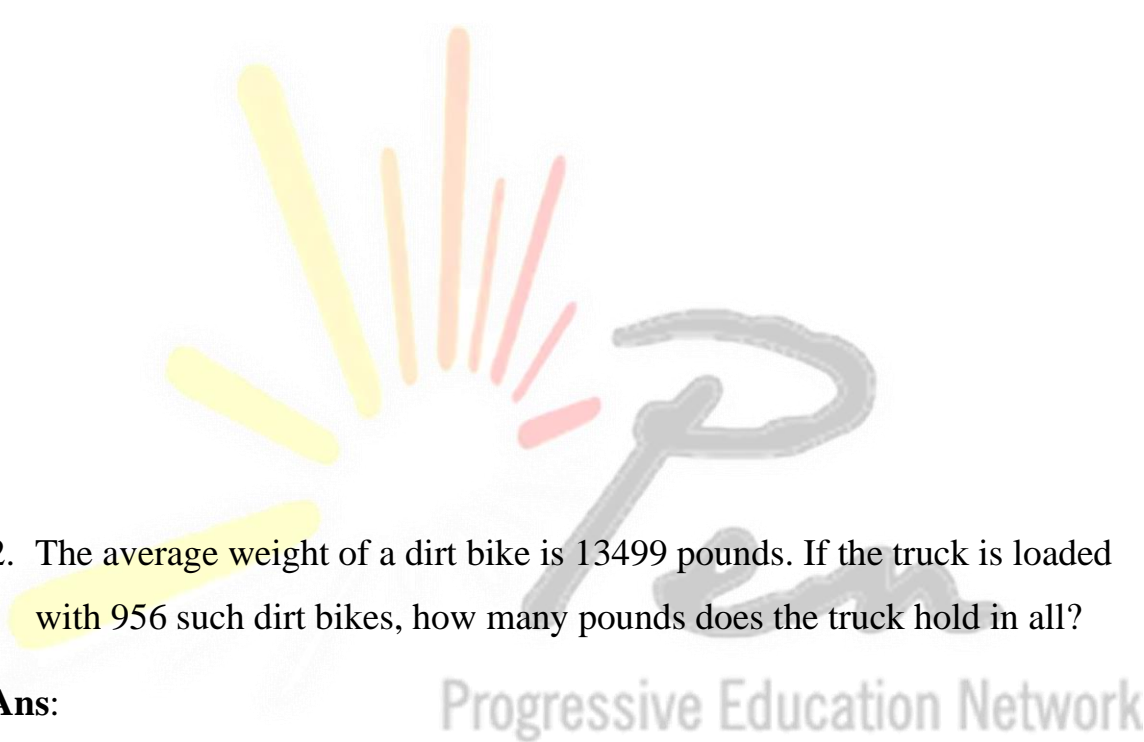
So, he will walk 18 639 steps in 3 days.

Activity # 8:

➤ **Solve the following word problems and answer the numerical in the expanded form, and with a place value chart.**

1. The annual preschool fee of Ali School is Rs. 12740. Mrs. Sara admits her triplets at the beginning of the school year. What are the total annual fees paid by Mrs. Sara?

Ans:

- 
2. The average weight of a dirt bike is 13499 pounds. If the truck is loaded with 956 such dirt bikes, how many pounds does the truck hold in all?

Ans:

Date: _____

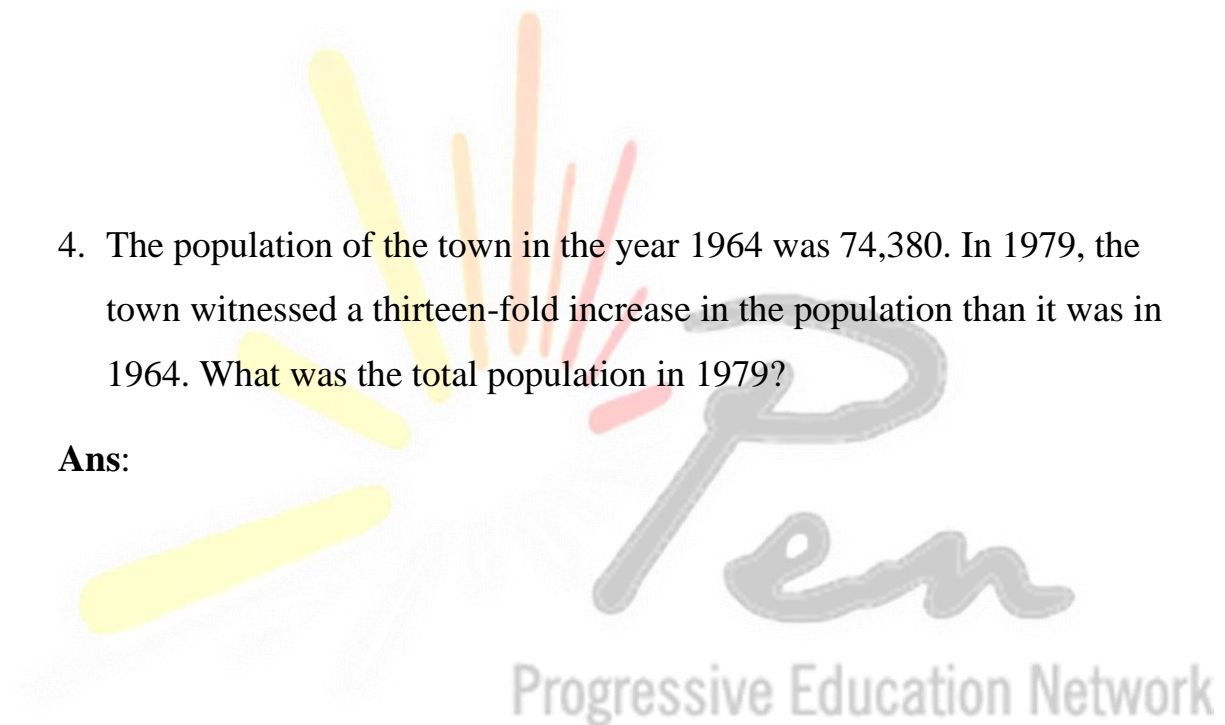
Day: _____

3. The average yield of wheat per acre is 23456 bushels, equivalent to 3,4360 pounds. How many pounds of wheat will 321 hectares of land produce on average?

Ans:

4. The population of the town in the year 1964 was 74,380. In 1979, the town witnessed a thirteen-fold increase in the population than it was in 1964. What was the total population in 1979?

Ans:



Date: _____

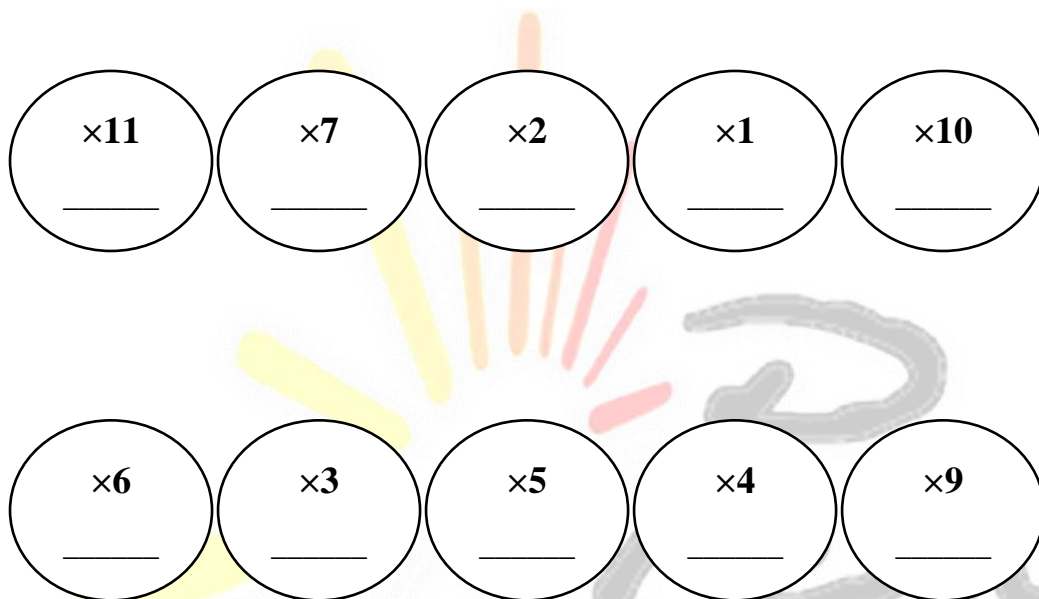
Day: _____

➤ **Solve the following.**

$631 \times 3 = \underline{\hspace{2cm}}$

$11088 \times 132 = \underline{\hspace{2cm}}$

- **Multiply the number 12 with each number given in the shape.**



$\times 11$ _____	$\times 7$ _____	$\times 2$ _____	$\times 1$ _____	$\times 10$ _____
$\times 6$ _____	$\times 3$ _____	$\times 5$ _____	$\times 4$ _____	$\times 9$ _____

Progressive Education Network

Division:



84 students from a school went to visit the river side. They were given a boat to visit. 6 students could visit the river side in one round. In how many rounds will all the students visit the river?



Dividing the total number of students by 6, find out the number of rounds taken by the boat, so that all the students will have a boat ride.



Number of students visited the river side = 84

Number of students who could visit the river side in one round = 6

Total number of rounds = $84 \div 6$

In 84, divide the highest place value digit '8' by 6.

Recall the table of 6 $1 \times 6 = 6$

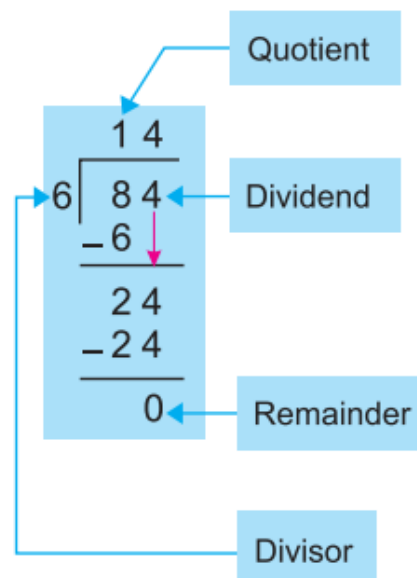
Write '1' as the quotient and write 6 below 8.

Subtract 6 from 8. $8 - 6 = 2$

Drop down 4 next to 2. Now, we have number 24.

$$4 \times 6 = 24$$

Write '4' at ones place in the quotient and write 24 below 24 and subtract. So, the remainder will be 0.



$$84 \div 6 = 14$$

So, in 14 rounds all the students will visit the river side.

Date: _____

Day: _____

Activity # 9:

➤ Solve the given equations.

$$13 \overline{)35744}$$

$$23 \overline{)44368}$$

$$61 \overline{)67812}$$

$$86 \overline{)10535}$$

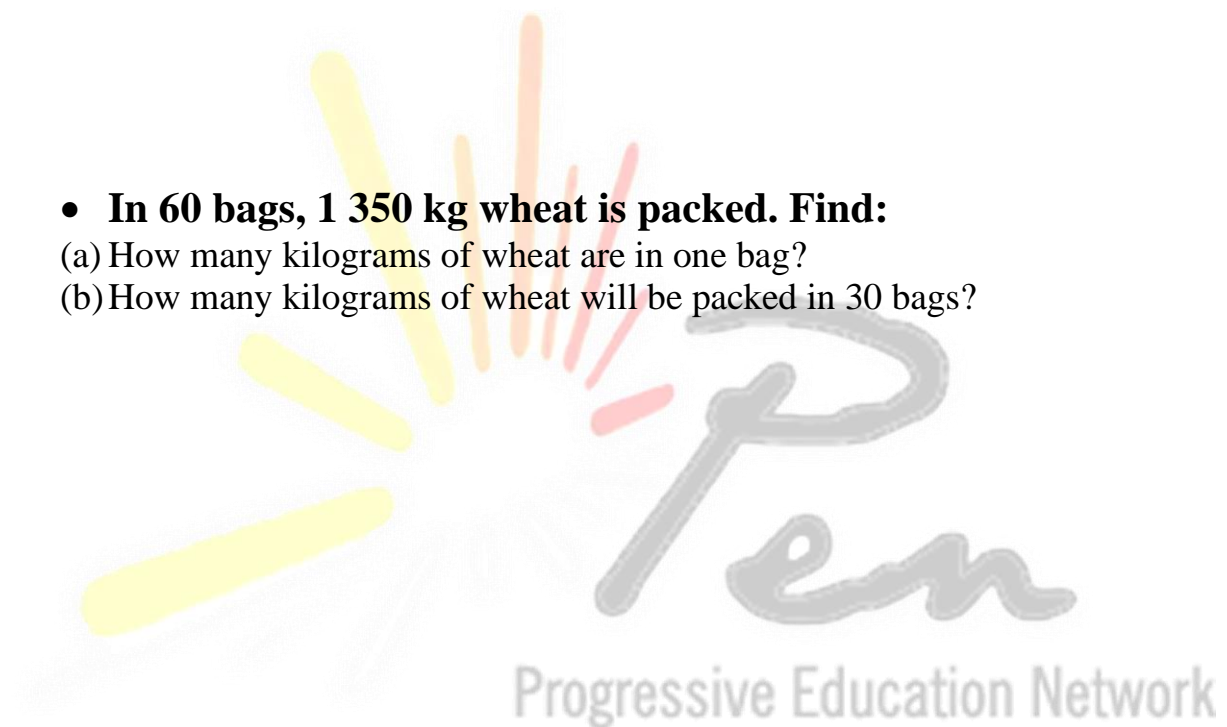
$$27 \overline{)33115}$$

$$43 \overline{)85831}$$

Activity # 10:

- If 3 036 pencils are packed in 11 boxes, then find out how many pencils are there in a box.

- **In 60 bags, 1 350 kg wheat is packed. Find:**
 - (a) How many kilograms of wheat are in one bag?
 - (b) How many kilograms of wheat will be packed in 30 bags?



Teaching Point: Ask students to write some 4-digit numbers and some 2-digit numbers. Divide a 4-digit number by a 2-digit number.



UNIT # 1: WHOLE NUMBERS

Topic: Patterns



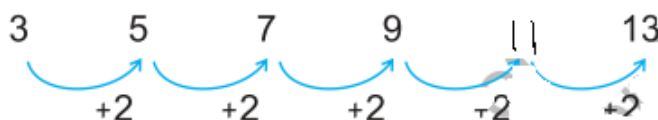
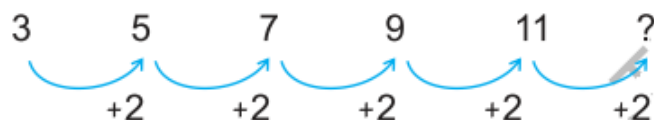
Ibrahim learns few new words with meanings every week. In the first week, he learnt 3 words. In the second week, he learnt 5 words, in the third week 7 words, in the fourth week 9 words and in the fifth week he learnt 11 words. If he keeps learning new words like this then find the number of words he would learn in the sixth week?



Write in order all the number of words that he learnt:

3, 5, 7, 9, 11, _____

Now, identify the rule in this order.



So, he would learn 13 words in the sixth week.

Ibrahim is learning with a special order. Here, the rule is "adding 2" means to get the next term, we add 2 in the previous term. This sequence is known as arithmetic sequence.

Key Fact

The rule of number pattern tells us how one member or number in this pattern is obtained from another member or number.



Try Yourself

Find the next two terms of this sequence.

5, 10, 15, 20, _____, _____

Activity # 11:

- Observe the given patterns, describe the rule, and write the pattern.

1. 16, 19, _____, _____, _____, _____, _____.

2. 8, 13, _____, _____, _____, _____, _____.

3. 25, 27, _____, _____, _____, _____, _____.

4. 49, 53, _____, _____, _____, _____, _____.

Date: _____

Day: _____

5. 28, 38, _____, _____, _____, _____, _____

- Observe the given chart and find at least .

1. 24, 34, 33, 43, 42, _____, _____, _____

2. 1, 1, 2, 3, 5, _____, _____, _____

3. 76, 69, 62, 55, 48, _____, _____, _____

4. 7, 21, 63, 189, 567, _____, _____, _____

5. 5, 10, 20, 35, 55, _____, _____, _____

6. 70, 69, 67, 64, 60, _____, _____, _____

7. 1, 4, 9, 16, 25, _____, _____, _____

Review Exercise

1. Fill in the blanks.

The smallest 3-digit number is _____.

The greatest 6-digit number is _____.

In number 39,201, the place value of digit 2 is _____.

Comparison of numbers always starts from the _____.

2. Write the following numbers in words.

85 689 = _____

95 202 = _____

35 901 = _____

35 567 = _____

3. Write the following numbers in expanded form. $26\ 869 =$ $33\ 783 =$ $72\ 321 =$ $69\ 742 =$ **4. Write the following in numerals.**

- Forty-one thousand five hundred eighty-six. _____
- Ninety-seven thousand three. _____
- Twelve thousand one hundred five. _____
- Twenty-four thousand five hundred six. _____

5. Write the place and place value of the coloured digits. $65031 =$ $46725 =$ $12514 =$ $52664 =$ **➤ Choose the correct options.**

1. The sum of 35 528 and 43 567 is equal to:

- (a) 79 095 (b) 85 089 (c) 55 025

2. Sara had 23 456 Rs. Her friend gave her Rs 14 121 more. Now, she has

Rs _____.

- (a) 32 525 (b) 37 577 (c) 52 889

3. When we subtract 75 210 from 92 654 then we will get

- (a) 17 444 (b) 34 567 (c) 36 434

4. In a zoo, there were 87 652 animals. If 22 567 animals are shifted to another zoo, then _____ animals will be left in the first zoo.

- (a) 88 958 (b) 23 568 (c) 65 085

Date: _____

Day: _____

5. There are 4500 books in 90 shelves. Each shelf contains equal number of 9 books. Find the number of books in a row.

- (a) 100 (b) 10 (c) 50

6. By dividing 1800 by 9, we will get _____.

- (a) 200 (b) 100 (c) 60

7. The next term in 88, 78, 68 is _____.

- (a) 48 (b) 54 (c) 46

8. If the price of one bag is Rs 300, then price of 20 bags will be.

- (a) Rs 5 500 (b) Rs 6 600 (c) Rs 4500

➤ **Solve the following.**

T.th Th H T O

6 7 3 2 0

5 6 4 3 2

+ _____

T.th TH H T O

3 3 1 8 7

-2 6 0 6 3

➤ Ali has Rs 21 785. He wants to buy a cell phone which costs 75 524. How much more amount does he need to buy a cell phone?

Date: _____

Day: _____

- **Solve the following.**

$$4\,290 \div 30 =$$

$$698 \times 2 =$$

- **A truck covers a distance of 1400 km in 7 hours. Find:**

(a) How much distance would it cover in one hour?

(b) How much distance would it cover in 4 hours?

- **Observe the given patterns, identify the rule, and write the next two terms.**

(a) 2, 4, 6, 8, 10 _____.

(b) 100, 90, 80, 70, 60 _____.

(c) 6, 12, 18, 24 _____.

(d) 105, 95, 85, 75 _____.

Date: _____

Day: _____

- Fill in each blank with the correct number to continue the pattern.

1. 35, _____, 55, 65, 75, 85, 95

2. 10, 25, 40, _____, 70, 85

3. 25, _____, 75, 100

4. 7, 14, 21, _____, 35, 42, 49

5. 100, 90, 80, _____, 60, 50, 40

6. 1, 3, 6, 10, _____, 21, 28, 36

7. 23, 26, _____, 32, 35, 38

8. 24, 20, 16, _____, 8, 4

9. 2, 4, 6, _____, 10, 12, 14

10. 8, 16, 24, 32, _____, 48, 56

- Observe the given chart and find at least five patterns. One pattern is highlighted for you as an example.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



UNIT #2: FACTORS AND MULTIPLES

Topic: Divisibility Rule

Learning Outcomes:

After completing this unit, you will be able to:

- Identify divisibility rules for 2, 3, 5 and 10.
- Use divisibility tests for 2,3,5 and 10 on numbers up to 5- digits.
- Identify and differentiate 2-digit prime and composite numbers.
- Find factors of a number up to 50.
- List the first ten multiples of a 1-digit number.
- Differentiate between factors and multiples.
- Factorize a number by using prime factors.
- Determine common factors of two or more 2-digit numbers.
- Determine common multiples of two or more 2-digit numbers.

Divisibility: Divisibility tests or division rules in maths help one to check whether a number is divisible by another number without the actual method of division. If a number is completely divisible by another number then the quotient will be a whole number and the remainder will be zero.

Divisibility Rule for 2:

Any number that ends in 0,2,4,6 or 8 can be divided by 2 to produce a whole number.

Key Terminology:

Prime Numbers
Composite Numbers
Divisibility Rule
Factors Multiples
Prime Factorization



12

446

7804

10506

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Divisibility Rule 3

A number is divisible by three if the sum of the digits is divisible by 3.

Examples: 75 $7+5=12$, $12 \div 3=4$ No Remainder

369 $3+6+9=18$, $18 \div 3=6$ No Remainder

Key Fact:

If a number is divisible by 2 and 5, then the number is also divisible by 10.

Divisibility Rule for 5:

If the digit at the one's place is 0 or 5 then the number is divisible by 5.

The last digit should be zero or 5.



25

315

7590

85155

Divisibility Rule for 10:

If the digit at the one's place is 0, then the number is divisible by 10.



100

1220

9550

84550

All these numbers are divisible by 10.

If a number is divisible by 2 and 5, then the number is also divisible by 10.

Activity # 12:

- **Tick (✓) the number according to the statement.**

1. Which number is divisible by 5?

5	2	3	1
---	---	---	---

2. Which number is divisible by 10?

8	20	4	5
---	----	---	---

- **Write 5 numbers that are completely divisible by 2,3 and 5.**

- **For each number on the left, place ✓ under the numbers it is divisible by.**

Number	Divisibility by.....			
	2	3	5	10
45				
369				
7,870				
1,976				
6,003				
136				



UNIT #2: FACTORS AND MULTIPLES

Topic: Factors and Multiples

When a number completely divides the other number then number is called factor of that number.

Multiple is the product when we multiply one number by another number.

Let's find out the factors of 7.

$$7 = 1 \times 7$$

The factors of 7 are 1 and 7.

$$7 = 7 \times 1$$

So, 7 is a prime number.

The numbers greater than 1 which have two factors, 1 and the number itself. Such numbers are called prime numbers.



Key Fact

Every number is a factor of itself and 1 is the factor of every number.



Let's find out the factors of 21.

$$21 = 1 \times 21$$

$$21 = 3 \times 7$$

$$21 = 7 \times 3$$

So, 1, 3, 7 and 21 are factors of 21.

$$21 = 21 \times 1$$

Therefore, 21 is a composite number

The numbers whose factors are more than two, called composite numbers.

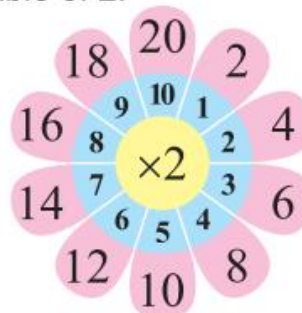


Find out the first 10 multiples of 2.

To find the first 10 multiples of 2, recall the table of 2.

So, the first 10 multiples of 2 are as follows:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20



Activity # 13:

- List the first five multiples for each number.

- 1) 9
- 2) 2
- 3) 4
- 4) 8
- 5) 5

- Circle the prime numbers.

	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- Write the factors for each number. Then, decide if it is prime or composite.

Numbers	Factors	Prime/ Composite
8		
25		
21		

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30		
5		
48		
19		
12		

- Find the factors of the given numbers.

1. 12

2. 32

3. 40

4. 18

- Find the first 10 multiples of the given numbers.

6

7

3



UNIT #2: FACTORS AND MULTIPLES

Topic: Prime Factorization

Let's find out the factors of 8.

$$8 = 1 \times 8$$

$$8 = 2 \times 4$$

2	8
2	4
2	2
	1

Let's find the prime factors of 8.

Prime factors of 8 = 2, 2, 2

2, 2 and 2 are the prime factors of 8.

Prime factorization of 8 = $2 \times 2 \times 2$



Do you know what is prime factorization?

The process of writing a number as a product of its factors is called factorization. The factorization in which all factors are prime is called prime factorization.



Find the factors of 30 that are prime.

Prime factors of 30 = 2, 3, 5

Prime factorization of 30 = $2 \times 3 \times 5$

2	30
3	15
5	5
	1

Common Prime Factors

When two or more numbers have the same prime factors, those factors are called the common prime factors.



Find the common prime factors of 18 and 27.

Prime factorization of 18 = $2 \times 3 \times 3$

Prime factorization of 27 = $3 \times 3 \times 3$

Common prime factors = 3, 3

2	18	3	27
3	9	3	9
3	3	3	3
	1		1

Find the common prime factors of 9, 15 and 12.

Prime factorization of 9 = 3×3

Prime factorization of 15 = 3×5

Prime factorization of 12 = $2 \times 2 \times 3$

Common prime factor = 3

Topic: Common Multiple

A number that is a multiple of two or more numbers is called the common multiple.

Find the common multiples of 3 and 5.

To find the common multiples of two or more numbers first, we write some multiples of these numbers, then we will encircle the common multiples.

Now we write the multiples of numbers, then encircle the common multiples.

Multiples of 3

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

Multiples of 5

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ...

The first common multiple of 3 and 5 is 15

- Write each number in prime factorization form.

1. 24

2. 39

3. 22

4. 21

- Find common prime factors of given numbers.

a) 6,18

b) 7, 21, 28

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c) 13,39

d) 5, 30, 12

- Find the first common multiple of the given numbers.

a) 12,22

b) 8,4,16

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Review Exercise**• Choose the correct options.**

1. 17 is the _____ number.
(a) composite (b) common (c) prime
2. If _____ of all the digits of a number is divisible by 3, then that number is divisible by 3.
(a) sum (b) difference (c) product
3. Prime factorization of 18 is:
(a) $2 \times 3 \times 3$ (b) $2 \times 2 \times 2 \times 3$ (c) $2 \times 2 \times 5$
4. The first common multiple of 4 and 8 is _____.
(a) 2 (b) 4 (c) 8

• Tick (✓) the given boxes in the table by using the divisibility rule.

Numbers	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 10
112				
580				
6312				
2132				
5409				

- Write prime numbers between 30 and 60.

- Write the first 12 composite numbers.

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- Find the factors and prime factors of given numbers.

(a) 38

(b) 25

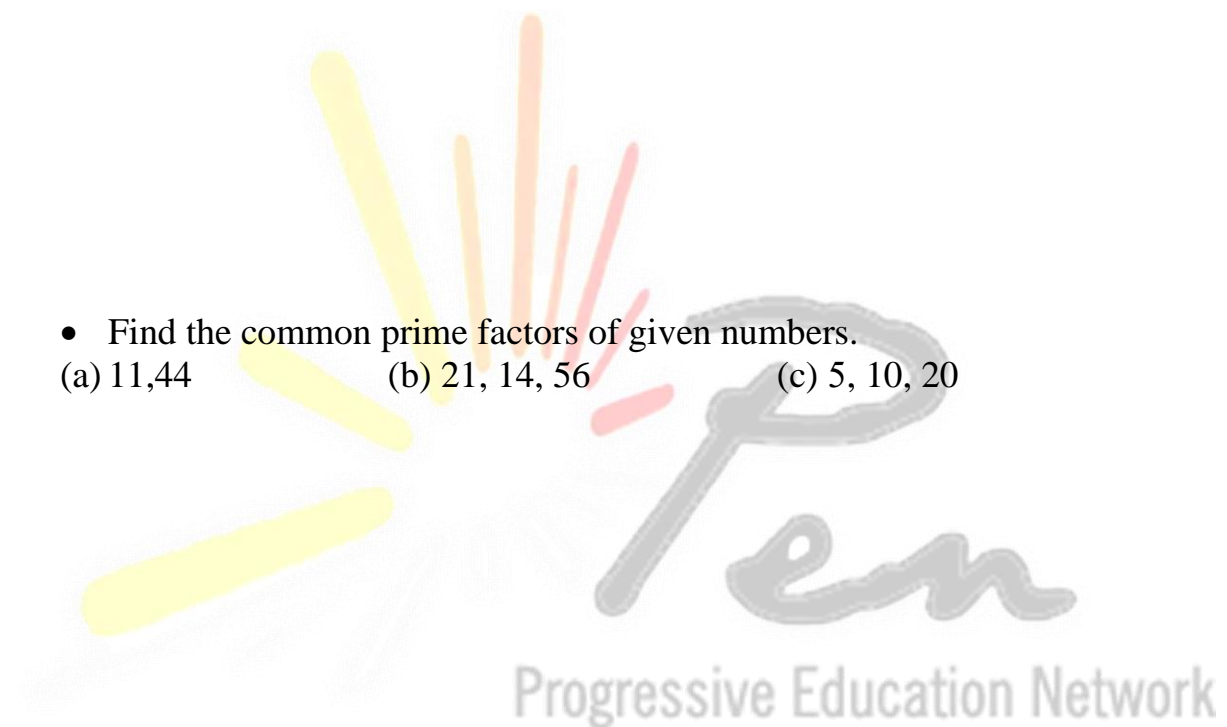
(c) 10

- Find the common prime factors of given numbers.

(a) 11, 44

(b) 21, 14, 56

(c) 5, 10, 20

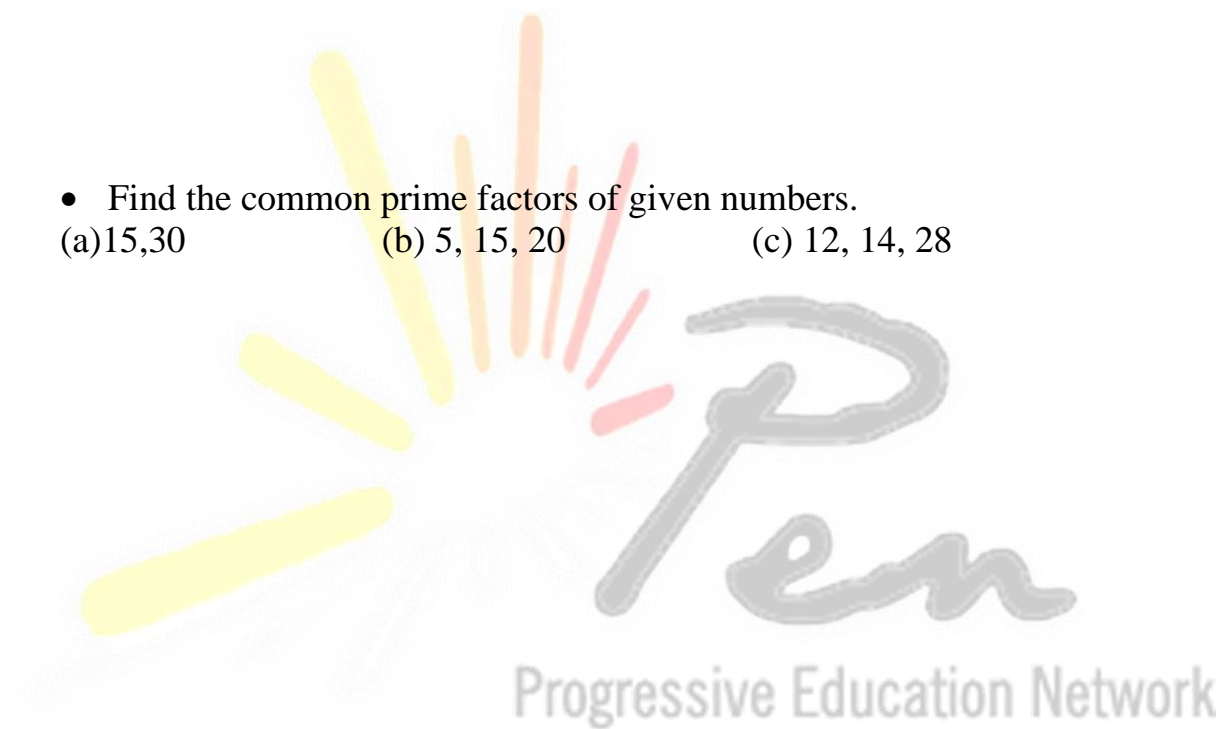


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- Find the first 6 multiples of the given numbers.
(a) 6 (b) 5 (c) 9

- Find the common prime factors of given numbers.
(a) 15, 30 (b) 5, 15, 20 (c) 12, 14, 28





UNIT # 3: FRACTIONS

Learning Outcomes

After completing this unit, you will be able to:

- Recognize like and unlike fractions.
- Compare two, unlike fractions by converting them to equivalent fractions with the same denominator.
- Simplify fractions to the lowest form.
- Identify (unit, proper, improper) fractions and mixed numbers.
- Convert improper fractions into mixed numbers and vice versa.
- Arrange fractions in ascending and descending order.
- Add fractions with like denominators.
- Subtract fractions with like denominators.
- Multiply a fraction (proper, improper) and mixed numbers.
- Multiply two fractions (proper, improper) and mixed numbers.
- Divide a fraction (proper, improper) and mixed numbers by a whole number.
- Analyze real-life situations involving fractions by identifying appropriate number operations.

Key Terminology:

Fractions, Like Fractions, Unlike Fractions, Unit Fractions, Conversion of Fractions, Equivalent Fractions, Improper Fractions, Mixed Numbers, Mixed Fractions

Topic: Like and Unlike Fractions

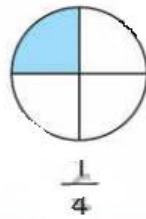
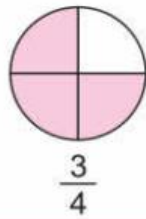
Like Fraction

Like fractions are fractions that have the same denominator.

Unlike Fraction

Unlike fractions have different numbers as their denominators.

We represent these fractions by using diagram.

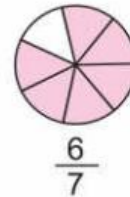
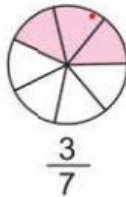
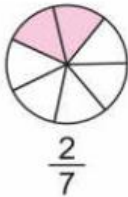


The denominators of both the fractions are same i.e., '4'. Therefore, $\frac{3}{4}$ and $\frac{1}{4}$ are like fractions.

Fractions with same denominators are called Like Fractions.

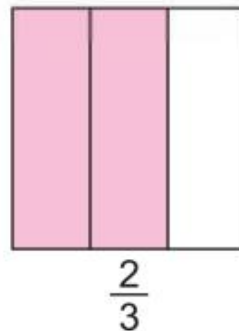
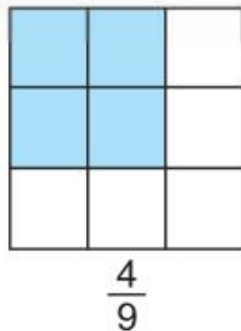


Now, consider $\frac{2}{7}$, $\frac{3}{7}$ and $\frac{6}{7}$.



As 7 is the denominator for all three fractions. Therefore, $\frac{2}{7}$, $\frac{3}{7}$ and $\frac{6}{7}$ are like fractions.

Let's consider $\frac{4}{9}$ and $\frac{2}{3}$.



The denominators for $\frac{4}{9}$ and $\frac{2}{3}$ are different.



Fractions with different denominators are called Unlike Fractions.

Therefore, $\frac{4}{9}$ and $\frac{2}{3}$ are unlike fractions

Activity # 14:

- **Separate the like and unlike fractions.**

1)	$\frac{7}{2}, \frac{4}{9}$ _____
2)	$\frac{4}{6}, \frac{7}{6}$ _____
3)	$\frac{2}{9}, \frac{10}{9}$ _____
4)	$\frac{1}{5}, \frac{3}{4}$ _____

Topic: Comparing Unlike Fractions

Fractions are to be called equivalent fractions, in which numerators and denominators are different but have the same value.

In like fractions, which fraction has greater numerator is called greater fraction.

$$\frac{1}{4} \text{ and } \frac{2}{3}$$

Common multiple of 3 and 4 is 12

$$\frac{1 \times 3}{4 \times 3} = \frac{3}{12} \quad \left| \quad \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

$$\frac{3}{12} < \frac{8}{12}$$

$$\frac{1}{4} < \frac{2}{3}$$

- Compare the fractions, and write $<$, $>$ in the boxes.

1)



$$\frac{1}{2}$$



$$\frac{10}{10}$$

2)



$$\frac{3}{3}$$



$$\frac{6}{12}$$

3)



$$\frac{10}{10}$$



$$\frac{10}{11}$$

Simplification of Fractions



Hamid solves 5 questions out of 10 i.e., $\frac{5}{10}$. Can we write this in the lowest form?

Common factor of 5 and 10 is 5. To write in the lowest form, divide numerator and denominator of the fraction by 5.



$$\frac{5}{10} = \frac{5 \div 5}{10 \div 5} = \frac{1}{2}$$

Now, there is no common factor of 1 and 2.

So, $\frac{1}{2}$ is the lowest form of $\frac{5}{10}$.

Let's write $\frac{12}{14}$ in the lowest form.

Common factor of 12 and 14 is 2.

Dividing their numerator and denominator by 2.

$$\frac{12}{14} = \frac{12 \div 2}{14 \div 2} = \frac{6}{7}$$

Now, there is no common factor of 6 and 7.

So, $\frac{6}{7}$ is the lowest form of $\frac{12}{14}$.



Key Fact

To write fraction in its lowest form, divide numerator and denominator with their common factor.

- Write the fractions in their simplest form.

$$\frac{14}{20} =$$

$$\frac{12}{16} =$$

$$\frac{11}{55} =$$

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Topic: Types of Fractions

Types of fractions	Definition	Example
Unit fractions	Fractions with numerator 1 .	$\frac{1}{7}$
Proper Fractions	Fractions in which the numerator is less than the denominator.	$\frac{2}{7}$
Improper Fractions	Fractions in which the numerator is more than or equal to the denominator.	$\frac{5}{3}$
Mixed Fractions	Mixed fractions consist of a whole number along with a proper fraction.	$8\frac{2}{3}$
Like Fractions	Fractions with the same denominators.	$\frac{1}{4}$ and $\frac{3}{4}$
Unlike Fractions	Fractions with different denominators.	$\frac{1}{3}$ and $\frac{3}{4}$
Equivalent Fractions	Fractions that have the same value after being simplified or reduced.	$\frac{6}{4}$ and $\frac{12}{8}$

Improper fraction:

Improper fractions do not show whole numbers separately and the numerator is bigger than the denominator.

Mixed Numbers:

Mixed numbers show whole numbers separate to fractions.

Improper Fractions

The numerator

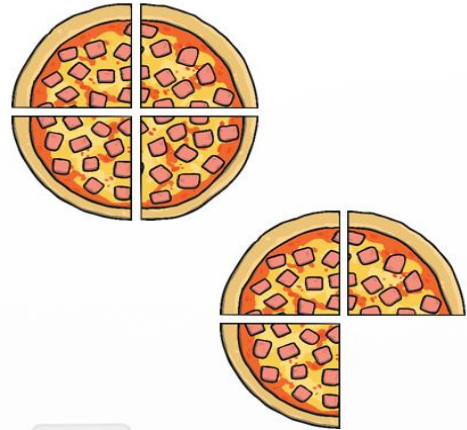
This shows us the number of pieces we have.

7

The denominator

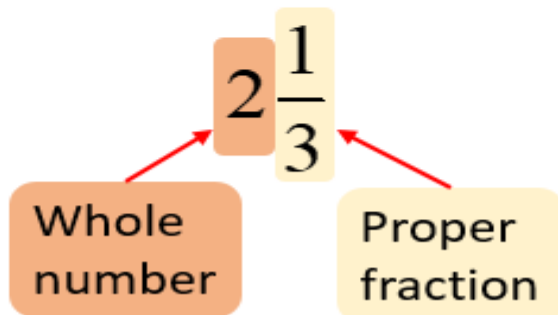
This shows us the number of parts we are dividing by.

4



Mixed Numbers

A mixed number is a number that consists of a whole number and a proper fraction.



Topic: Conversion of Fractions

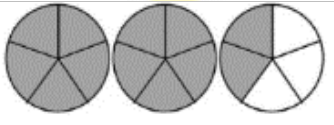
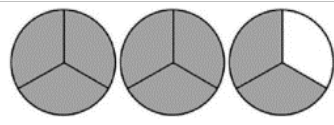
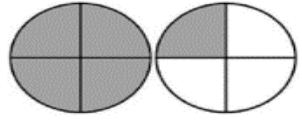
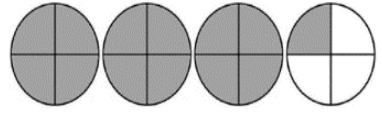
$$\text{Mixed Number} = \text{Quotient} \frac{\text{Remainder}}{\text{Divisor}}$$

Converting Improper Fraction to Mixed Number

$$\begin{array}{r} 3 \\ 4 \overline{) 13} \\ \underline{- 12} \\ 1 \end{array}$$

Improper fraction $\frac{13}{4} = 3\frac{1}{4}$ Mixed fraction

- Convert improper fractions into mixed numbers.



<p>1) $\frac{12}{5} =$</p> 	<p>2) $\frac{8}{3} =$</p> 
<p>3) $\frac{5}{4} =$</p> 	<p>4) $\frac{13}{4} =$</p> 

Mixed Number to Improper Fraction

$$2\frac{3}{4} = \frac{(4 \times 2) + 3}{4} = \frac{8 + 3}{4} = \frac{11}{4}$$

Mixed Number

Improper Fraction

 <p>$2\frac{3}{4}$</p>	=	 <p>$\frac{11}{4}$</p>
--	---	---

- **Convert mixed numbers into improper fractions.**

1) $1\frac{3}{5} =$

2) $3\frac{1}{4} =$

3) $2\frac{5}{6} =$

4) $1\frac{1}{6} =$

Topic: Ordering of Fractions

To write in order, first we convert these fractions into like fractions by method of equivalent fraction

Order Fractions from Least to Greatest

Using Common Denominators

Given Fractions : $\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{5}{6}$

Identify All the Denominators : 2, 3, 4, 6

Calculate the LCM of all the Denominators : 12

Rewrite each Fraction as an equivalent fraction with the denominator :

$$\frac{1}{2} \times \frac{6}{6} = \frac{6}{12}, \frac{2}{3} \times \frac{4}{4} = \frac{8}{12}, \frac{1}{4} \times \frac{3}{3} = \frac{3}{12}, \frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$$

Now, We have the Common Denominator which is 12.

Arrange Numerators in Increasing Order : $3 < 6 < 8 < 10$

Order the Fractions From Least to Greatest : $\frac{1}{4}, \frac{1}{2}, \frac{2}{3}, \frac{5}{6}$

- Write given fractions in ascending and descending order.

$$\frac{4}{9} \quad \frac{4}{3} \quad \frac{4}{5}$$

$$\frac{8}{7} \quad \frac{1}{3} \quad \frac{4}{5}$$

$$\frac{13}{3} \quad \frac{13}{2} \quad \frac{13}{5}$$

Addition of Fractions with Same Denominators

$$\frac{2}{4} + \frac{1}{4}$$

$$= \frac{2+1}{4}$$

$$= \frac{3}{4}$$

Addition of Fractions with Different Denominators

$$\frac{1}{3} + \frac{3}{5}$$

LCM of 3 and 5 = 15

$$= \frac{5+9}{15}$$

$$= \frac{14}{15}$$

• **Add the following fractions.**

<p>a</p> $\frac{4}{8} + \frac{7}{8}$	<p>b</p> $\frac{7}{8} + \frac{4}{8}$
<p>c</p> $\frac{1}{2}, \frac{2}{3} \text{ and } \frac{4}{7}$	<p>d</p> $\frac{3}{7} + \frac{2}{5} + \frac{6}{11}$

Subtracting Fractions

Same Denominators

Subtract the Numerators

$$\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$$

Simplify if possible

$$\frac{3 \div 3}{6 \div 3} = \frac{1}{2}$$

Different Denominators

Use equivalent fractions

$$\frac{5}{6} - \frac{7}{12} = \frac{5 \times 2}{6 \times 2} - \frac{7}{12} = \frac{10}{12} - \frac{7}{12}$$

Subtract the Numerators

$$\frac{10}{12} - \frac{7}{12} = \frac{3}{12}$$

Simplify if possible

$$\frac{3 \div 3}{12 \div 3} = \frac{1}{4}$$

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- Subtract the following fractions.

a) $\frac{1}{11}, \frac{7}{11}$	b) $\frac{7}{21}, \frac{15}{21}$
c) $\frac{2}{5}, \frac{4}{5}$	d) $\frac{12}{13}, \frac{7}{13}$

Solve Word Problems.

1. There was a pie left in the fridge. Danyal ate $\frac{1}{4}$ of the leftover pie. How much of a pie did he have?

2. There's $\frac{7}{8}$ kilograms of salt in the kitchen. Maria used $\frac{2}{15}$ of the salt when she was preparing dinner. How much salt did she use?

Multiplication of Fractions

$$\frac{3}{4} \times \frac{1}{2} = \frac{3 \times 1}{4 \times 2}$$

$$\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$$

- Solve the following.

1. $\frac{1}{2} \times \frac{1}{4} =$

2. $\frac{2}{3} \times \frac{3}{10} =$

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Multiply Mixed Numbers

1. Convert each mixed number into an improper fraction.
2. Multiply the fractions using canceling when possible.

Example:

$$\begin{aligned}
 &1\frac{3}{9} \times 2\frac{5}{6} \\
 &= \overset{2}{\cancel{12}} \times \frac{17}{\underset{1}{\cancel{6}}} \\
 &= \frac{34}{9} = 3\frac{7}{9}
 \end{aligned}$$

$$\begin{aligned}
 &3\frac{4}{5} \times 3\frac{1}{3} \\
 &= \frac{19}{\underset{1}{\cancel{5}}} \times \frac{\overset{2}{\cancel{10}}}{3} \\
 &= \frac{38}{3} = 12\frac{2}{3}
 \end{aligned}$$

Multiplying Mixed Numbers and Whole Numbers

1) $6\frac{2}{3} \times 9 =$ _____

2) $7 \times 1\frac{2}{9} =$ _____ k

3) $11 \times 2\frac{2}{7} =$ _____

4) $2\frac{1}{4} \times 8 =$ _____

Division of Fraction by a Whole Number

- Keep the first fraction the same.
- Change the division to a multiplication.
- Flip the second fraction.

$$\frac{4}{11} \div \frac{5}{9} = \frac{4}{11} \times \frac{9}{5} = \frac{36}{55}$$

a

$$6 \div \frac{1}{4} =$$

b

$$\frac{1}{5} \div 8 =$$

c

$$5 \div \frac{2}{5} =$$

d

$$4 \div \frac{2}{5} =$$

e

$$\frac{5}{6} \div 5 =$$

f

$$7 \div \frac{2}{3} =$$

Review Exercise

- Choose the correct options and fill in the blanks.

Write whether the following sets of fractions are like or unlike.

1) $\frac{6}{9}, \frac{3}{5}, \frac{1}{7}$ _____

2) $\frac{2}{3}, \frac{1}{3}, \frac{4}{3}$ _____

3) $\frac{8}{3}, \frac{6}{4}, \frac{7}{2}$ _____

4) $\frac{5}{12}, \frac{1}{12}, \frac{3}{12}$ _____

5) $\frac{4}{11}, \frac{1}{11}, \frac{8}{11}$ _____

6) $\frac{2}{5}, \frac{5}{2}, \frac{9}{4}$ _____

- 1) Identify the set of unlike fractions from the following.

a) $\frac{4}{7}, \frac{7}{9}, \frac{3}{8}$

b) $\frac{1}{9}, \frac{3}{9}, \frac{4}{9}$

c) $\frac{6}{5}, \frac{8}{5}, \frac{2}{5}$

d) $\frac{6}{8}, \frac{9}{8}, \frac{7}{8}$

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Match the following.

$$\frac{3}{9}$$

• proper •

$$\frac{7}{6}$$

$$\frac{8}{5}$$

$$\frac{4}{7}$$

• improper •

$$\frac{4}{10}$$

$$\frac{9}{4}$$

1) Which of the following is a proper fraction?

a) $\frac{6}{7}$

b) $\frac{3}{2}$

c) $\frac{9}{5}$

d) $\frac{7}{3}$

2) Which of the following is not a proper fraction?

a) $\frac{2}{5}$

b) $\frac{8}{3}$

c) $\frac{3}{8}$

d) $\frac{1}{9}$

• Compare the fractions, and write $<$, $>$ or $=$ in the blanks.

1)



$$\frac{1}{2}$$



$$\frac{2}{3}$$

2)



$$\frac{6}{7}$$



$$\frac{6}{10}$$

3)



$$\frac{2}{2}$$



$$\frac{11}{11}$$

- Write the given fractions in an ascending and descending order.

1. $\frac{1}{8}, \frac{1}{5}, \frac{1}{2}, \frac{1}{10}, \frac{1}{6} =$

2. $\frac{8}{9}, \frac{3}{9}, \frac{1}{9}, \frac{9}{9}, \frac{7}{9} =$

3. $\frac{5}{11}, \frac{5}{15}, \frac{5}{7}, \frac{5}{9}, \frac{1}{30} =$

4. $\frac{3}{8}, \frac{6}{8}, \frac{2}{8}, \frac{4}{8}, \frac{1}{8} =$

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- **Solve the following fractions.**

$$\boxed{1} \quad \frac{3}{7} + \frac{2}{7}$$

$$\boxed{2} \quad \frac{5}{8} + \frac{1}{8}$$

$$\boxed{3} \quad \frac{2}{6} + \frac{3}{6}$$

$$\boxed{4} \quad \frac{1}{4} + \frac{3}{4}$$

$$\boxed{5} \quad \frac{5}{6} + \frac{1}{6}$$

$$\boxed{6} \quad \frac{3}{9} + \frac{2}{9}$$

$$\boxed{7} \quad \frac{4}{6} - \frac{2}{6}$$

$$\boxed{8} \quad \frac{9}{10} - \frac{3}{10}$$

$$\boxed{9} \quad \frac{6}{12} - \frac{3}{12}$$

$$\boxed{10} \quad \frac{2}{8} - \frac{1}{8}$$

$$\boxed{11} \quad \frac{8}{11} - \frac{2}{11}$$

$$\boxed{12} \quad \frac{3}{4} - \frac{1}{4}$$

- Solve the following.

$$\frac{1}{2} \times \frac{5}{4}$$

$$= \text{—}$$

$$\frac{1}{6} \div \frac{8}{11}$$

$$= \text{—}$$

$$\frac{1}{3} \div \frac{13}{9}$$

$$= \text{—}$$

$$\frac{13}{4} \div \frac{1}{2}$$

$$= \text{—}$$

$$\frac{17}{6} \div \frac{3}{5}$$

$$= \text{—}$$

$$\frac{1}{4} \times \frac{5}{3}$$

$$= \text{—}$$

$$\frac{11}{2} \div \frac{1}{2}$$

$$= \text{—}$$

$$\frac{4}{3} \div \frac{11}{12}$$

$$= \text{—}$$

$$\frac{1}{3} \times \frac{20}{9}$$

$$= \text{—}$$

$$\frac{13}{7} \times \frac{14}{11}$$

$$= \text{—}$$

$$\frac{10}{3} \times \frac{11}{6}$$

$$= \text{—}$$

$$\frac{1}{2} \div \frac{1}{2}$$

$$= \text{—}$$

$$\frac{14}{9} \times \frac{7}{10}$$

$$= \text{—}$$

$$\frac{15}{8} \times \frac{7}{6}$$

$$= \text{—}$$

$$\frac{3}{2} \times \frac{4}{9}$$

$$= \text{—}$$

- **Solve the following.**

- a) This morning Miguel bought 1 pound of anchovies. In order to eat with his family, he used $\frac{3}{4}$ of a pound. How much does he have left in the refrigerator?

- b) Maria spent $\frac{1}{3}$ of the money her grandparents gave her on an adventure book. She also spent $\frac{1}{9}$ of the money on a bag of candy. How much money did she spend?



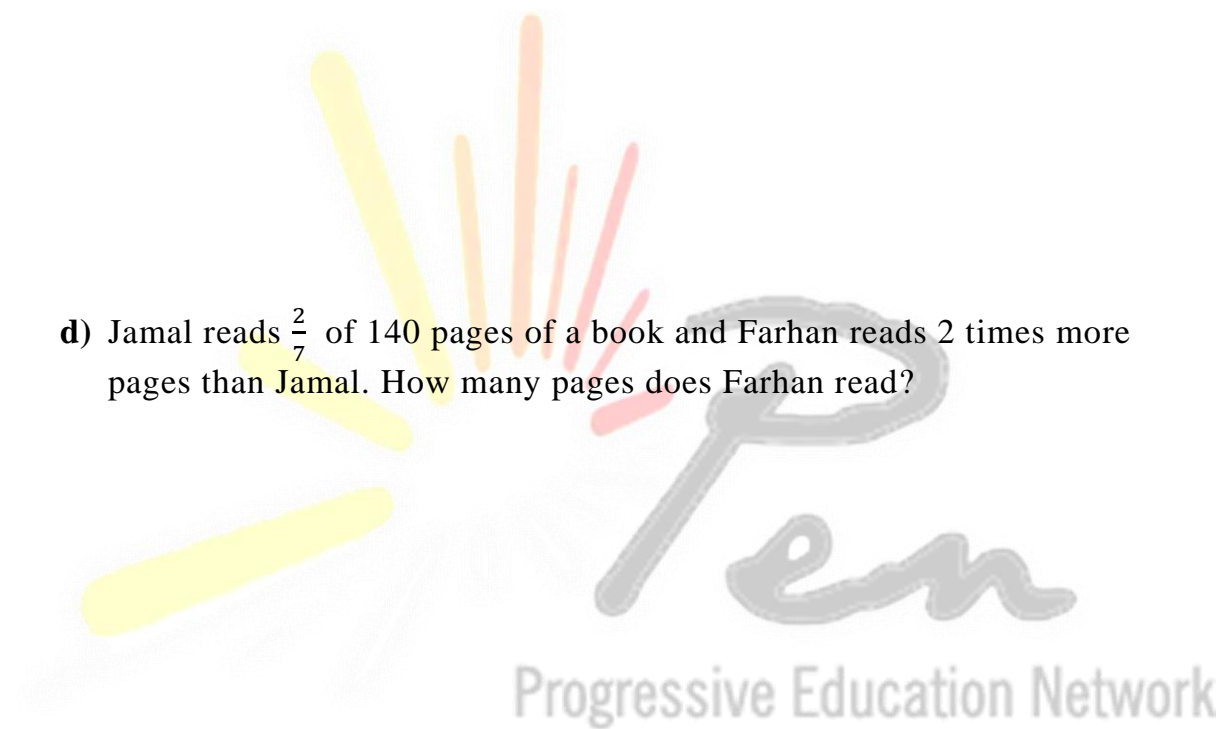
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- c) Hania has $12\frac{4}{7}$ m of ribbon. She wants to cut it into 8 equal pieces. What will be the length of each piece?

- d) Jamal reads $\frac{2}{7}$ of 140 pages of a book and Farhan reads 2 times more pages than Jamal. How many pages does Farhan read?





UNIT # 4: DECIMALS

Learning outcomes

After completing this unit, you will be able to:

- Recognize a decimal number as an alternative way of writing a fraction.
- Express a decimal number as a fraction whose denominator is 10, 100 or 1000.
- Identify and recognize the place value of a digit in decimals (up to 3 decimal places).
- Convert a given fraction into a decimal if:
 - The denominator of the fraction is 10, 100 or 1000.
 - The denominator of the fraction is not 10, 100 or 1000 but can be converted into 10, 100 or 1000.
- Convert a decimal (up to 3-decimal places) into fraction.
- Add and subtract 3-digit numbers (up to 2 decimal places).
- Multiply a 2-digit number (up to 1-decimal place) by 10, 100 and 1000.
- Multiply a 2-digit number with 1-decimal place by a 1-digit number.
- Solve real life situations involving 2-digit numbers with 1-decimal place using appropriate operations.
- Round off a whole number to the nearest 10, 100 and 1000.
- Round off decimal (with 1 or 2-decimal places) to the nearest whole number.

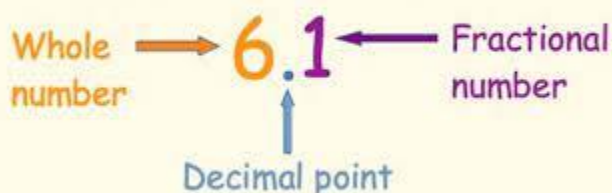
Key Terminology:

Fractions, Decimals, Denominator, Tenths, Hundredths, Whole Numbers, Round Off, Decimal Places, Thousandths

Topic: Decimal Numbers

The Word decimal comes from Latin word Decimus that means the tenth part.

Example of a decimal number



Date: _____

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Tenths

1 out of 10 parts = $\frac{1}{10}$ (fraction)

= 0.1 (Decimal)

We can write it as 0.1 and read it as 'zero point one'

Decimal is a fraction with a denominator of 10, 100 and 1000.

Hundredths

1 out of 100 parts = $\frac{1}{100}$ (fraction)

= 0.01 (Decimal)





We can write it as 0.01 and read it as 'zero point zero one'

Thousandths

1 out of 1000 parts = $\frac{1}{1000}$ (fraction)

= 0.001 (Decimal)

We can write it as 0.001 and read it as 'zero point zero zero one'

Model				
Place Name	Whole	Tenths	Hundredths	Thousandths
Fraction	$\frac{1}{1}$	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
Decimal	1.0	0.1	0.01	0.001
Trade-in Value		Ten tenths make one whole.	Ten hundredths make one tenth.	Ten thousandths make one hundredth.

Place Value of Digits in Decimals

The first digit after the decimal represents the tenths place. The next digit after the decimal represents the hundredth place. The remaining digits continue to fill in the place values until there are no digits left.

Number	Place Value (of the red digit)	Value of the Digit (of the red digit)
3.145	Ones	3
3.145	Tenths	$\frac{1}{10} = 0.1$
3.145	Hundredths	$\frac{4}{100} = 0.04$
3.145	Thousandths	$\frac{5}{1000} = 0.005$

Activity # 15:

- Write the statements in decimals form.

- 1 out of 10 parts
- 4 out of 10 parts
- 5 out of 10 parts
- 15 out of 100 parts
- 25 out of 100 parts

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6. 83 out of 100 parts

7. 99 out of 100 parts

8. 135 out of 1000 parts

9. 122 out of 1000 parts

• **Write the value of the coloured digits.**

1. 1.56

2. 45.987

3. 321. 15

4. 4.019

• **Fill in the blanks.**

1. 7.55

“7” is at one’s place,
The place value of 7 is:
 $7 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

2. 25.8

“2” is at tens place,
The place value of 2 is:
 $2 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

3. 82. 391

“9” is at hundredths place,

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The place value of 9 is

$$9 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

4. 26. 352

“2” is at thousandths place,

The place value of 2 is

$$2 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

To convert the fraction into decimals, divide the numerator by the denominator.

To convert a decimal to a fraction, place the decimal number over its place value.

Conversion of a fraction into a decimal and decimal into a fraction

To convert fractions with denominator of 10, 100 or 1000

- Count the number of zeroes in the denominator.
 - Count the digit in the numerator from right to left.
- Put the decimal point according to the number of zeros.

Decimal number is also Known as decimal fraction.

Example 1: converting a simple fraction to a decimal

Convert $\frac{1}{2}$ to a decimal.

1 If needed convert the mixed number to an improper fraction.

There is no need to convert as the fraction is already in the correct form.

2 Divide the numerator by the denominator.

$$1 \div 2$$

Using the 'bus stop method':

$$\begin{array}{r} 0.5 \\ 2 \overline{) 1.0} \end{array}$$

3 State the answer clearly in the form 'fraction'='decimal'.

$$\frac{1}{2} = 0.5$$

- Represent these into decimal.

Fraction	$\frac{3}{1000}$	$\frac{6}{10}$	$\frac{2907}{1000}$
Decimal			

Example 1: converting a simple decimal to a fraction (without simplifying)

Convert 0.3 to a fraction

1 Write the decimal as a fraction by dividing by 1

$$0.3 \div 1$$

$$\frac{0.3}{1}$$

2 Convert the numerator to an integer (by multiplying by a multiple of 10). You need to do the same to the denominator to create an equivalent fraction

The lowest value in the number 0.3 is the 3 tenths.

This means if we multiply 0.3 by 10 we get the integer 3.

If you multiplied the numerator by 10 you would change the value of the whole fraction so you also need to multiply the denominator by 10. See below:

work

$$\frac{0.3}{1}$$

$$\frac{0.3 \times 10}{1 \times 10}$$

$$\frac{3}{10}$$

3 Simplify the fraction if possible

$\frac{3}{10}$ cannot be simplified as 3 and 10 do not have a common factor (which is not 1)

4 Clearly state the answer showing the 'decimal' = 'fraction'

$$0.3 = \frac{3}{10}$$

- Convert the following decimal into fractions.

1) 1.2

2) 3.05

3) 7.89

4) 5.4

5) 7.15

6) 10.12

The logo for the Progressive Education Network (PEN) features a stylized 'PEN' in a grey, handwritten font. To the left of the text is a semi-circle of ten colorful rays in shades of yellow, orange, and red. Below the 'PEN' text, the words 'Progressive Education Network' are written in a smaller, grey, sans-serif font.

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Topic: Addition and Subtraction of Decimals

- 1) Line up the decimal points vertically. Fill in any 0's where necessary.
- 2) Add or subtract the numbers as if they were whole numbers.
- 3) Place the decimal point in the sum or difference so that it lines up vertically with the numbers being added or subtracted.

Addition of Decimals

To add the decimals, always write the value at the same place in a column. Add ones in ones, tenths in tenths and hundredths in hundredths.

Subtraction of Decimals

To subtract the decimals, always write the value at the same place in a column. Subtract ones in ones, tenths in tenths and hundredths in hundredths.

Addition

$$\begin{array}{r}
 15.00 \\
 + 12.56 \\
 \hline
 27.56
 \end{array}$$

Subtraction

$$\begin{array}{r}
 \overset{\textcircled{9}}{5} \overset{\textcircled{20}}{0} \overset{\textcircled{10}}{0} \\
 \cancel{8}. \cancel{0} \cancel{0} \\
 - 2.25 \\
 \hline
 3.75
 \end{array}$$

Date: _____

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- **Add the following.**

a. 9.11, 8.03	b. 43.1, 12.7
c. 5.69, 2.98	d. 49.3, 2.16

- **Subtract the following.**

e. 9.80, 1.09	f. 78.9, 7.84
---------------	---------------

Date: _____

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g. 7.69, 2.86

h. 5.06, 2.76

• **Find the missing numbers.**

1) $7.1 + \underline{\hspace{2cm}} = 8.8$

2) $8.0 + \underline{\hspace{2cm}} = 12.7$

3) $\underline{\hspace{2cm}} + 3.6 = 13.4$

4) $\underline{\hspace{2cm}} + 3.9 = 3.9$

5) $0.95 - 0.71 = \underline{\hspace{2cm}}$

6) $4.7 - 0.8 = \underline{\hspace{2cm}}$

7) $2.1 - 1.0 = \underline{\hspace{2cm}}$

8) $6.7 - 3.7 = \underline{\hspace{2cm}}$

9) $0.66 - 0.58 = \underline{\hspace{2cm}}$

10) $5.5 - 0.41 = \underline{\hspace{2cm}}$

• **Read and answer the questions.**

1) Each batch of cookie mix needs 0.4 cups of sugar, and each batch can make 16 cookies. If Sara is making 4 batches of cookies, how much sugar does she need?

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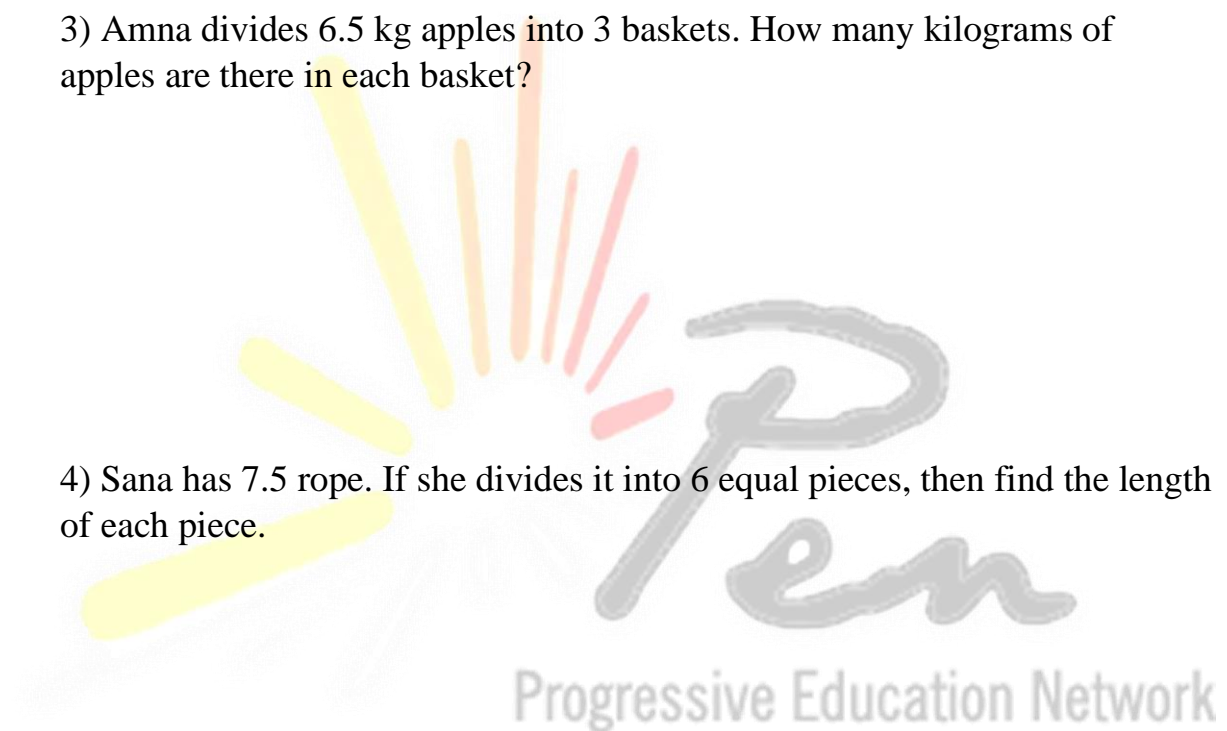
Day: _____

2) The bag of cookies is 8.9 oz. what is the weight of 2.5 batches of cookies?

3) Amna divides 6.5 kg apples into 3 baskets. How many kilograms of apples are there in each basket?

4) Sana has 7.5 rope. If she divides it into 6 equal pieces, then find the length of each piece.

5) Ali solves 6 questions of Mathematics in 8.5 minutes. How long does he take to solve 1 question?



Topic: Multiplication and Division of Decimal

Multiplication of Decimals with 10, 100 and 1000

- To multiply any decimal number by 10, we move the decimal point 1 place to the right.
- To multiply any decimal number by 100, we move the decimal point 2 place to the right.
- To multiply any decimal number by 1000, we move the decimal point 3 place to the right.

Multiplication of Decimals with 1-digit number

In multiplication of decimals, the place of decimal point in product is equal to the sum of decimal places of multiplicand and multiplier.

$$\begin{array}{r}
 0.4 \\
 \times 0.6 \\
 \hline
 0.24
 \end{array}$$

0.4 → 1 digit after decimal point
 × 0.6 → 1 digit after decimal point
 0.24 → Total number of digits after decimal point (1 digit + 1 digit = 2 digits)

- Solve the following

$$\begin{array}{r}
 2.3 \\
 \times 2 \\
 \hline
 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 0.8 \\
 \times 3 \\
 \hline
 \\
 \hline
 \end{array}$$

Topic: Division of Decimals

Division of Decimals by Whole Numbers

Example 1

a. $8.4 \div 4$

Solution

a.

$$\begin{array}{r}
 2.1 \quad \leftarrow \text{Quotient} \\
 4 \overline{) 8.4} \quad \leftarrow \text{Dividend} \\
 \underline{-8} \\
 04 \\
 \underline{-4} \\
 0
 \end{array}$$

Therefore, $8.4 \div 4 = 2.1$

a. $1.8 \div 9$

b. $6.4 \div 4$

c. $2.7 \div 3$

d. $8.4 \div 6$

Topic: Estimation**Rounding off to the nearest 10:**

In order to round to the nearest 10, Check if the number is a multiple of 10, if it is, do nothing. If the one digit is less than 5, round down to the previous 10. If the one digit is 5 or more than 5, round up to the next 10.

Rounding 62 to the nearest 10

1. $2 < 5$, so **add nothing** to 6
2. **Replace 2** with 0
3. The **rounded off result** is 60

Rounding 67 to the nearest 10

1. $7 > 5$, so **add 1** to 6
2. **Replace 7** with 0
3. The **rounded off result** is 70

Rounding off to the nearest 100:

E.g.

Round 123 to the nearest 10.

The number to the right of the tens column is 3 which is less than 5 so we round down.

So 123 rounded to the nearest 10 is **120**.

Rounding off to the nearest 1000:

To round to the nearest thousand, we look at the last three digits. If these digits are 500 or greater, then we round the thousand digit up, and if they are less than 500, then we round down, keeping the thousand's digit the same. As below in the example:

$$3100 \approx 3000$$

Activity # 16:

- Round off the following whole numbers to the nearest 10, 100, and 1000:

Numbers	10	100	1000
a) 9971			
b) 5467			
c) 3598			
d) 4545			
e) 1211			

Estimation means to find a number that is the nearest to the original number but not exact.

Topic: Round off decimals to the nearest whole Number

We follow the same rules to round off any decimals to the nearest whole number.

- If the digit at the right side of the decimal point is less than 5, then write the digit at the ones place as it is and remove the decimal point and the digit at tenth place.
- If the digit at the right side of the decimal point is equal to 5 or greater than 5, then add “1” to the digit at one’s place and remove the decimal point and the digit at tenth place.

Example

In 2.8, the digit after the decimal point is greater than 5 so, we add 1 to the digit at the ones place.

$$\therefore 2.8 \approx 3$$

- **Round off the following decimal fractions to the nearest whole number:**

a) 5.61 _____

b) 54.2 _____

c) 5.5 _____

d) 8.20 _____

e) 86.87 _____

f) 12.7 _____

Review Exercise

- **Choose the correct options.**

1. Decimal is a fraction with the denominator is the power of _____.
(a) 10 (b) 2 (c) 0
2. To add the decimal always _____ ones in ones, tenths in tenths and hundreds in hundreds.
(a) add (b) subtract (c) multiply
3. When we multiply any decimal by 100, we move the decimal _____ place to the right.
(a) 1 (b) 2 (c) 0
4. _____ means to find a number that is nearest to the original number but not exact.
(a) Decimal (b) Fraction (c) Round off

- **Represent the following in decimals.**

$$\frac{3}{5}$$

$$2\frac{3}{5}$$

$$\frac{5}{3}$$

Solution

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- **Solve the following.**

1. $6.03 + 5.56$

2. $6.19 - 4.21$

3. 8.9×200

4. $5.1 \div 3$

Solution

- **Round off the decimals to the nearest whole number.**

1. $3.57 =$ _____

2. $8.45 =$ _____

- The length of the pencil is 3.41m and length of another pencil is 7.56 m.
- What will be the total length?
- What is the difference between the length of the wires?
- The mass of 4 books is 1.8 kg. What will be the mass of 1 book?

Solution

- **Round off the Whole number to the nearest 10, 100, 1000.**

a. $3.57 =$ _____ , _____ , _____

b. $8.45 =$ _____ , _____ , _____



UNIT # 5: MEASUREMENT

Topic: Length

Learning Outcomes:

After completing this unit, you will be able to:

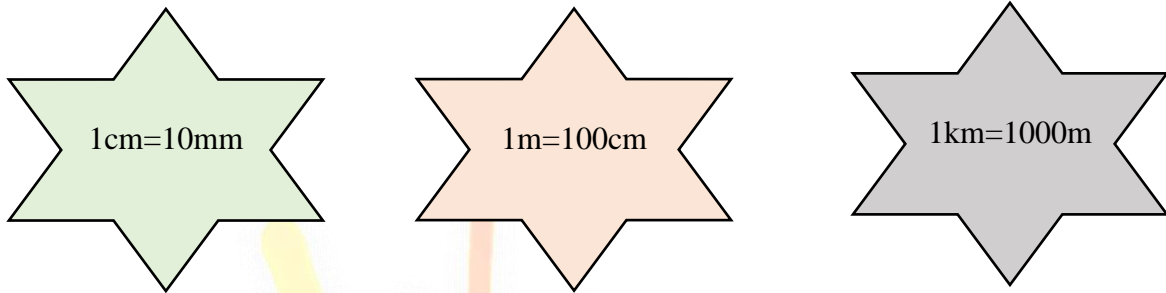
- Use standard metric units to measure the length of different objects.
- Convert larger into smaller metric units (2-digit number with one decimal place):
 - kilometers into meters
 - meters into centimeters
 - centimeters into millimeters
- Add and subtract measures of length in same units.
- Use standard metric units to measure the mass of different objects.
- Convert larger into smaller metric units (2-digit numbers with one decimal place):
 - kilograms into grams
 - grams into milligrams
- Add and subtract measures of mass in same units.
- Use standard metric units to measure the capacity of different containers.
- Convert larger into smaller metric units (2-digit numbers with one decimal place) liters into milliliters.
- Add and subtract measure of capacity in same units.
- Solve real life situations involving conversion, addition and subtraction of measures of length, mass and capacity.

Key Terminology:

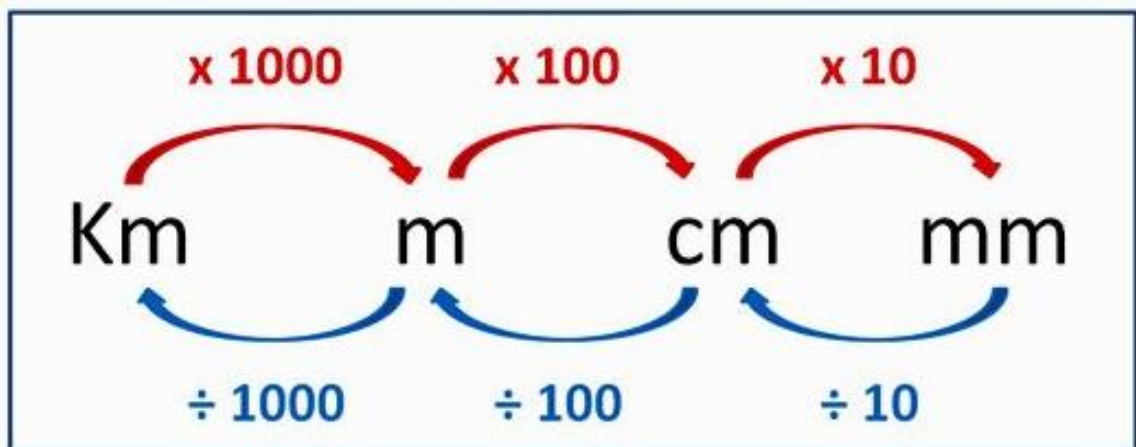
Length, Kilometre, Metre, Centimetre, Millimetre, Mass, Kilogram, Gram, Capacity, Litre, Millilitre

Length

The measurement of something from one end to the other is called its length. The standard unit of length is a meter. We use different units to measure different lengths. Millimeters, centimeters, and decimeters are the smaller units used to measure smaller distances, the meter is used to measure average distances, whereas units like kilometers are used to measure longer distances. All these units are related to each other.



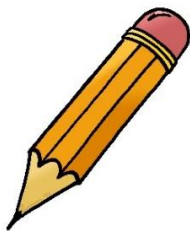
Conversion of units of Length



Activity # 17:

- Tick the correct units of length.

(a)



m/cm

(b)



m/cm

(c)



m/km

Date: _____

Day: _____

Kilometres to Metres

Convert 45km into 7 metre

Solved Example

$$\begin{aligned}45\text{km } 7\text{m} &= 45\text{km} + 7\text{m} \\&= 45 \times 1000\text{m} + 7\text{m} \\&= 45000\text{m} + 7\text{m} \\&= 45007\text{m}\end{aligned}$$

Metres to Centimetres

Convert 7m into centimetre

Solved Example

$$\begin{aligned}7\text{m} &= 7 \times 100\text{cm} \\&= 700\text{ cm}\end{aligned}$$

- **Convert these units of length.**

(a) 15 km into m

(b) 4.2 cm into mm

(c) 60m 78cm into cm

(d) 55 cm 2 mm into mm

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Date: _____

Day: _____

- **Solve the given units of length.**

$$42\text{km} + 35\text{km} =$$

$$49\text{m} - 10\text{m} =$$

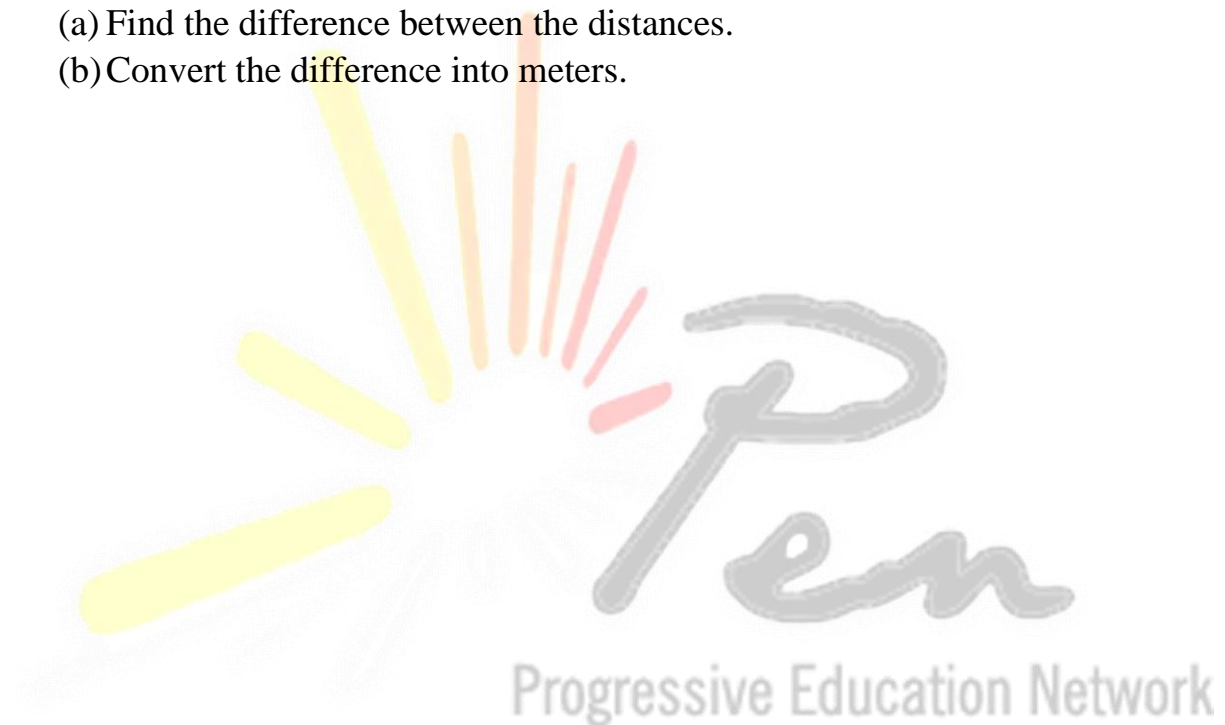
$$74\text{km } 122 \text{ m} - 13\text{m} =$$

$$21 \text{ m } 16\text{cm} + 20 \text{ m } 14\text{cm} =$$

Key Fact:

To add/subtract the units of length always add/subtract the same units.

- Tahir has two books. The length of one book is 38 m 87cm and the length of the other book is 52 m 13cm. What will be the total length
- Sara covers a distance of 4km 610 m to go from school to home. She covers distance of 1 km 215 m to go from home to Masjid.
 - (a) Find the difference between the distances.
 - (b) Convert the difference into meters.

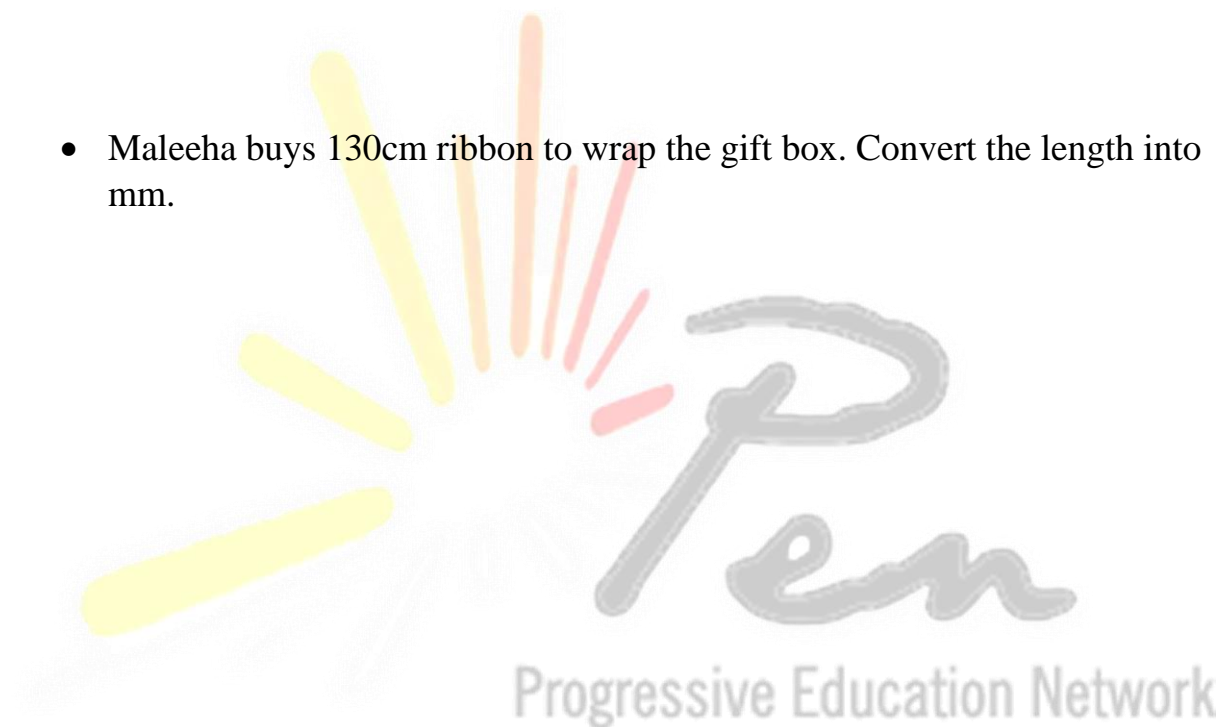


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- The length of Afaq's room is 10m 55 cm and his sister's room is 20 40 cm.
(a) What will be the total length of both rooms in cm?
(b) What is the difference between the length of both rooms?

- Maleeha buys 130cm ribbon to wrap the gift box. Convert the length into mm.





UNIT # 5: MEASUREMENT

Topic: Mass

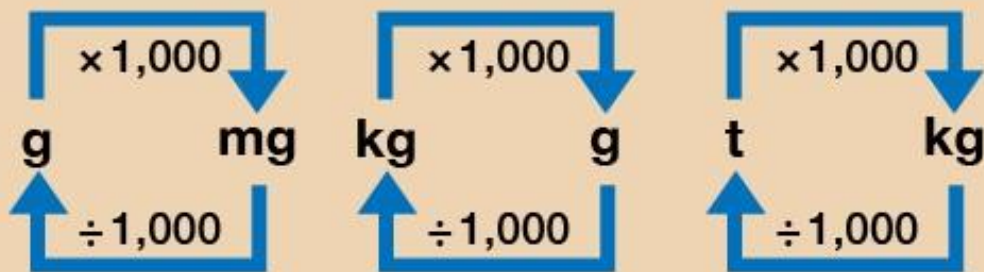
- We use grams to measure the mass of light objects.
- We use kilogram to measure the mass of heavy objects.
- We use milligram to measure the mass of small objects like beads, grain of wheat or medicines

Conversion of units of Mass

$$1\text{kg}=1000\text{g}$$

$$1\text{g}=1000\text{mg}$$

Mass



g = gram mg = milligram t = tonne kg = kilogram

Date: _____

Day: _____

Activity # 18:

- **Convert the following unit of mass.**

(a) 55 kg into g

(b) 28 kg 185 g into g

(c) 1.9 g into mg

(d) Convert 60kg 234g into grams

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Addition and Subtraction of Units of Mass

Key Fact:

To add/subtract the units of mass always add/subtract the same units.
Add/Subtract kg into kg, g into g and mg into mg.

Example:

	kg	g
	7	400
+	5	350
	12	750

Sum = 12 kg 750 g

• **Solve the following.**

(a) $36\text{kg} + 76\text{ kg}$

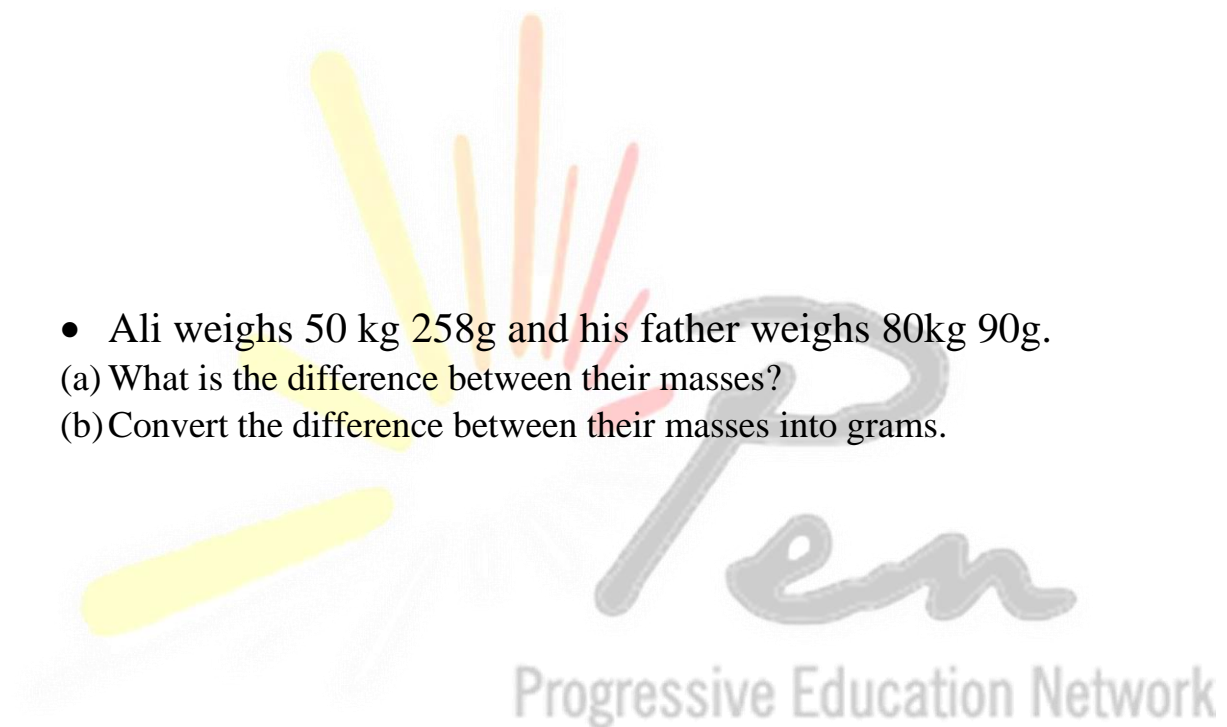
(b) $92\text{kg } 124\text{g} + 24\text{g}$

(c) $80\text{ kg} - 54\text{g}$

(d) $39\text{ g } 500\text{mg} - 25\text{g } 100\text{ mg}$

- Alina has two bags. The mass of one bag is 30g 15mg and the mass of the other is 10g 12 mg. What is the difference between the masses of the two boxes in mg?

- Ali weighs 50 kg 258g and his father weighs 80kg 90g.
 - (a) What is the difference between their masses?
 - (b) Convert the difference between their masses into grams.



**UNIT # 5: MEASUREMENT****Topic: Capacity****Conversion of units of capacity**

To convert units of capacity, we just need to know how many of one thing make up another. Remember! When you convert from a larger unit to a smaller unit (e.g., *l* to *ml*), you multiply. When you convert from a smaller unit to a larger unit (e.g., *ml* to *l*), you divide.

Litres to Millilitres

To convert litres into millilitres, we multiply litres by 1000.

$$1\text{ l} = 1000\text{ ml}$$

- **Convert the following units of capacities.**

a) 10 *l* into *ml*

b) 50 *l* into *ml*

c) 1.6 *l* into *ml*

d) 74 *l* into *ml*

Addition and Subtraction in Units of Capacity

Addition



		l	ml
Capacity of first bucket	=	4	450
Capacity of second bucket	=	(+) 5	180
Total capacity of two buckets	=	9	630

Total capacity is 9 l 630 ml.

Subtraction

	l	ml
	15	500
-	6	300
	9	200

Difference = 9 l 200 ml

- Solve the following.

a) $122 \text{ ml} + 76 \text{ ml}$

b) $6.5 \text{ l} + 4.2 \text{ l} =$

Date: _____

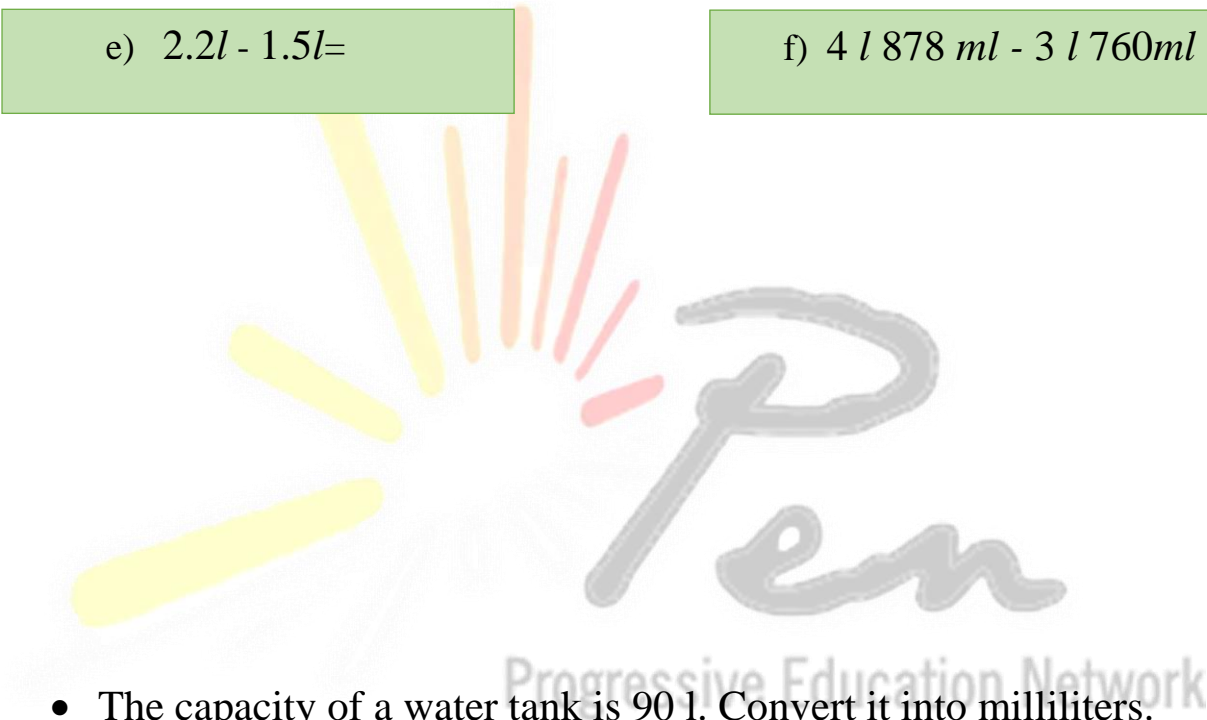
Day: _____

$$\text{c) } 41\text{ l } 200\text{ ml} + 404\text{ l } 478\text{ ml}$$

$$\text{d) } 22\text{ l } 500\text{ ml} - 10\text{ l } 109\text{ ml}$$

$$\text{e) } 2.2\text{ l} - 1.5\text{ l} =$$

$$\text{f) } 4\text{ l } 878\text{ ml} - 3\text{ l } 760\text{ ml}$$

- 
- The capacity of a water tank is 90 l. Convert it into milliliters.

Date: _____

Day: _____

- Farah has two jars. The capacity of one jar is 50l 190ml and the other is 80l 250ml.
 - (a) What is the total capacity of the jars?
 - (b) What is the difference between the capacity of both jars?





UNIT # 5: TIME

Topic: Time

Learning Outcomes

After completing this section, you will be able to:

- Read and write the time using digital and analog clocks on 12-hour and 24-hour format.
- Convert hours into minutes and minutes into seconds.
- Add and subtract measures of time without carrying and borrowing.
- Solve simple real-life situations involving conversation, addition and subtraction of measures of time.












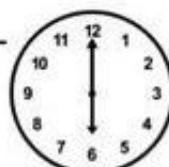



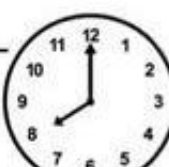
Key Terminology:

Months, Week, Conversions, Addition, Subtraction, Years

Time, Hours, Minutes, Seconds, Days

Activity # 19:

- Write the correct time of each activity with the help of clock.

I make my bed at  _____ : _____ 	I eat breakfast at  _____ : _____ 
I go to school at  _____ : _____ 	I eat a snack at  _____ : _____ 
I eat lunch at  _____ : _____ 	I eat dinner at  _____ : _____ 
I take a bath at  _____ : _____ 	I read a book at  _____ : _____ 

Date: _____

Day: _____

Key Fact

When minute hand completes one revolution, one-hour passes.

When second hand completes one revolution, one-minute passes.

There are 24 hours in a day, to show the time on the clocks. There are two ways.

➤ 12-hours clock

The 12-hour clock is a time convention in which the 24 hours of the day are divided into two periods: a.m. and p.m. Each period consists of 12 hours

We use a.m. to read the time after 12 midnight to before 12 noon.

We use p.m. to read the time after 12 noon to before 12 midnight.

➤ 24-hours clock

A day runs from midnight and is divided into 24 hours.

Time is shown in 4 or 6 digits.

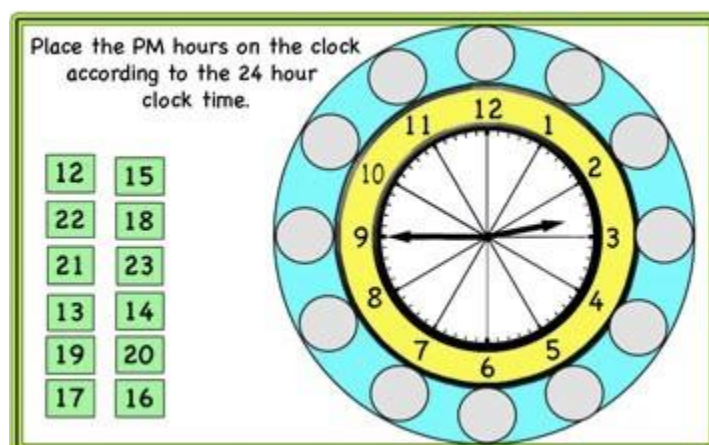
12 O' clock noon is expressed as 12:00 hours.

In the afternoon. Format to write time in 12-hours and 24-hours.



We did not use number 24 in 24 hours format. We use numbers from 0 to 23.

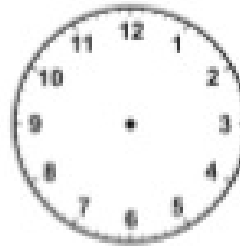
Challenge

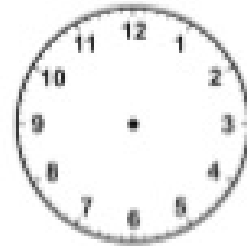


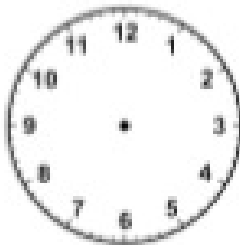
Activity # 20:

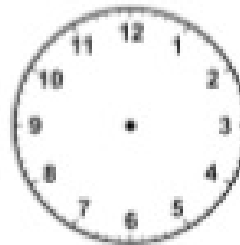
- Draw the following 12-hours clock times on the clocks. Also write the time in 24-hour clock below.

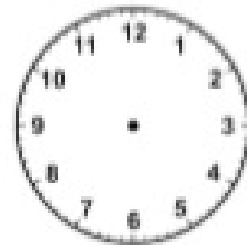
1) **5:00 p.m.**

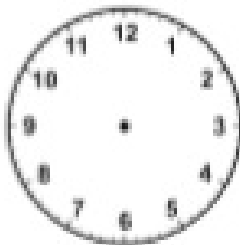
2) **1:20 a.m.**

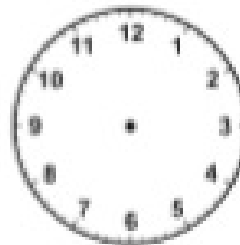
3) **4:50 p.m.**

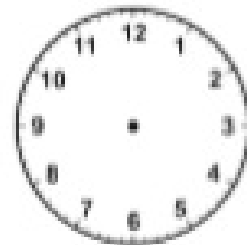
4) **2:30 a.m.**

5) **9:45 p.m.**

6) **6:25 p.m.**

7) **3:00 a.m.**

8) **12:15 p.m.**

9) **12:00 a.m.**

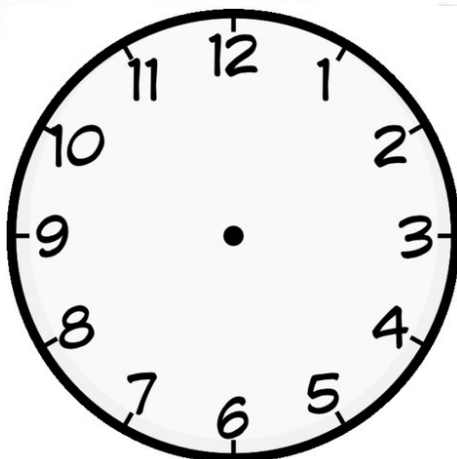
Date: _____

Day: _____

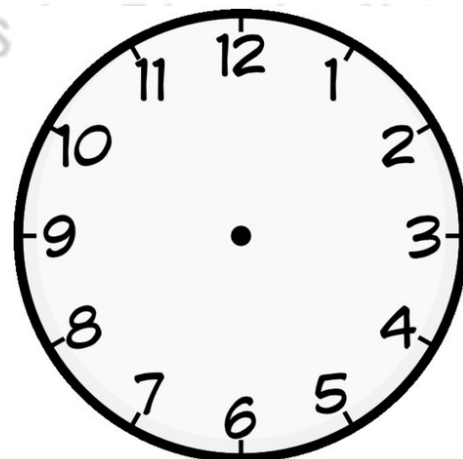
- Look at the following clocks and tell the time in hours, minutes and seconds.



- Draw hour, minute and second hands according to the given time.



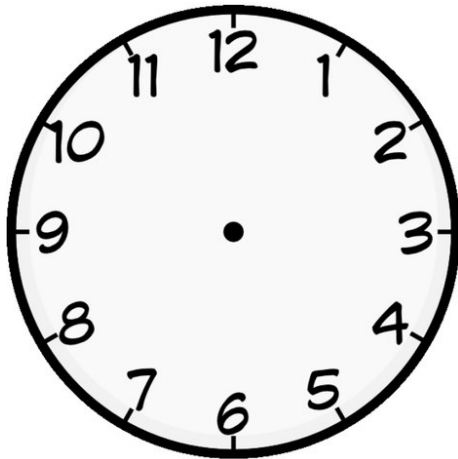
1:15:30



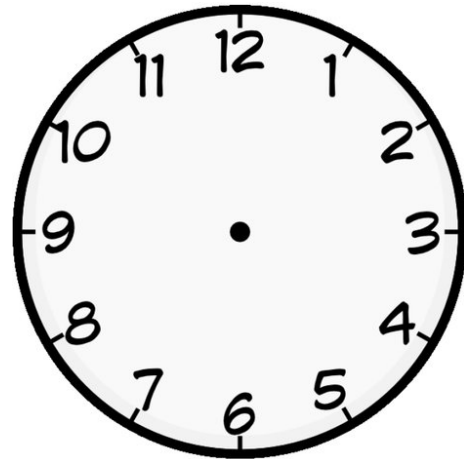
7:30:02

Date: _____

Day: _____

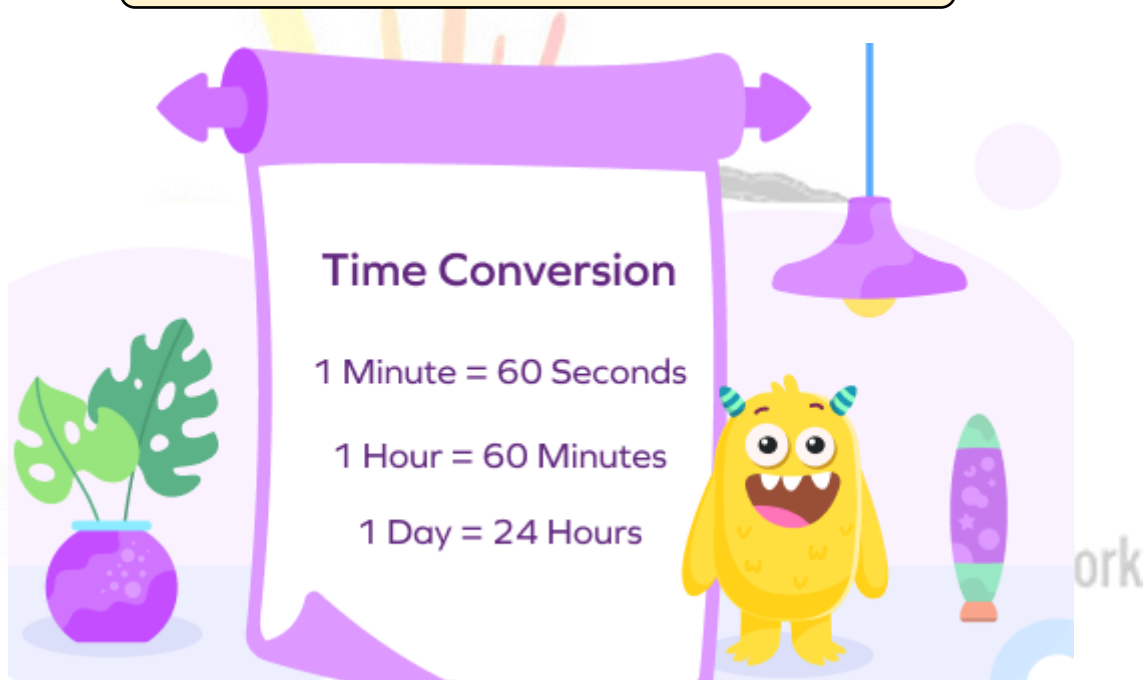


9:22:55



10:20:20

Conversion of Hours, Minutes, and Seconds



Converting Hours to Minutes

Multiply the number of hours by the expression in red.

Hours \times 60 Minutes

❖ 60 Minutes = 1 Hour

Date: _____

Day: _____

- **Convert the following time into minutes.**

(a) 5h =	(b) 15h 5 min =
(c) 22h 32 min =	(d) 9h 43min =

Converting Minutes to Seconds

Multiply the number of minutes by the expression in red.

Minutes \times 60 Seconds

❖ 60 Seconds = 1 Minute

To convert 5-minute 5 sec into seconds first we convert 5 minutes into seconds and then we will add 5 seconds in it.

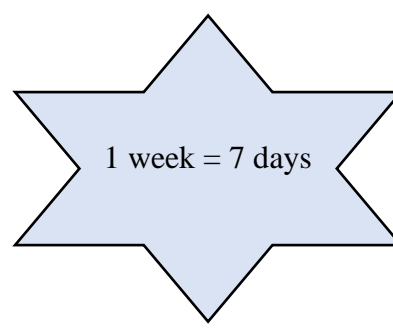
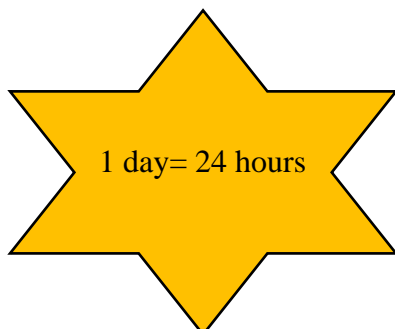
Date: _____

Day: _____

- **Convert the following time into seconds.**

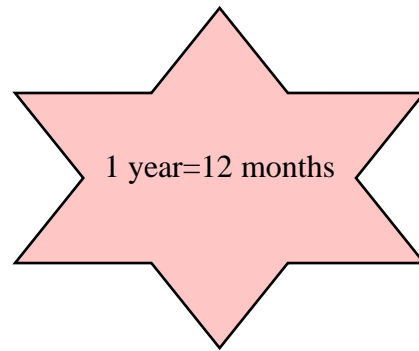
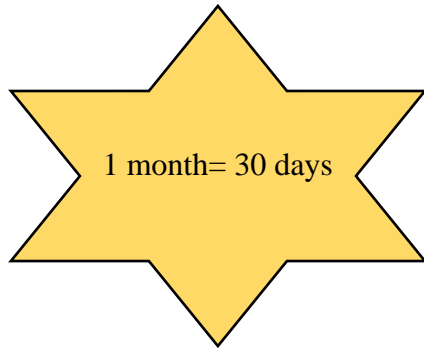
(a) 88min	(b) 5 min 55 sec
(c) 90 min 10 sec	(d) 176 min 18 sec

Conversion of Years, Months, and Days



Date: _____

Day: _____



Conversion of Years into Months

Example:

3 years = 36 months

Think: 1 year = 12 months

$$3 \times 12 = 36$$

1 year 3 years
12 months 36 months

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Challenge!

The planet Jupiter completes one revolution around the Sun in about 12 years. In how many months does it complete a revolution?

Date: _____

Day: _____

- **Convert the following into months.**

(a) 8 years	(b) 4 years 3 months
(c) 15 years 10 months	(d) 30 years 6 months

Conversion of Months into Days

To convert months into days
we multiply by 30.

1 month = 30 days

Conversion of Weeks into Days

To convert weeks into days
we multiply by 7.

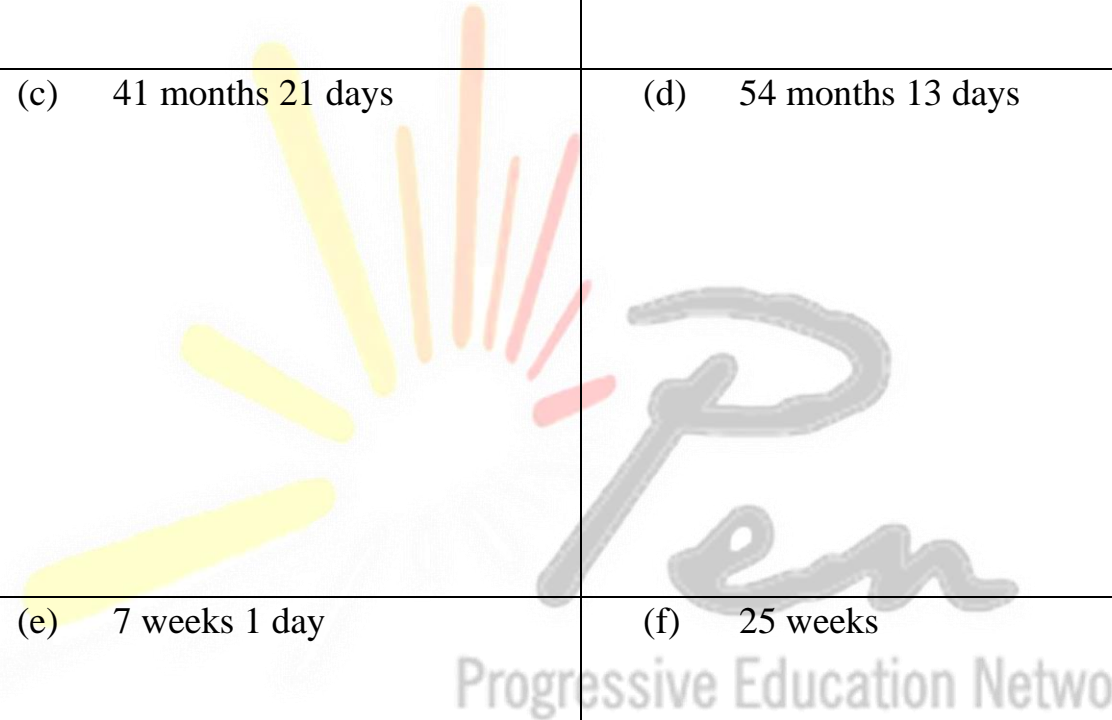
1 week = 7 days

Date: _____

Day: _____

- **Convert the following into days.**

(a) 11 weeks	(b) A week 3 days
(c) 41 months 21 days	(d) 54 months 13 days
(e) 7 weeks 1 day	(f) 25 weeks



Addition and Subtraction of Measures of Time

To add/subtract the units of time always start from ones.

Example: During an information tour, the students spent 3 hours 15 minutes in the Army Museum and 2 hours 22 minutes in the Science museum. How much time did they spend at both places?

Solution:

Hint: To find the total time, they spent at both places, we add the time and convert it into minutes

Time spent in Army Museum	=	3h	15min
Time spent in Science Museum	=	+ 2h	22 min
Total Time spent	=	5h	37 min

They spent 5 hours 37 minutes. Now, we will convert this time into minutes.

$$\begin{aligned}
 5 \text{ h } 37 \text{ min} &= 5\text{h} + 37\text{min} \\
 &= 5 \times 60 \text{ min} + 37 \text{ min} \\
 &= 300 \text{ min} + 37 \text{ min} \\
 &= 337 \text{ min}
 \end{aligned}$$

So, the students spent 337 minutes at both places.

Date: _____

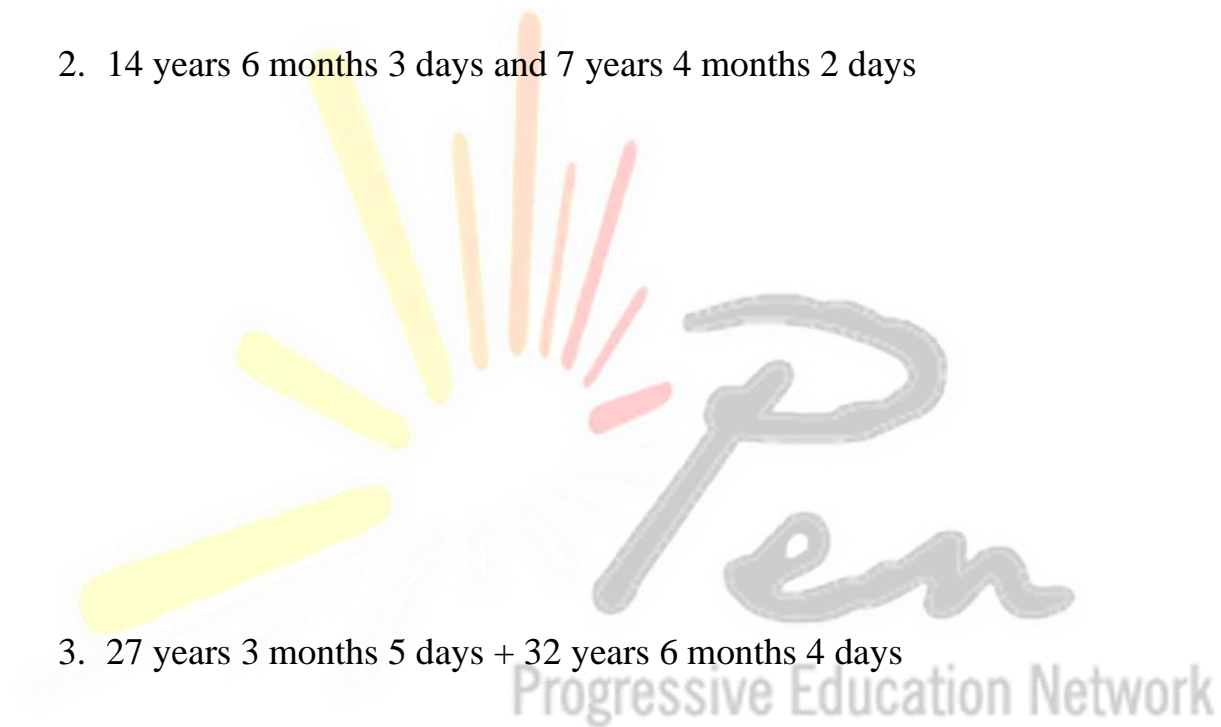
Day: _____

- **Solve the following:**

1. 35 h 15 min 10 sec + 10 h 18 min 30 sec

2. 14 years 6 months 3 days and 7 years 4 months 2 days

3. 27 years 3 months 5 days + 32 years 6 months 4 days



Date: _____

Day: _____

4. 65 h 28 min 56 sec – 54 h 20 min 45 sec

5. 37 years 6 months 29 days – 17 years 5 months 18 days

6. Ayesha went to her grandmother's home on Sunday and she stayed there for 3 hours and 15 minutes. On Monday, she went to her aunt's home and she spent 6 hours and 23 minutes. Find:

(a) How much time did she spend at her relative's home?

(b) Write the time in minutes.

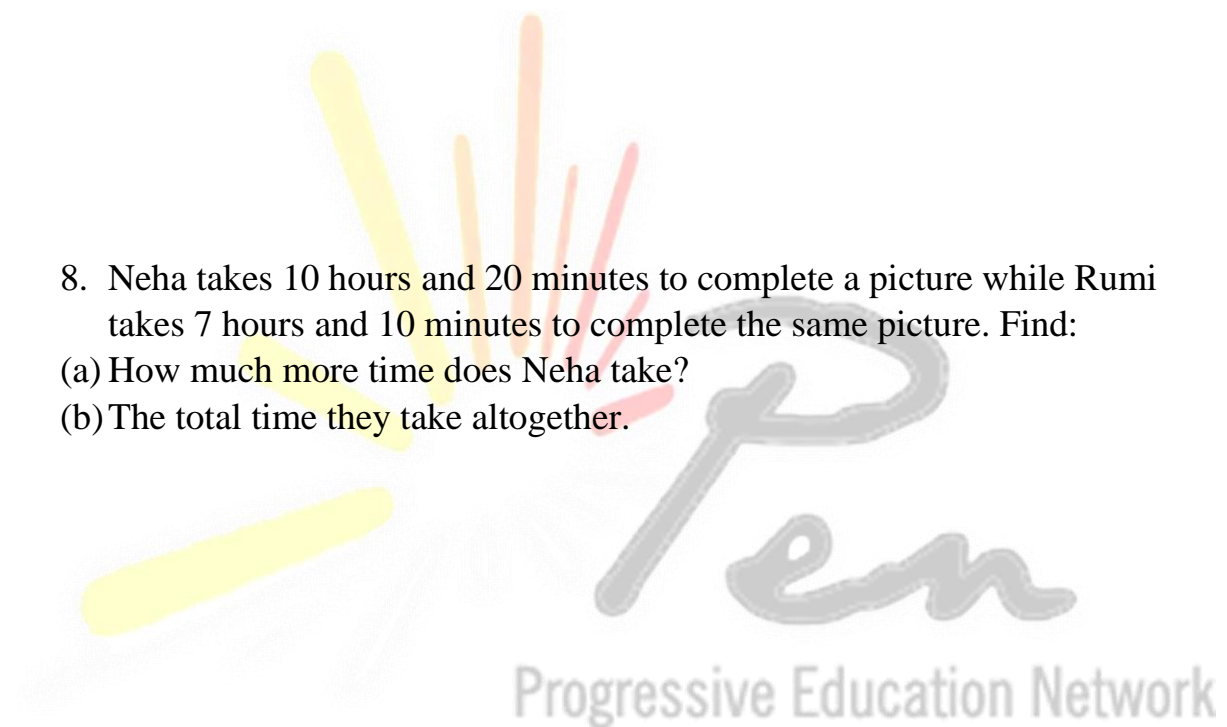
Progressive Education Network

Date: _____

Day: _____

7. Bilal travelled 5 hours 35 minutes 45 seconds in a bus and 4 hours 20 minutes 12 seconds in a train. Find:
- (a) How much time did he travel on the bus than the train?
 - (b) How much did he travel altogether?

8. Neha takes 10 hours and 20 minutes to complete a picture while Rumi takes 7 hours and 10 minutes to complete the same picture. Find:
- (a) How much more time does Neha take?
 - (b) The total time they take altogether.



Review Exercise**• Choose the correct options.**

1. There are _____ metres in one Kilometre.
(a) 1 (b) 10 (c) 1000
2. To convert m into cm, multiply it by _____.
(a) 10 (b) 100 (c) 1
3. There are _____ grams in one kilogram.
(a) 1000 (b) 100 (c) 10
4. One centimeter is equal to _____ millimeters:
(a) 100 (b) 10 (c) 1000
5. There are _____ months in 2 years 6 months.
(c) 30 (d) 25 (c) 20

• Convert the given units.

(a) 105 km into m	(b) 60 kg into g
(c) 9.8 l into ml	(d) 50 cm into mm

Date: _____

Day: _____

(e) 433 min 44 sec	(f) 54 weeks 9 days
--------------------	---------------------

• **Solve the following.**

(a) 4kg 300g + 10kg	(b) 50g 312mg + 90g 150 mg
(c) 406kg- 311kg	(d) 90 l 700 ml – 40 l 650 ml

Date: _____

Day: _____

(e) $4.5 \text{ m} + 2.8 \text{ m}$

(f) $38 \text{ h } 33 \text{ min } 38 \text{ sec} - 00 \text{ h } 22 \text{ min } 26 \text{ sec}$

- **The height of K-2 is 8km 611 m and Mount Everest is 8km and 848m.**

- (a) What is the difference between their heights? Give your answer in metres.
- (b) Find the total height of the mountains?

- **Look at the following clocks and tell the time in hours, minutes and seconds.**



Date: _____

Day: _____

- **Convert the following into days and months.**

1) 4 years

2) 8 years

- **Solve the following.**

1) $24 \text{ h } 15 \text{ min } 12 \text{ sec} + 10 \text{ h } 18 \text{ min } 30 \text{ sec}$

2) $17 \text{ years } 4 \text{ months } 5 \text{ days} + 32 \text{ years } 5 \text{ months } 4 \text{ days}$



Date: _____

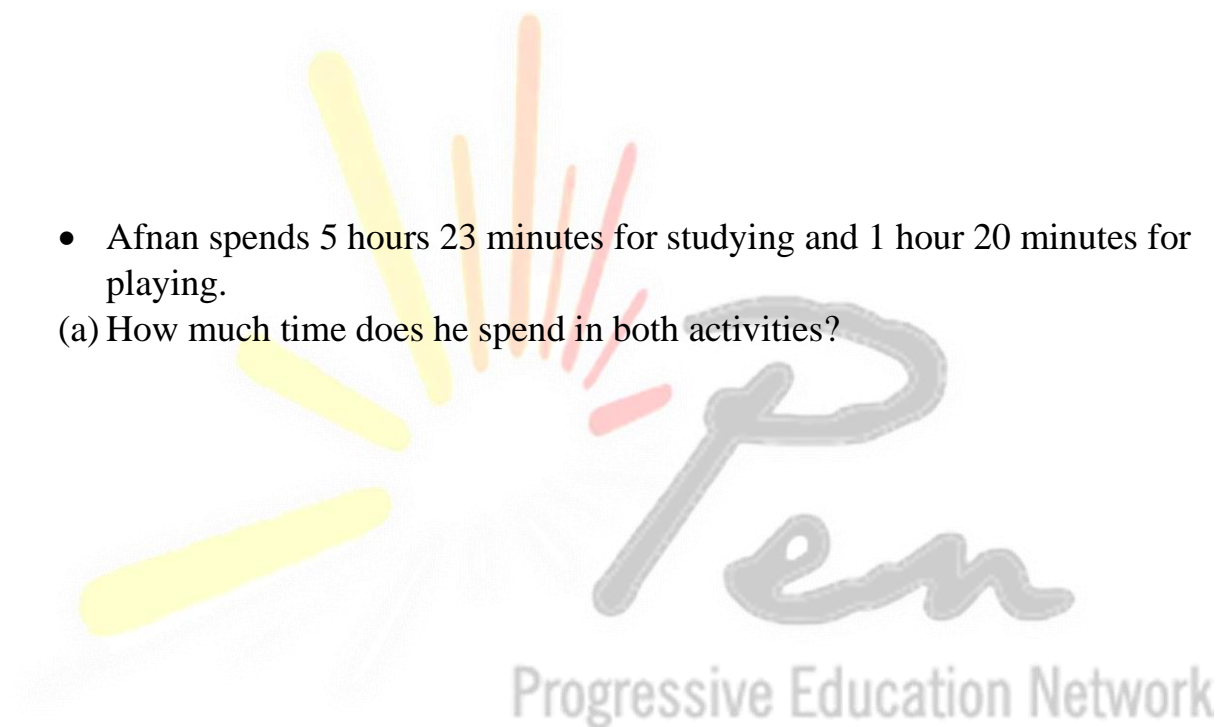
Day: _____

- Farheen completes her medical education in 4 years 10 months 7 days and her house job in 2 years 2 days. How much time did she spend in medical education and house job?

- Afnan spends 5 hours 23 minutes for studying and 1 hour 20 minutes for playing.

(a) How much time does he spend in both activities?

(b) Write the total time in minutes.





UNIT # 6: GEOMETRY

Learning Outcomes:

After completing this unit, you will be able to:

- Recognize and identify parallel and non-parallel lines.
- Recognize an angle formed by intersection of two rays.
- Measure angles in degrees by using a protractor.
- Draw an angle of given measurement and use the symbol \angle to represent it.
- Differentiate acute, obtuse and right angles.
- Measure angles using protractor.
- Upper scale of protractor reads the measure of angle from left to right.
- Lower scale of protractor reads the measure of angle from right to left.
- Identify right angles in 2-D shapes.
- Describe radius, diameter and circumference of a circle.
- Find perimeter of 2-D figures on a square grid.
- Recognize that perimeter is measured in units of length.
- Find area of 2-D figures on a square grid.
- Recognize that area of a square is measured in metre square and centimeter square.
- Recognize lines of symmetry in two-dimensional(2-D) shapes.
- Complete a symmetrical figure with given line of symmetry on square grid/dot pattern.
- Compare and sort 3-D objects (cubes, cuboids, pyramids, cylinder, cone, sphere).

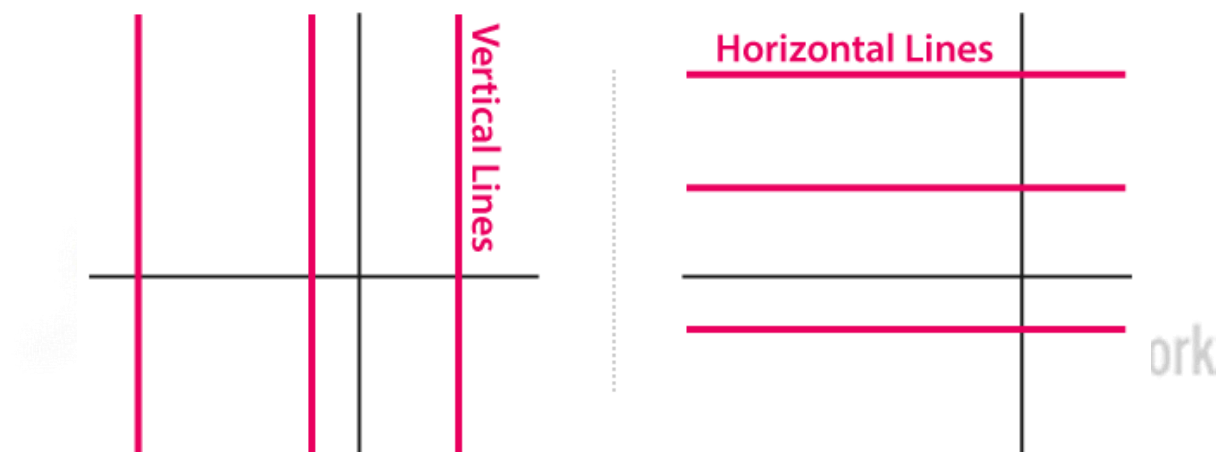
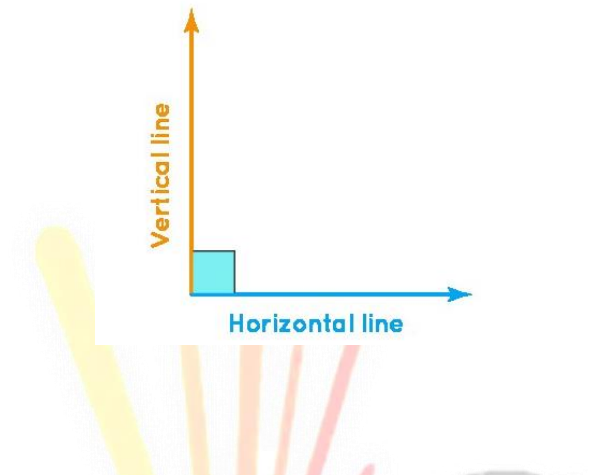
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Key Terminology:

Parallel lines, non-parallel lines, Angle, Right Angle, Acute Angle, Obtuse Angle, Symmetry, 3-D shapes, 2-D shapes, Sphere, Cube, Cylinder, Cuboid, Cone, Pyramid

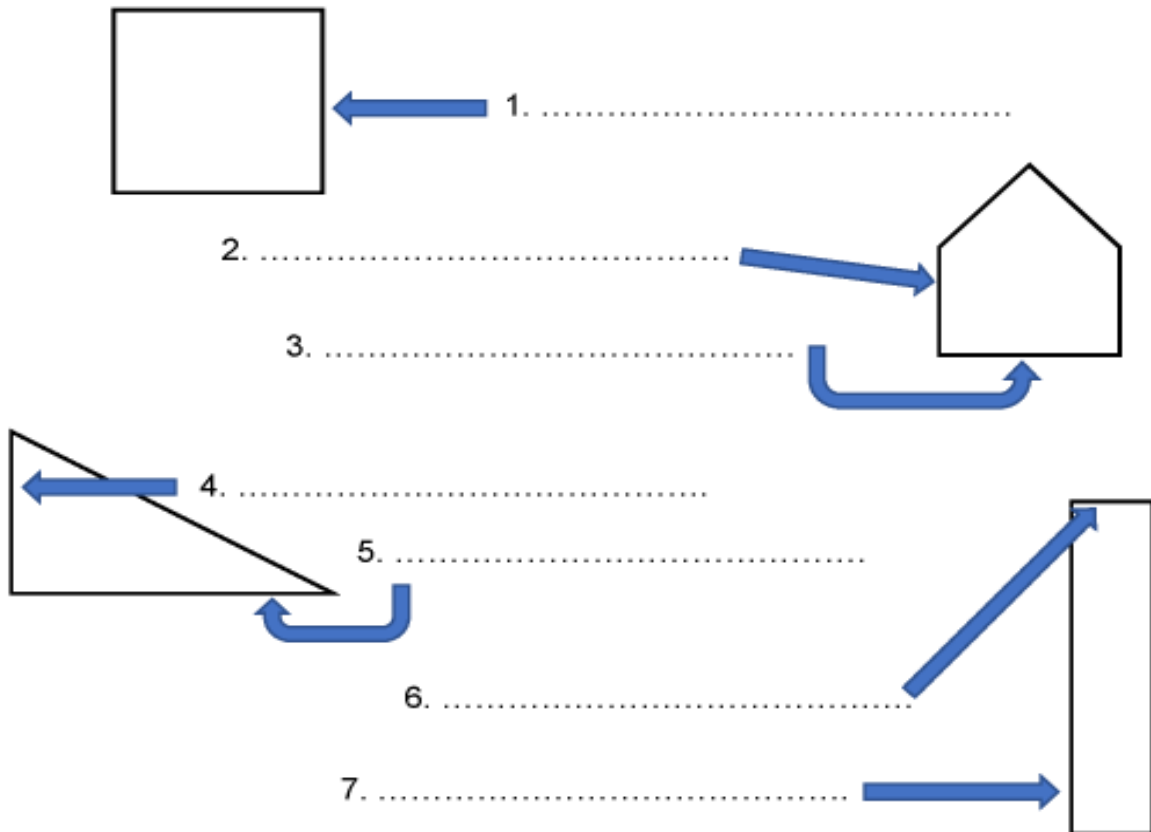
Topic: Horizontal and Vertical Lines

A vertical line is a line, parallel to the y-axis and goes straight, up and down, in a coordinate plane. Whereas the horizontal line is parallel to the x-axis and goes straight, left and right.

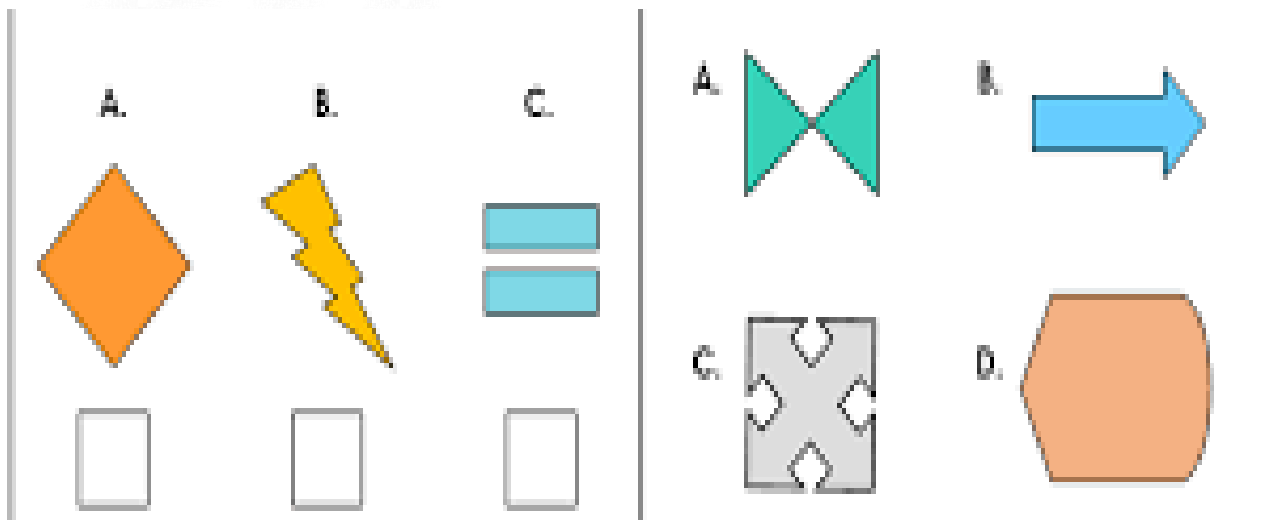


Activity # 21:

- Label the lines that the arrows are pointing to on these shapes to say if they are horizontal or vertical.



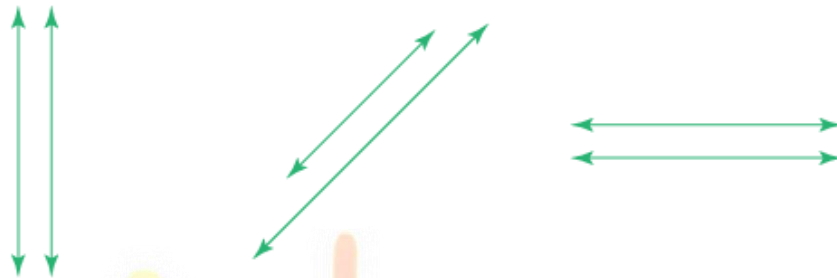
- Tick the shapes having vertical line symmetry and encircle the shapes having horizontal line symmetry.



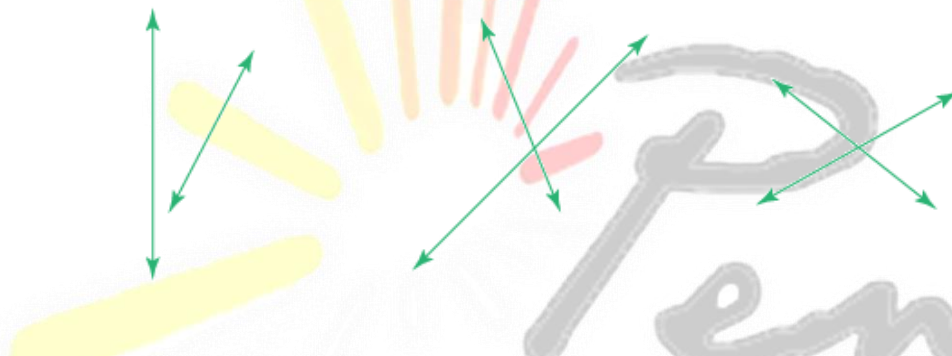
UNIT # 6: GEOMETRY

Topic: Parallel and Non-parallel lines

Parallel Lines


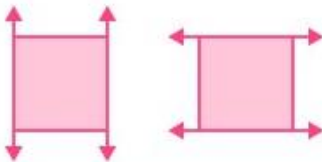



Non - Parallel Lines



Parallel Lines

Parallel lines are lines that never intersect because they are always the same distance apart.

Geometric lines	Shapes	Real World Objects
<p>The two lines below are parallel.</p> 	<p>The opposite sides of a square are parallel.</p> 	<p>The lines that pass by the sides of a table top are parallel.</p> 

Date: _____

Day: _____

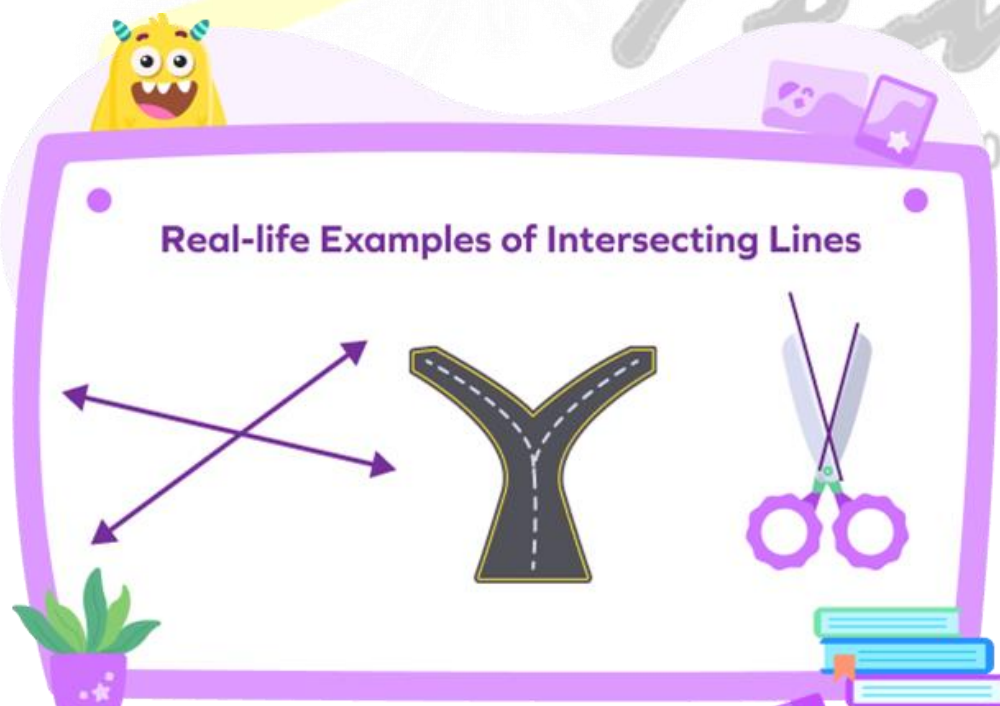
Parallel lines are the lines that never meet each other, no matter how long we extend them. The symbol used to denote parallel lines is \parallel .

Look at the things in your surroundings. Can you see parallel lines?

For example, $AB \parallel PQ$ indicates that line AB is parallel to line PQ.



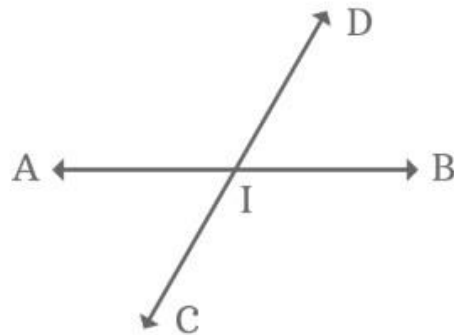
Topic: Non- parallel lines












Date: _____

Day: _____

Non-parallel lines are those lines which intersect each other at any point if they are extended. The symbol that denotes non-parallel lines is \nparallel .



1. Differentiate between the parallel and non-parallel lines

1.  _____	2.  _____	3.  _____
4.  _____	5.  _____	6.  _____
7.  _____	8.  _____	9.  _____

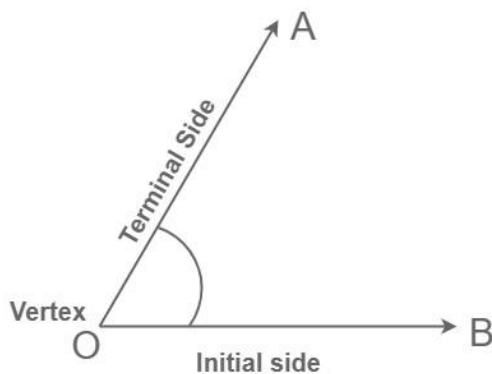


UNIT # 6: GEOMETRY

Topic: Angle

What is an angle? In-Plane Geometry, a figure that is formed by two rays or lines that share a common endpoint is called an angle. The word “angle” is derived from the Latin word “angulus”, which means “corner”. The two rays are called the sides of an angle, and the common endpoint is called the vertex. The symbol \angle is used to denote an angle.

Representation of Angles

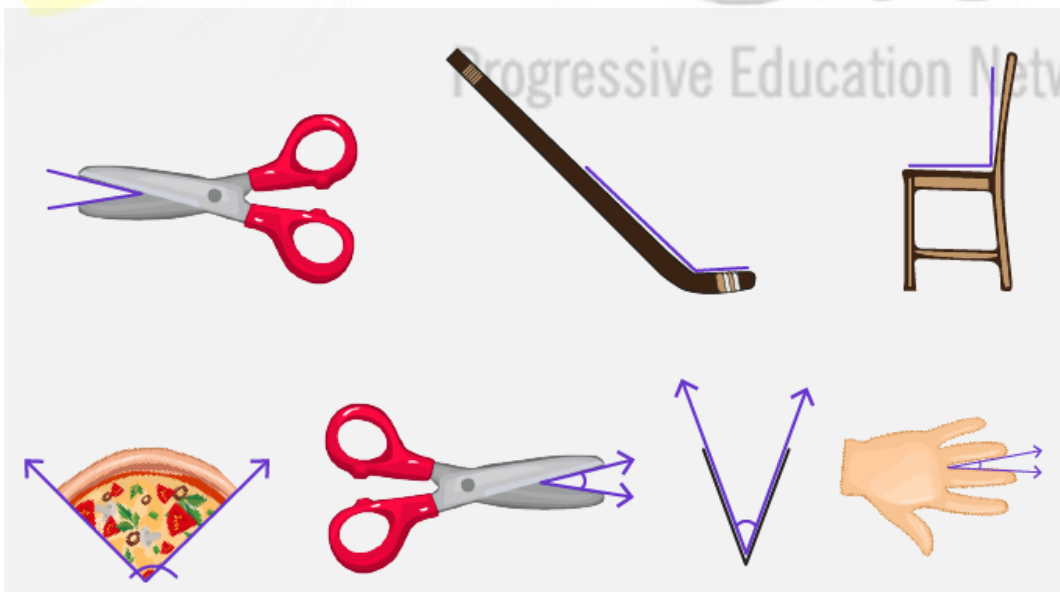


Here, we call OA initial ray and OB terminal ray. Their common point O is called vertex of the angle. We can write this angle as.

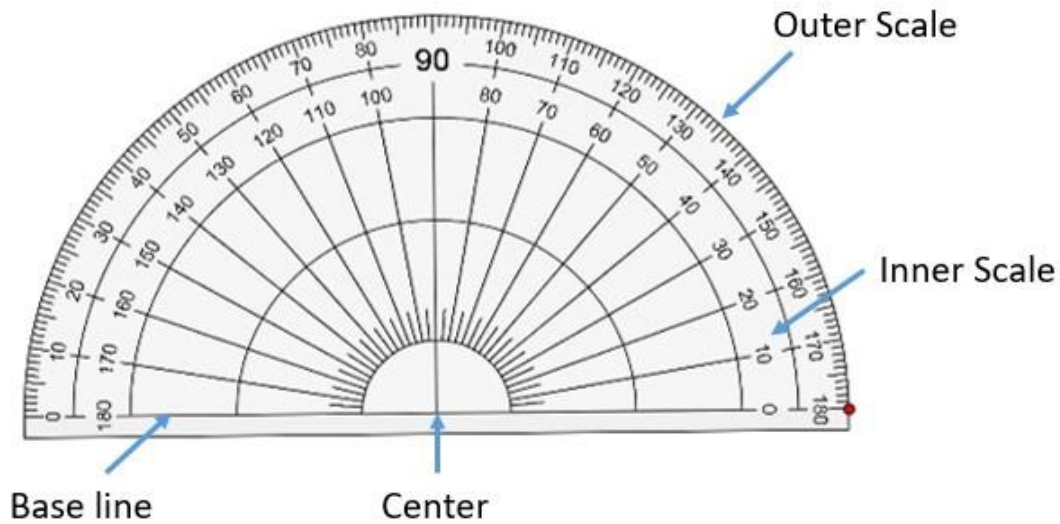
$\angle AOB$ or $\angle BOA$

Angle Around Us

There are many daily life examples of an angle, such as cloth-hangers, arrowheads, scissors, partly opened doors, pyramids, edge of a table, the edge of a ruler, etc.



Topic: Measurement and Construction of Angles



Base line: The straight line at the bottom of the protractor.

Center point: The middle of baseline is called centre point of protractor.

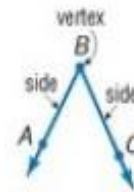
Scale: There are two scales in every protractor, an inner scale and an outer scale.

Inner scale: It starts from 0 and is up to 180. The measurement of an angle is taken from right to left on this scale.

Outer scale: It starts from 0 and is up to 180. The measurement of an angle is taken from left to right on this scale.

Measuring and Drawing Angles

Two rays that have a common endpoint form an **angle**. The common endpoint is called the **vertex**, and the two rays that make up the angle are called the **sides** of the angle. A circle can be divided into 360 equal sections. Each section is one **degree**. You can use a **protractor** to measure an angle in degrees and draw an angle with a given degree measure.



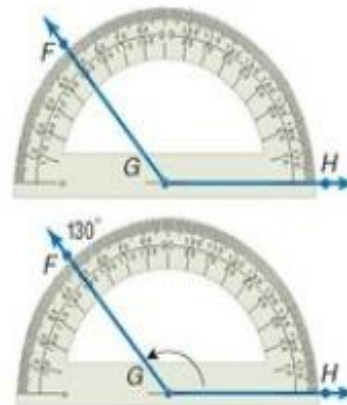
EXAMPLE Measure an Angle

- 1 Use a protractor to measure $\angle FGH$.

Step 1 Place the center point of the protractor's base on vertex G. Align the straight side with side \overrightarrow{GH} so that the marker for 0° is on the ray.

Step 2 Use the scale that begins with 0° at \overrightarrow{GH} . Read where the other side of the angle, \overrightarrow{GF} , crosses this scale.

The measure of angle FGH is 130° .
Using symbols, $m\angle FGH = 130^\circ$.



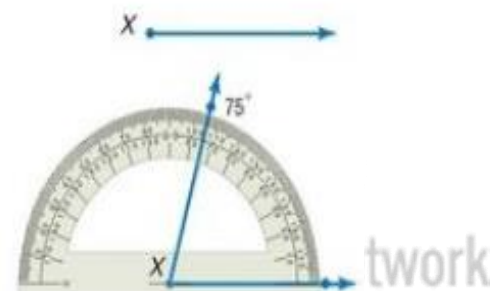
EXAMPLE Draw an Angle

- 2 Draw $\angle X$ having a measure of 75° .

Step 1 Draw a ray. Label the endpoint X.

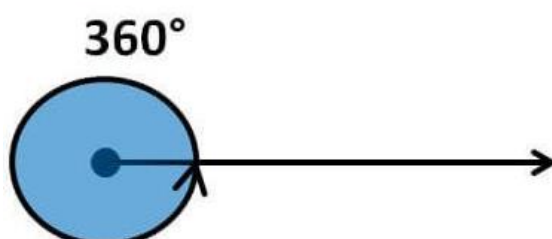
Step 2 Place the center point of the protractor's base on point X. Align the mark labeled 0 with the ray.

Step 3 Use the scale that begins with 0. Locate the mark labeled 75. Then draw the other side of the angle.

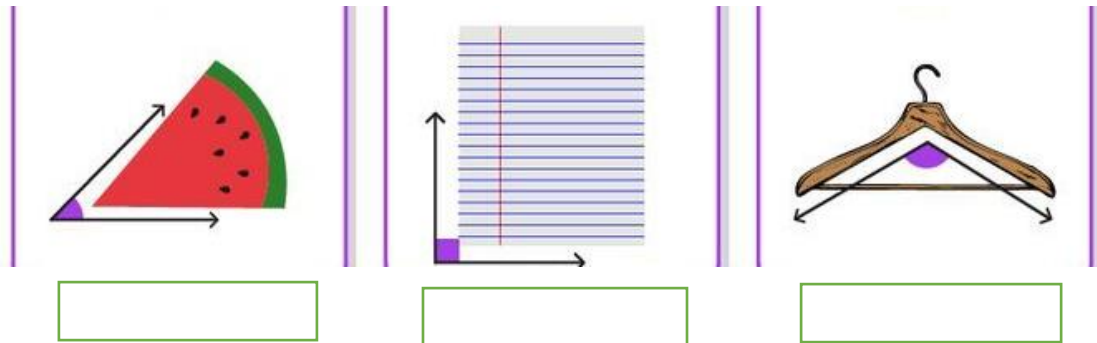



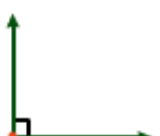
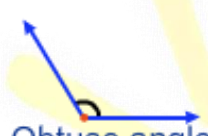

Topic: Difference between Acute, Obtuse, and Right Angle

As you know the unit of measurement of an angle is degree. The following ray AB complete 360 degree in one revolution around its initial point A.



Do you know the name of Angles



 <p>Acute angle</p> <p>An angle which measures more than 0°, but less than 90°.</p>	 <p>Right angle</p> <p>An angle which measures exactly 90°.</p>
 <p>Obtuse angle</p> <p>An angle which measures more than 90°, but less than 180°.</p>	 <p>Straight angle</p> <p>An angle which measures exactly 180°.</p>

Activity # 22:

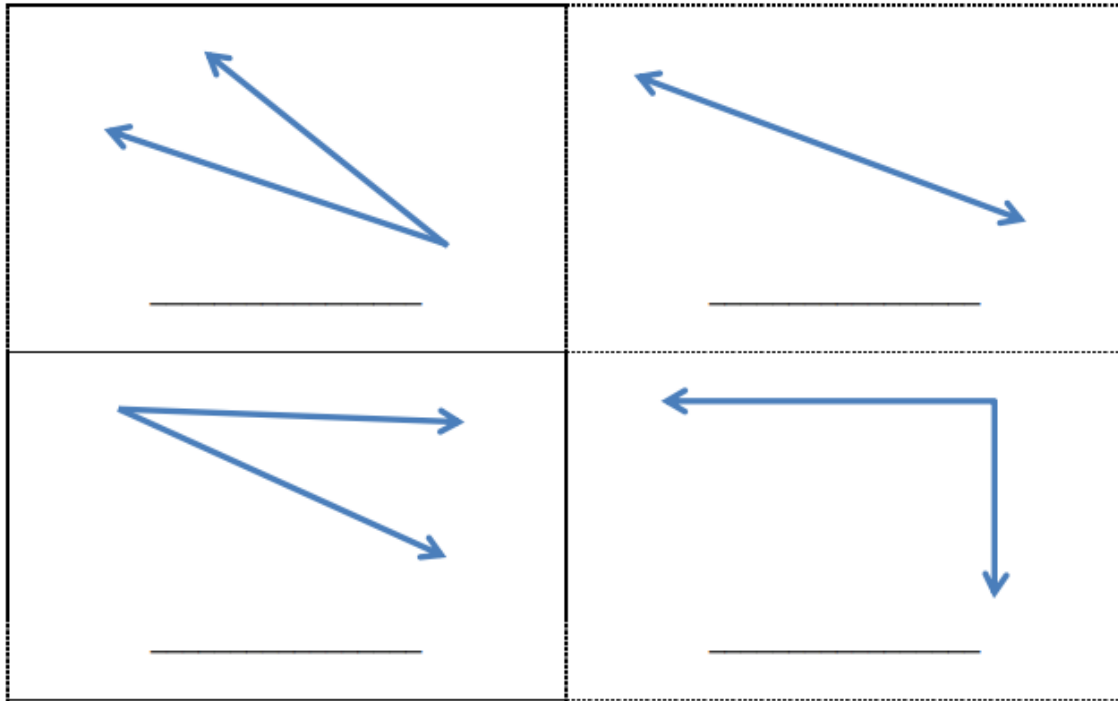
- Which of the following angles is an obtuse angle?



Date: _____

Day: _____

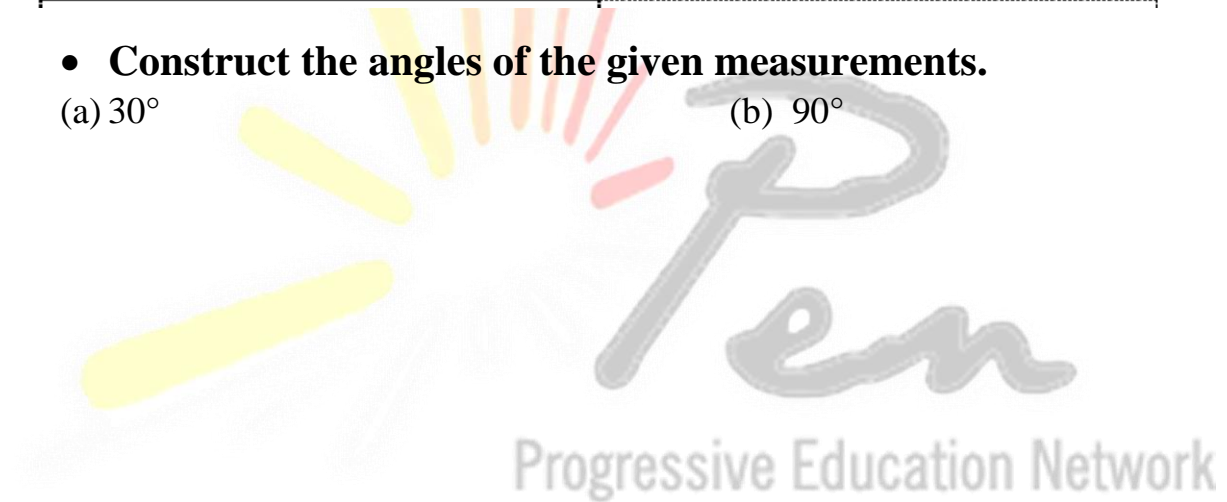
- **Measure the angles and write their types.**



- **Construct the angles of the given measurements.**

(a) 30°

(b) 90°





UNIT # 6: GEOMETRY

Topic: Right angle in 2-D shapes

Square

All sides of a square figure are equal in length.

All angles are right angles.

Rectangle

The length of opposite sides in a rectangle are equal.

Like a square, all the angles of a rectangle are right angles.

Activity # 23:

- Encircle the square and tick the rectangular objects.





UNIT # 6: GEOMETRY

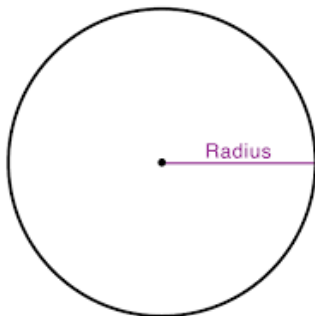
Topic: Circle

Circle

- A circle is a set of points in which all the points are at an equal distance from its centre.
- The shape of wheel is like a circle.

Radius of circle

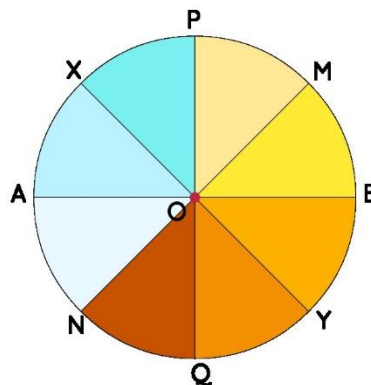
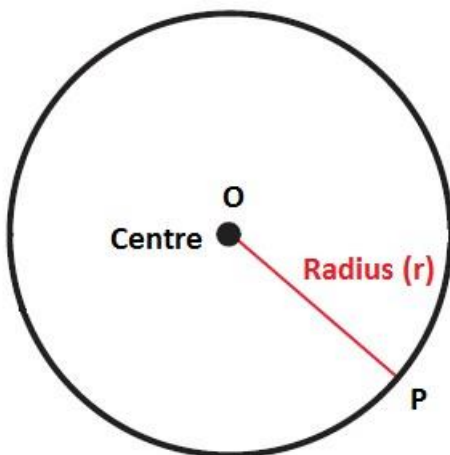
- The line segment which joins any point on the circle to its centre is called radius of circle. The length of all the radii in a circle is same.



Usually, the radius of a circle is represented by "r"

In the figure given below, OA is the radius of the circle. We can write it as :

$$r = OP$$



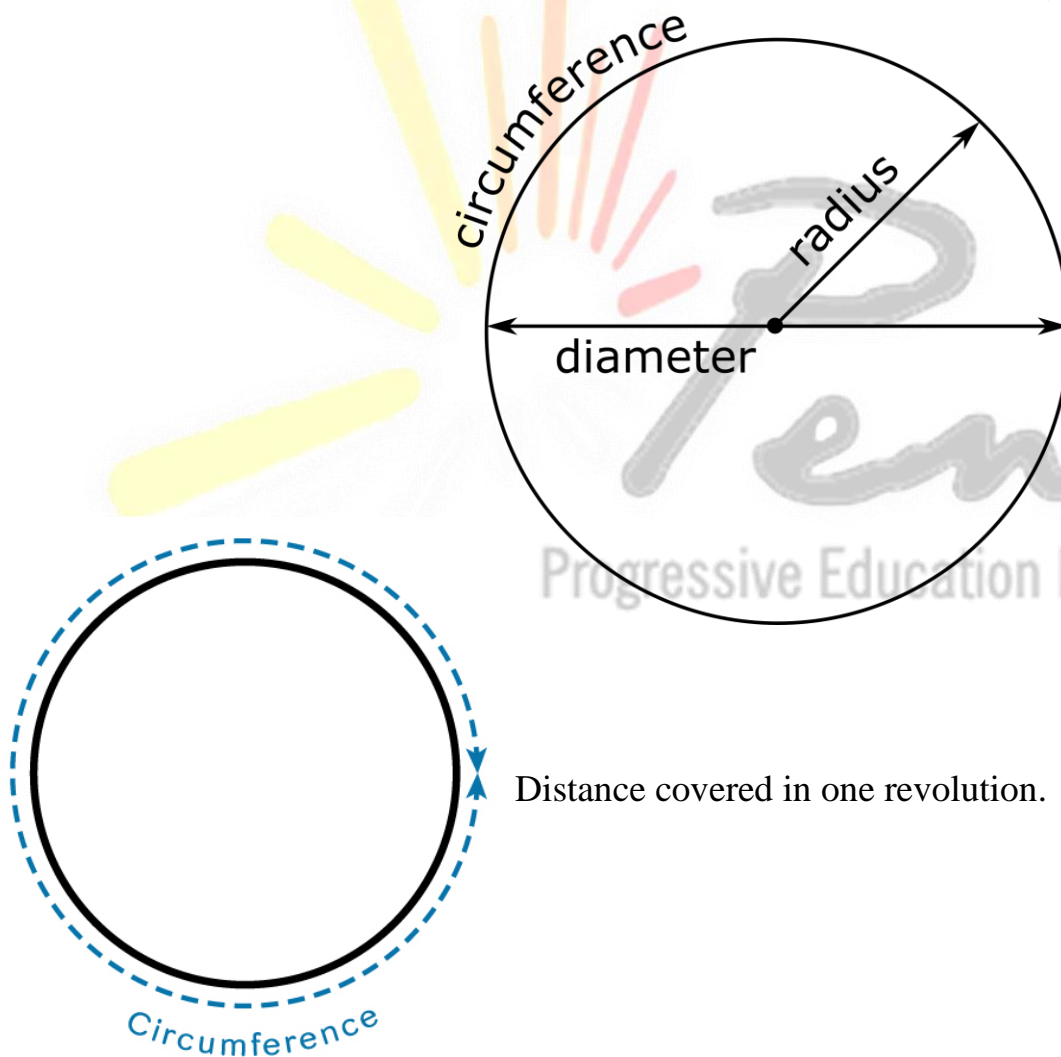
All line segments OA, OB, OM, OP, OX, ON, OQ, OY are the radii of the circle

Diameter of Circle

- The line segment which joins any two points on a circle and passes through its centre.
- Diameter of a circle is twice of its radius.

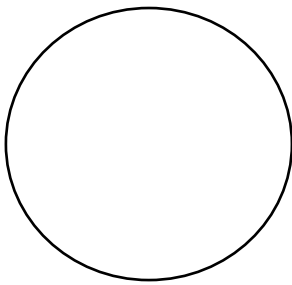
Circumference of a circle

- Distance covered in one revolution is equal to circumference of a circle.
- The linear distance around the circle.

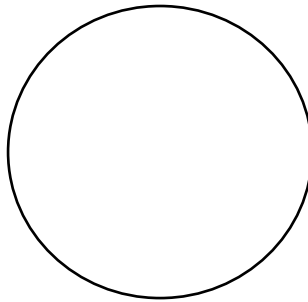


Activity # 24:

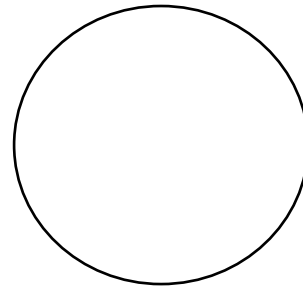
- Draw the parts of the following circles:



Diameter of a
circle

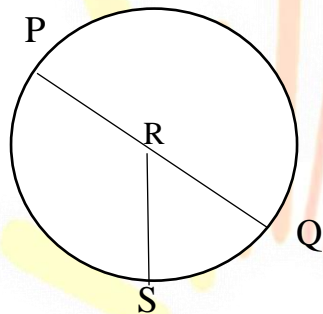


Radius of a
circle



Center of a
circle

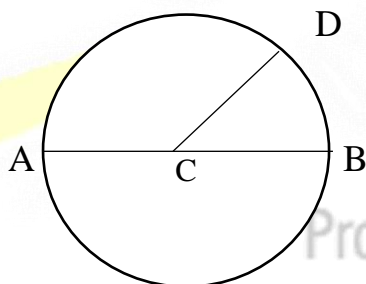
- Write the name of parts of circles.



Centre:

Diameter:

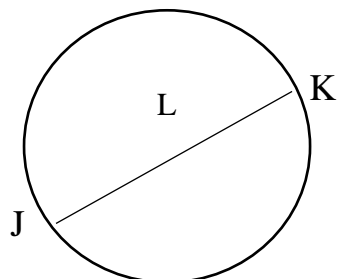
Radius:



Centre:

Diameter:

Radius:



Centre:

Diameter:

Radius:



UNIT # 6: GEOMETRY

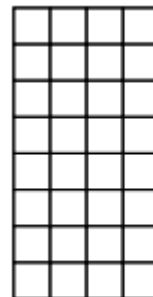
Topic: Perimeter and Area

Perimeter: Total length of surroundings of a closed figure is called perimeter of that figure.

Area: Area of rectangle is the region occupied by a rectangle within its four sides or boundaries. Area of square and rectangle can be calculated in centimetre square and metre square.

Activity # 25:

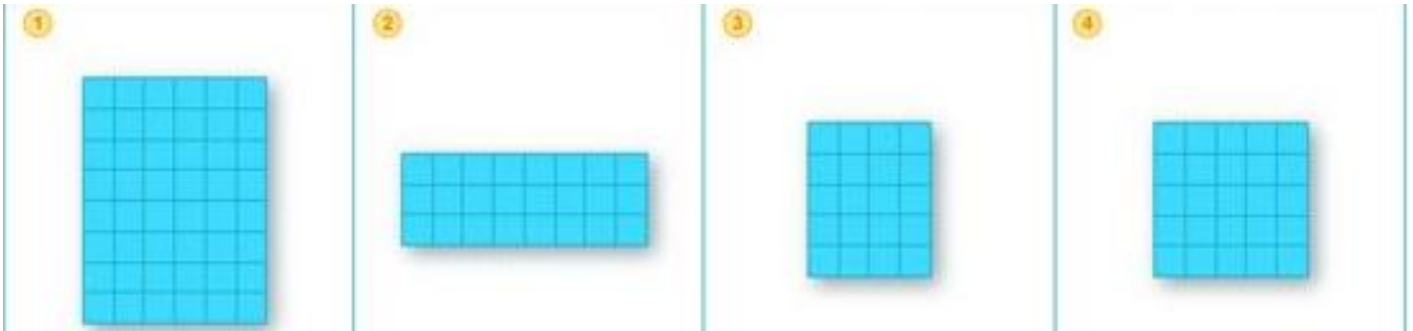
- Find the area of the given figures. Each square is equal to 1 m^2



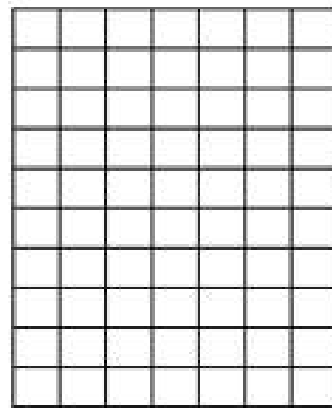
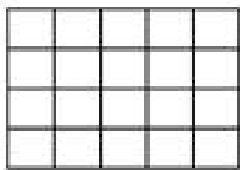
Date: _____

Day: _____

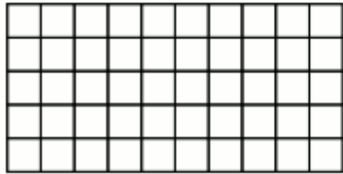
- Find the perimeter of the given figure. Each square is equal to 1m.



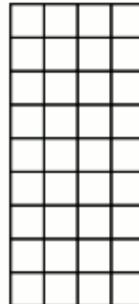
- Find the area of the given figures. Each square is equal to 1 cm^2



- 1 a.** Find the area and perimeter of this rectangle.



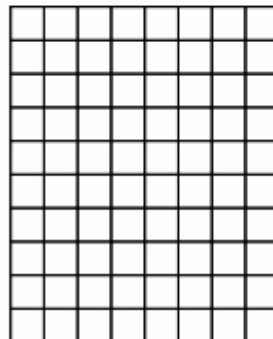
- 1 b.** Find the area and perimeter of this rectangle.



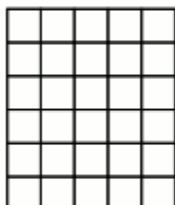
- 2 a.** Find the area and perimeter of this square.



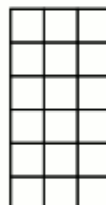
- 2 b.** Find the area and perimeter of this rectangle.



- 3 a.** Find the area and perimeter of this rectangle.



- 3 b.** Find the area and perimeter of this rectangle.



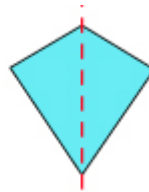


UNIT # 6: GEOMETRY

Topic: Symmetry

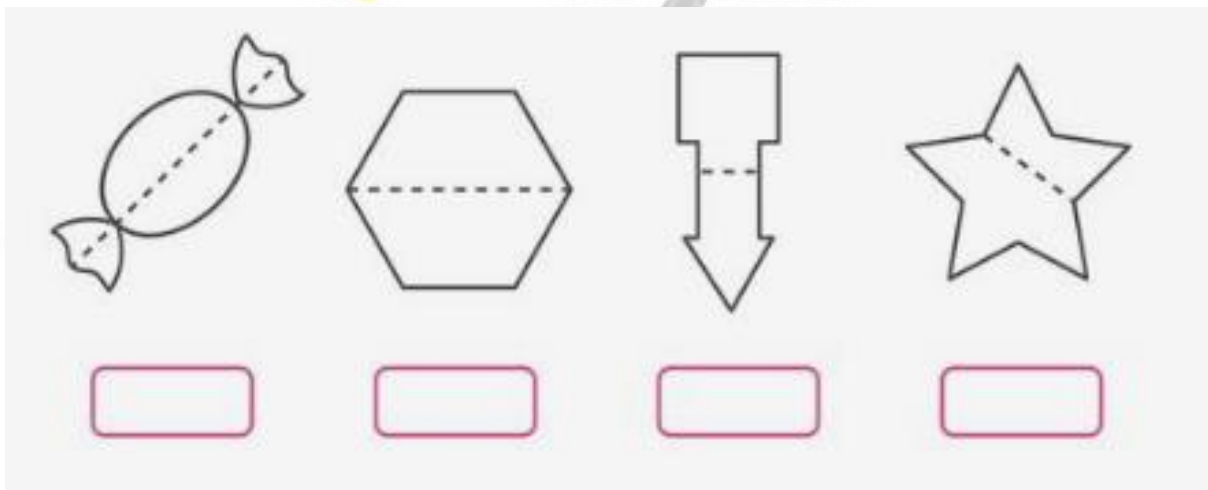
Symmetry means when we turn, flip, or rotate a figure, it takes exactly the same shape as before. It means one-half is the mirror image of the other half.

Line of Symmetry



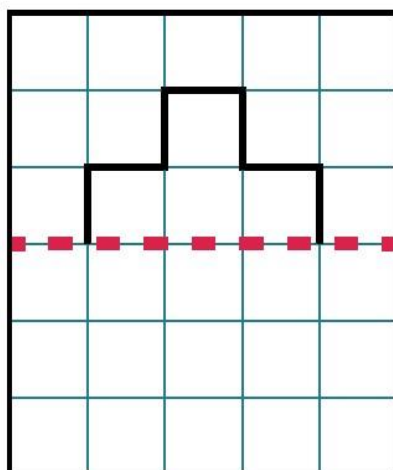
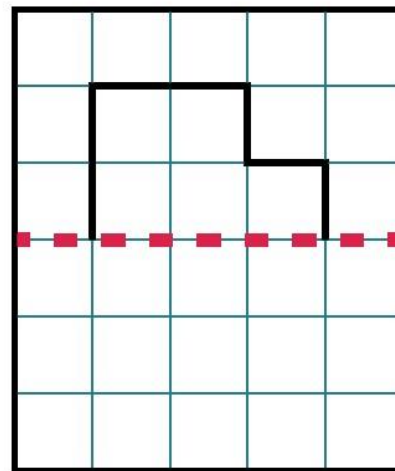
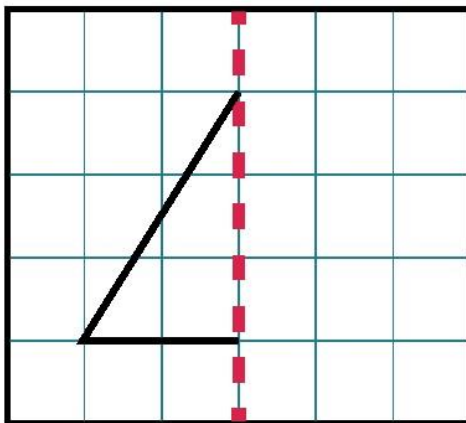
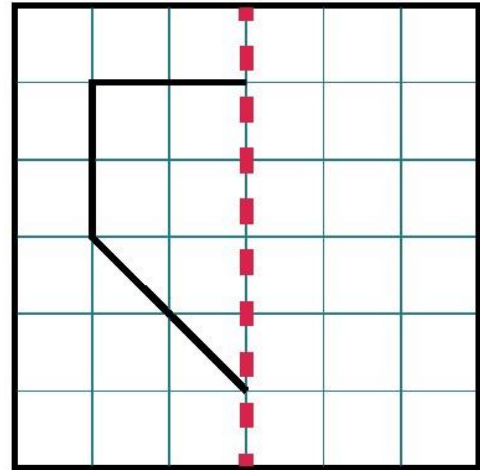
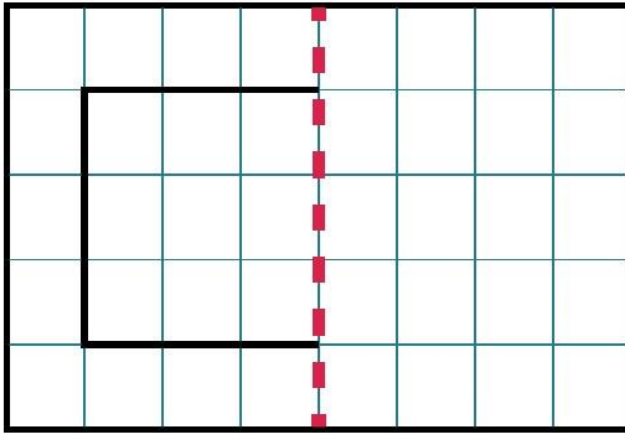
Activity # 26:

- Tick on the figures where you can see line of symmetry.



Activity # 27:

- Complete the given figures.



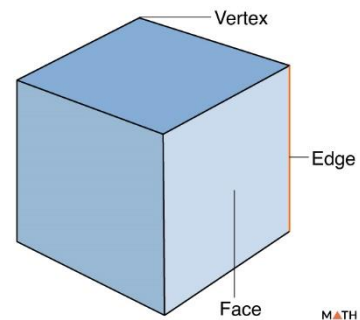


UNIT # 6: GEOMETRY

Topic: Comparison of 3-D shapes

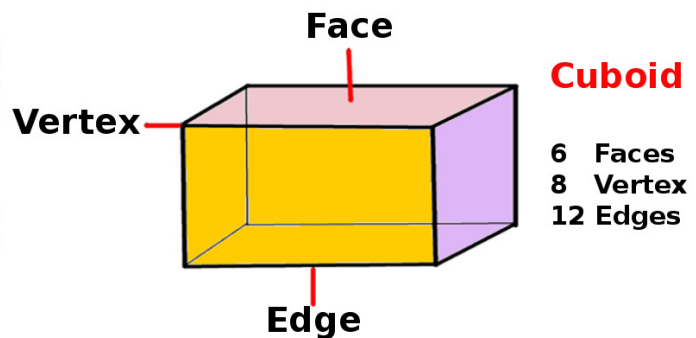
Cube: A symmetrical three-dimensional shape, either solid or hollow, contained by six equal squares. In a cube, length, width and height are same.

Properties: 8 vertices, 6 surfaces, 12 edges.



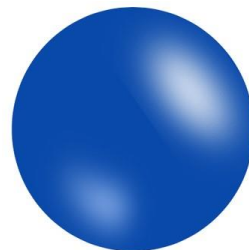
Cuboid: A solid which has six rectangular faces at right angles to each other.

Properties: 8 vertices, 6 surfaces, 12 edges.



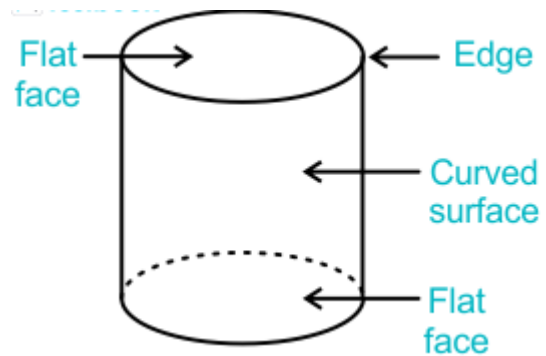
Sphere: It has a curved surface. It does not have vertices and edges.

Properties: 0 vertices, 1 surface, 0 edges.



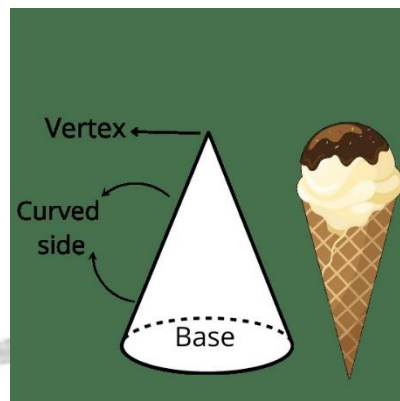
Cylinder: It has 3 surfaces, one curved and the two plane circular.

Properties: 0 vertices, 3 surfaces, 2 edges.



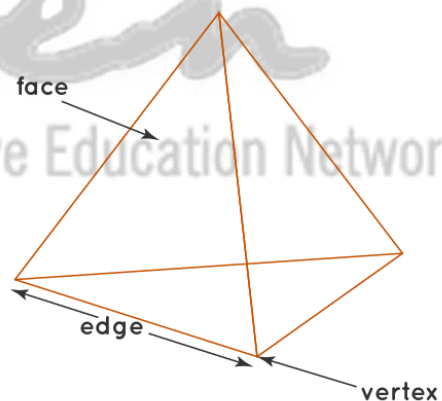
Cone: It has two surfaces, one curved and the other plane(circular).

Properties: 1 vertex, 2 surfaces, 1 edge.



Pyramid: It has a base as a square. It has five surfaces, one square and four triangles.

Properties: 5 vertices, 5 surfaces, 8 edges



Do you know!

2-D figure have only, length and width.

3-D shapes have length, width and height.

All 3-D shapes are made by combining 2-D figures.

Activity # 28:

Write the names of these figures and label their vertices and edges.

- Name:
- Vertices:
- Edges:



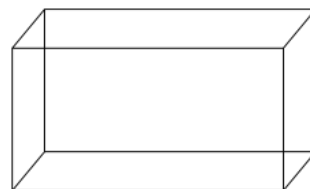
- Name:
- Vertices:
- Edges:



- Name:
- Vertices:
- Edges:



- Name:
- Vertices:
- Edges:


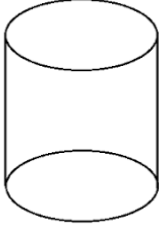

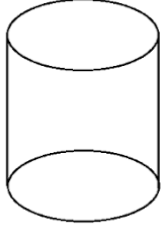
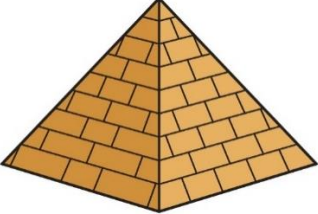


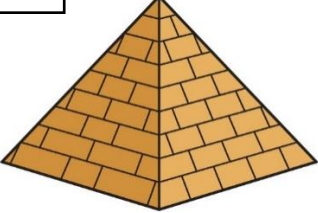


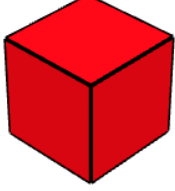



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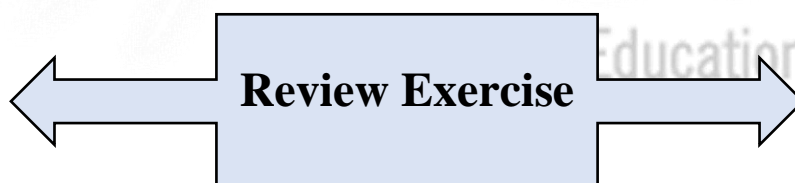
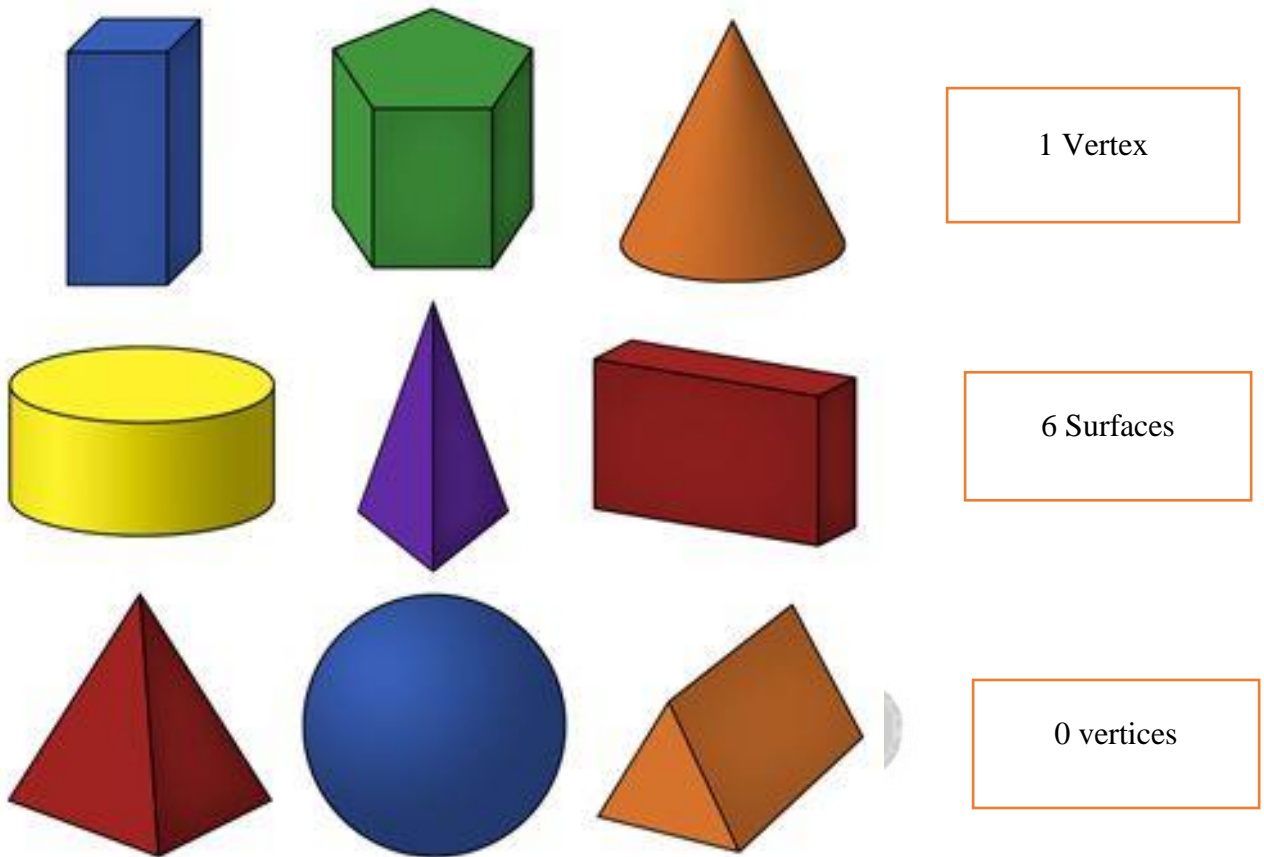
Activity # 29:

- Mark ✓ the figure which has the given properties.

<p>3 surfaces:</p> <p>0 Vertices:</p> <p>2 Edges:</p>	<input type="checkbox"/> 	<input type="checkbox"/> 	<input type="checkbox"/> 
<p>6 surfaces:</p> <p>8 Vertices:</p> <p>12 Edges:</p>	<input type="checkbox"/> 	<input type="checkbox"/> 	<input type="checkbox"/> 
<p>5 surfaces:</p> <p>5 Vertices:</p> <p>8 Edges:</p>	<input type="checkbox"/> 	<input type="checkbox"/> 	<input type="checkbox"/> 
<p>0 vertices:</p> <p>1 surface:</p> <p>0 Edges:</p>	<input type="checkbox"/> 	<input type="checkbox"/> 	<input type="checkbox"/> 

Activity # 30:

- Encircle the figures which have the following properties.



- Choose the correct options and fill in the blanks.
- (a) The lines which never meet each other and distance between them always remain same are called _____.
- (I) Horizontal lines (II) Parallel lines (III) Tangent lines
- (b) Angle can also be drawn by using _____ scale.
- (I) Inner scale (II) Outer scale (III) Parallel scale
- (c) We can measure the angles by using a _____.
- (I) Scale (II) Protractor (III) Graph

Date: _____

Day: _____

(d) The length of all the radii in a circle is _____.

(I) Different

(II) Same

(III) Partially different

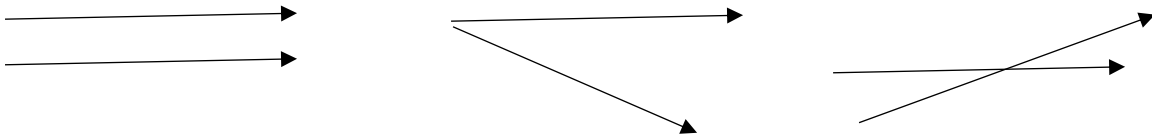
(e) All the surfaces of a cuboid are of _____ shape.

(I) Square

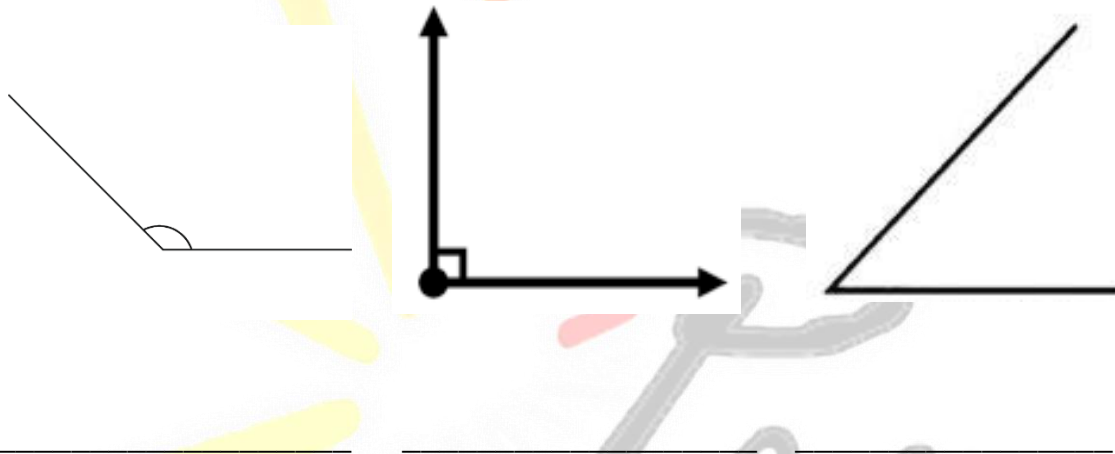
(II) Circle

(III) Rectangle

- Encircle the parallel lines from given lines.



- Differentiate right, acute and obtuse angle in the following.



- Draw the angles of the given measurements.

(a) 130°

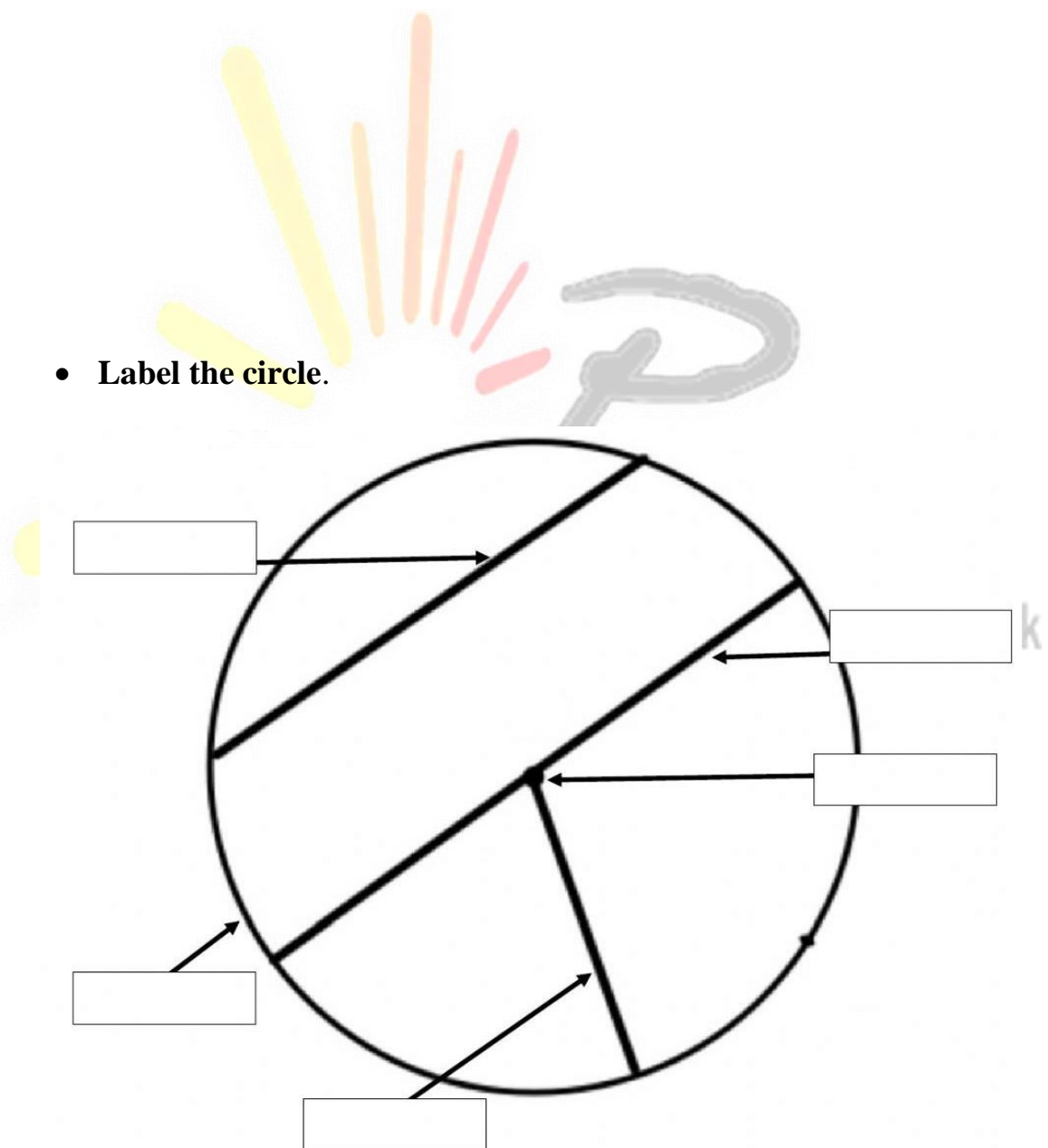
Date: _____

Day: _____

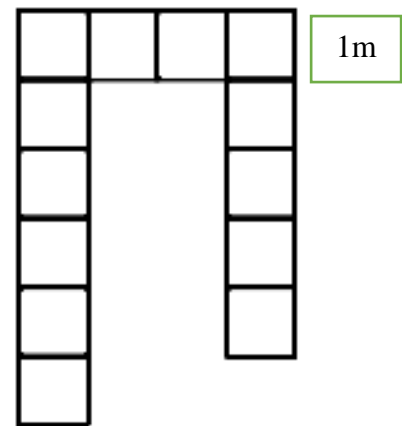
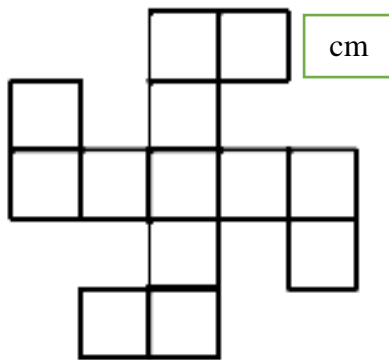
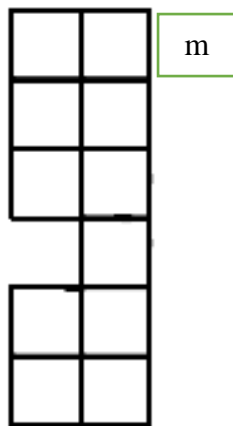
(b) 90°

(c) 45°

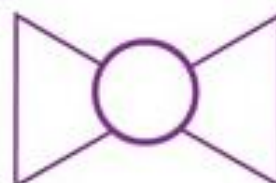
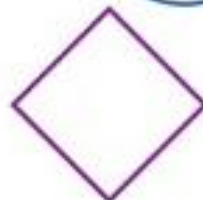
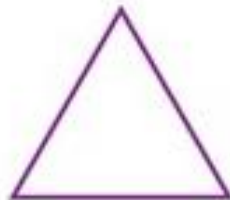
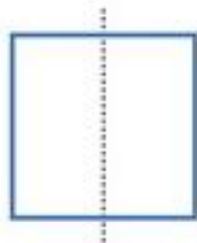
- Label the circle.



- Find the perimeter and area of given figures.



- Identify the symmetry in the given figures and draw lines of symmetry where possible.





UNIT # 7: DATA HANDLING

Learning Outcomes:

After completing this unit, you will be able to:

- Read simple bar graphs given in horizontal and vertical form.
- Interpret real life situations using data presented in bar graphs.
- Read line graph.
- Interpret real life situations using data presented in line graphs.
- Read Pie Chart.
- Interpret real life situations using data presented in a Pie Chart.

Key Terminology:

Data, Bar Graph, Horizontal Bar Graph Vertical Bar Graph, Line Graph, Pie Chart, Sector

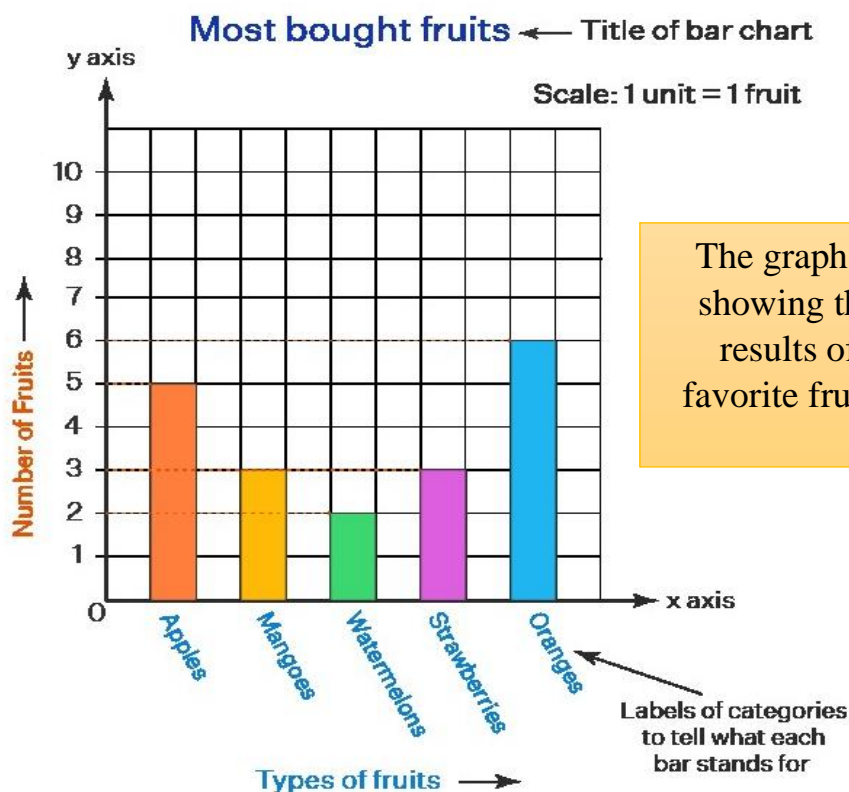
Bar Graph:

A bar graph is a pictorial representation of data, quantities, or numbers using bars, columns, or strips.

Example:

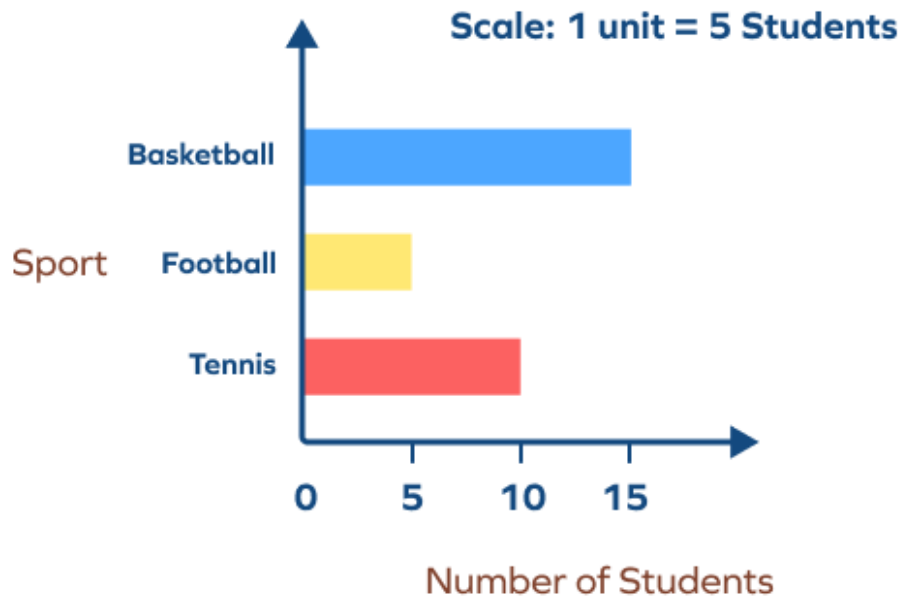
Saad surveyed five fruits to buy in his area in which he asked about the favorite fruits of people. He has prepared a bar graph based on this information.

Vertical Bar Graph



The graph is showing the results of favorite fruits.

Example: The following graph is about the sports play students. In this graph the bar is horizontal. That is why it is called a horizontal bar graph.



The width of each bar in a bar graph is same.

We can obtain the following information from this graph:

1. The maximum number of students was played basketball.
2. The minimum number of students was played football.
3. The difference between students played Tennis and football ($10 - 5 = 5$)

Activity # 31:

Four friends recorded their game scores. Create a bar graph and answer the questions.

Name	Ali	Furqan	Kashan	Yasir
Points	10	8	12	16

Date: _____

Day: _____

(1) Who got the highest points?

(2) How many points did Ali and Kashan get?

(3) Who got a score higher than Furqan but less than Yasir?

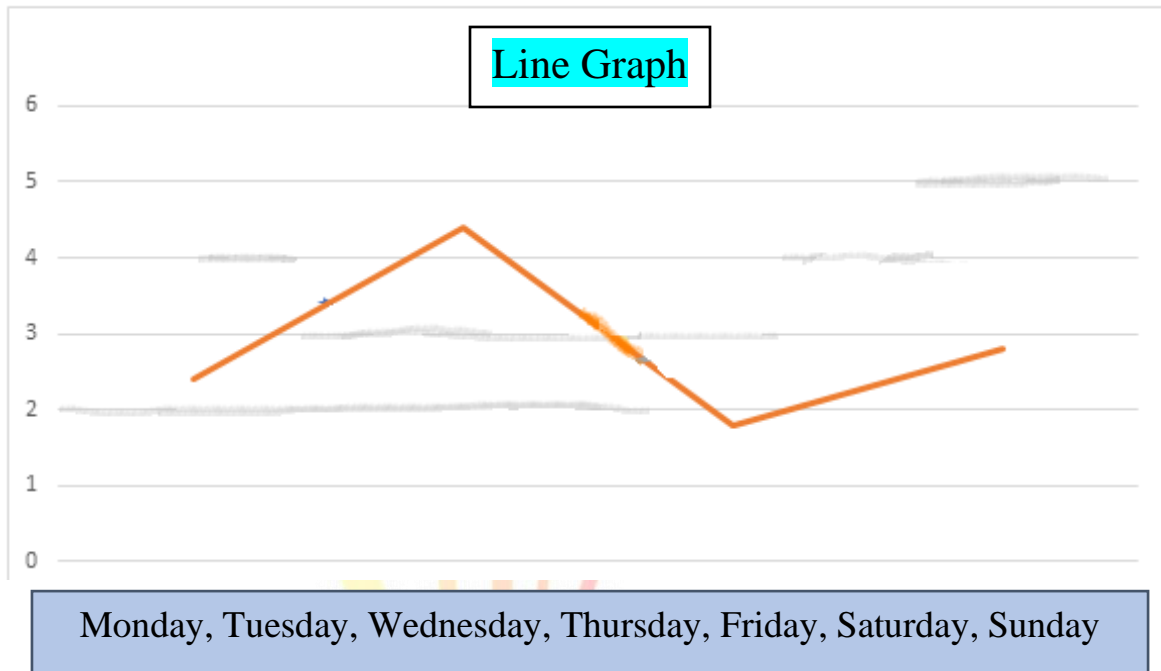
- **In March 2021 almost 200 people from different countries included Pakistan, India, China, Bangladesh, and Iran participated in Olympic games. Create a horizontal bar graph, showing the number of people and their countries.**

Countries	Pakistan	India	Bangladesh	China	Iran
Number of people	40	35	25	27	73

Progressive Education Network

Line Graph:

This is a line graph. It is drawn by joining different points which represent the values of some data.



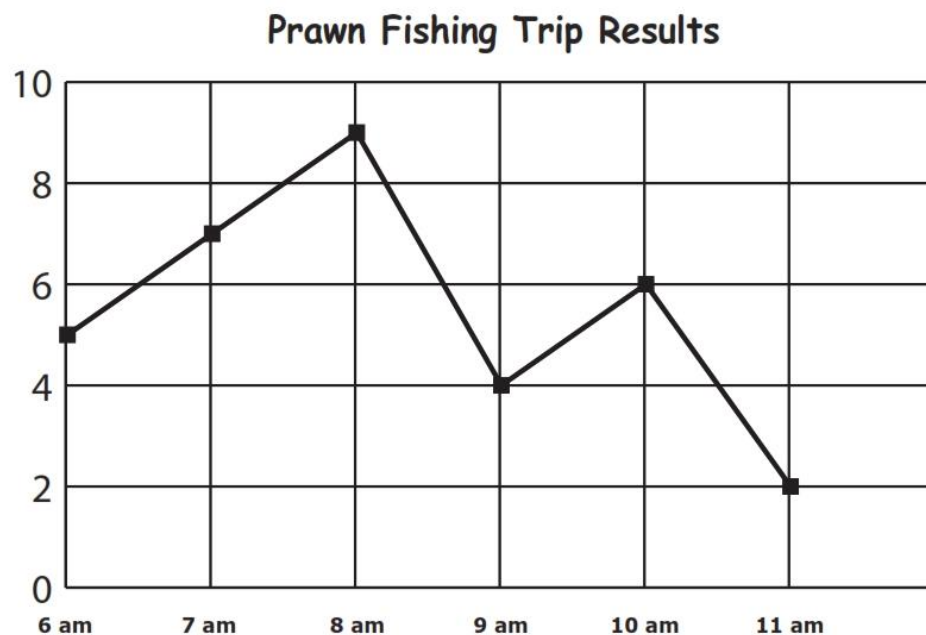
In a park, the number of visitors who came to park for a week, is shown in the above line graph.

- From Monday to Wednesday the number of visitors in park was at peak.
- The less visitors visited the park on Thursday and Friday.
- On Saturday and Sunday number of visitors was more than Thursday and Friday.

Usually, a line graph represents data which changes with time.

Activity # 32:

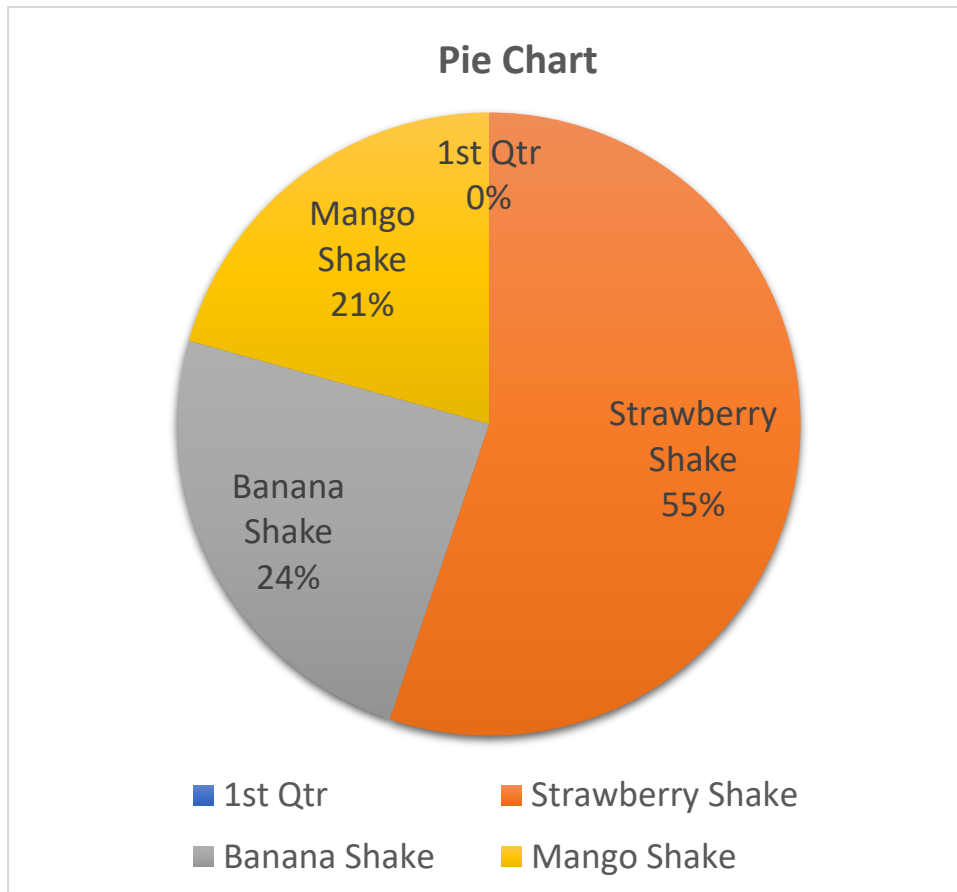
The following graph shows the number of prawns caught in a day. Use the graph to answer the questions.



- ① What time were the most prawn caught?
- ② What time were the fewest prawn caught?
- ③ From 7 a.m. to 8 a.m. did the number of prawn caught increase or decrease?
- ④ How many prawn were caught at 7 a.m.?
- ⑤ How many prawn were caught at 8 a.m.?
- ⑥ Were more caught at 10 a.m. or at 11 a.m.?
- ⑦ What is the total number of prawn caught?
- ⑧ Were there at least 3 prawn caught at 11 a.m.?

Pie Chart:

A Pie Chart is also called a circle graph. It can be divided into many sectors and each sector represents only one type of thing.



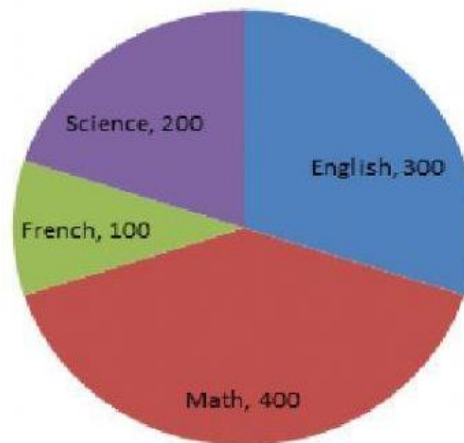
- **The Pie Chart is showing information about people's favorite flavour of milk shake, according to the result of survey.**

- (a) Most of the people like strawberry shake.
- (b) Least number of people like mango shake.
- (c) Less than a half number of people like banana shake.

Activity # 33:

Look at the pie chart showing the number of books in the library of different subjects. Answer the following questions:

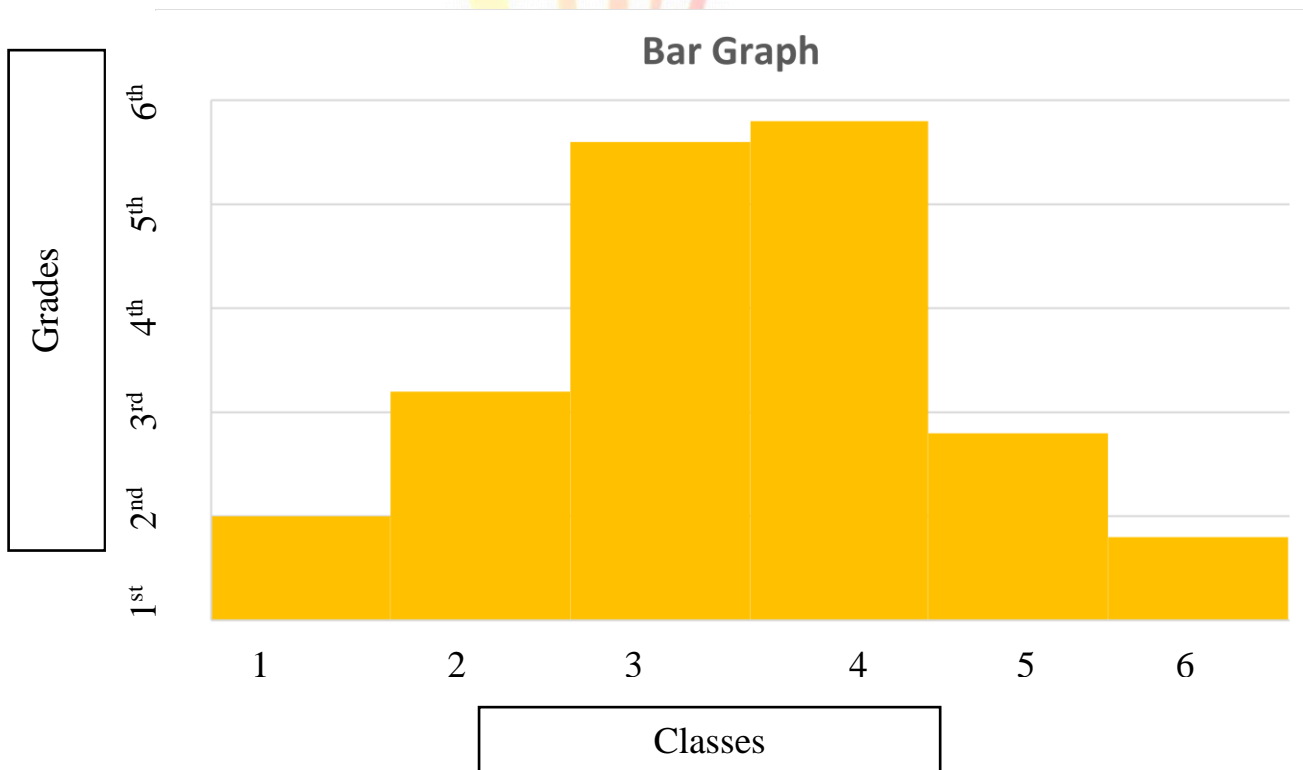
Library books



- How many books are there in the library of English? _____.
- How many more books are there of English than of Science? _____
- Which subject books are minimum in the library? _____
- Which subject books are maximum in the library? _____
- How many total books are there in the library?

Review Exercise

- Choose the correct options and fill in the blanks.
- 1. It is important that in a bar graph, the _____ of each bar is same.
 (a) Colour (b) Length (c) Width
- 2. Line graph can be of _____ types.
 (a) Two (b) One (c) Three
- 3. _____ is drawn by joining the dots representing the quantity of a given value.
 (a) Pie chart (b) Line graph (c) Bar graph
- 4. _____ is also called a circle graph.
 (a) Pie chart (b) Bar graph (c) Line graph
- Sara 's grade from 1 to 6th class is shown in following bar graph . Read the graph to answer the questions.



(a) What was Sara 's grade in one class? _____

(b) In which class Sara got highest grade? _____

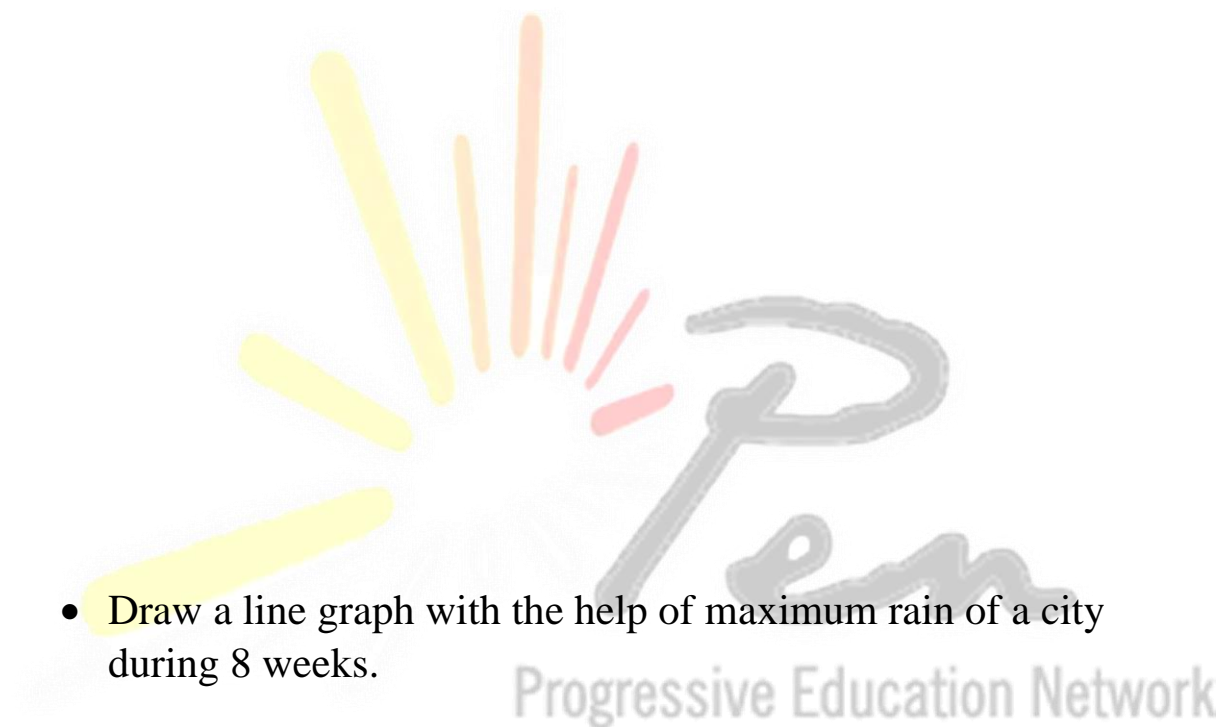
Date: _____

Day: _____

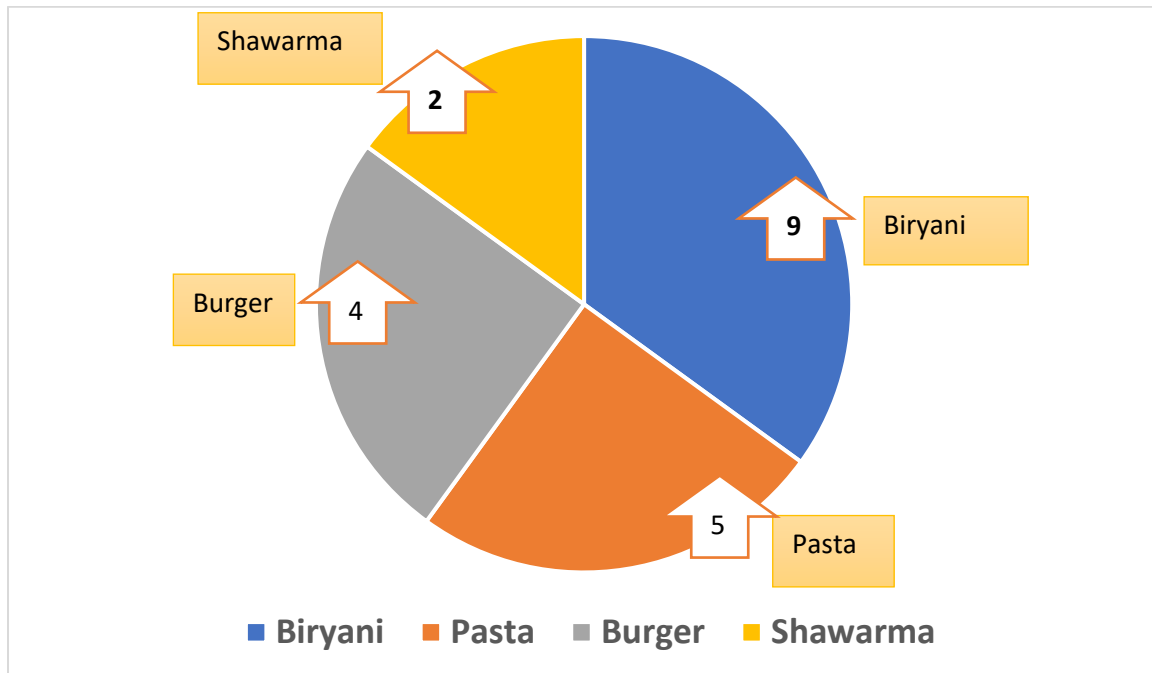
(c) In which class Sara got lowest grade? _____

- Create a horizontal bar graph by doing a survey of your colony in which you have to ask people about their favorite game.

- Draw a line graph with the help of maximum rain of a city during 8 weeks.



- Arham asked 20 members of his family about their favourite food. Arham, prepared a pie chart based on the answers given by all family members.



(a) How many people like Burger?

(b) Which food is liked the most?

(c) Which food is liked the least?

Date: _____

Day: _____

- Make a pie chart of any 5 items of a departmental store, according to their quantity.



Date: _____

Day: _____

