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**Syllabus**  
**Academic Session 2017-2018**

**APRIL-MAY:****1. Integers:**

- Multiplication and division of integers
- Properties of integers (including identities for addition & multiplication - *commutative, associative and distributive*)
- Word problems including integers (all operations)

**2. Lines and Angles:**

- Pairs of angles (linear pair, supplementary, complementary, adjacent and vertically opposite angles)
- Properties of parallel lines with transversal (alternate, corresponding, interior and exterior angles)

**JULY:****3. Rational Numbers:**

- Introduction to rational numbers
- Operations on rational numbers
- Word problems (including all operations)

**4. Data Handling:**

- Collection and organization of data
- Mean, median and mode of ungrouped data
- Introduction to Probability
- Drawing bar graphs

**AUGUST:****5. Exponents and Powers:**

- Introduction to exponents
- Zero exponent
- Laws of exponents (through patterns)

**6. Perimeter and Area:**

- Area of a square, rectangle, parallelogram and triangle
- Area between two rectangles
- Idea of  $\pi$
- Circumference and area of circle
- Area between two concentric circles

**REVISION FOR FIRST TERM EXAMS**

**SEPTEMBER-OCTOBER:****7. Symmetry:**

- Recalling reflection symmetry
- Rotational symmetry – observations of rotational symmetry of 2D objects ( $90^\circ$ ,  $120^\circ$ ,  $180^\circ$ )
- Rotating given figure about a given point by  $90^\circ$  and  $180^\circ$

**NOVEMBER:****8. Algebraic Expressions:**

- Identifying constants, coefficients and powers
- Like and unlike terms, degree of expressions
- Addition and subtraction of algebraic expressions.
- Evaluation of algebraic expressions.

**9. The Triangle and its Properties:**

- Angle sum property
- Exterior angle property
- Triangle inequality property
- Pythagoras Theorem

**DECEMBER:****10. Simple Equations:**

- Solving linear equations in one variable
- Word problems

**JANUARY-FEBRUARY:****11. Practical Geometry:**

- Construction of simple triangles (given three sides, given a side and two angles on it, given two sides and the included angle, given a side and the hypotenuse of a right angle)

**12. Congruence of Triangles:**

- Introduction to the concept of congruence of figures
- Conditions of congruence of triangles (SAS, SSS, ASA and RHS)

**13. Comparing Quantities:**

- Understanding percentage as a fraction with denominator 100
- Converting fractions and decimals into percentage and vice-versa
- Application to profit and loss
- Application to simple interest

**REVISION FOR ANNUAL EXAMS**



# *Assignments*

THE CIVIL SERVICES SCHOOL

**Assignment - 1**  
**INTEGERS**

1. (a) What should be subtracted from  $(-18-19-13)$  to obtain  $(-15+28-9)$  ?  
 (b) The product of two integers is  $-105$ . If one of them is 7, find the other.  
 (c) Write a pair of integers whose difference gives  $-6$ .  
 (d) What is the difference between the temperature 15 degrees above zero and 20 degrees below zero?  
 (e) Solve  $-|-12| + |-3| - |5|$ .
2. Which of the following statements is true and which is false? *Justify each false statement with an example/reason.*  
 (a) The collection of integers is closed under division.  
 (b) The product of four positive integers is positive.  
 (c) The product of four negative integers is negative.  
 (d)  $24 \div 3(2)$  is same as  $24 \div 3 \times 2$ .  
 (e)  $(-1)^{25} = 1$
3. Simplify each of the given expressions:  
 (a)  $[(-8) \times (-7)] \div [(-10) + (-4)]$       (b)  $24 - 42 \div 6 \times 5 + 3 - 10$   
 (c)  $25 - [-15 - (23 - 4 \text{ of } 7 + 10)]$       (d)  $17 + [18 \div 3(-2 - 4) + 1]$   
 (e)  $-125 + 250 \div 5 \times 10 - 325$       (f)  $(5 - 2 \times 3) - [-2 - \{-10 + (3 + 10 \div 2)\}]$
4. Simplify each of the following using a suitable property:  
 (a)  $15 \times 93 + 15 \times (-73)$     (b)  $80 \times 665 \times (-125)$   
 (c)  $-124 \times 25 - 25 \times (-24)$     (d)  $(-42) \times (-98)$   
 (e)  $56 \times (-23) - 56 \times 76 - 56$
5. A boy flung a pebble 18 metres high in the air which fell and settled at the bottom of a pond 14 metres deep. By how much distance did the pebble fall?
6. A certain freezing process requires that room temperature be lowered from  $45^\circ\text{C}$  at a rate of  $6^\circ\text{C}$  every hour. What will be the room temperature 8 hrs after the process begins?
7. Every floor of a 20 storey building is 5 m high. If a lift moves 2 metres every second, how long will it take to move from 3<sup>rd</sup> floor to the 15<sup>th</sup> floor?
8. In a test (+4) marks are given for every correct answer and (-2) marks for every wrong answer. Rohit answered 25 questions correctly and scored 68 marks. How many questions did he attempt incorrectly?
9. Poonam is an enthusiastic student in her diving class. On the first day, she managed to dive to a depth of 5m. From second day onwards, she managed to dive five meters deeper than the previous day, and so on. How far did she dive on the fifth day?
10. A manufacturer is producing two products A and B. He earns a profit of Rs 36 per unit on product A and a loss of Rs 8 per unit on product B. If he sells 3000 units of product A and 2500 units of product B, find his overall profit or loss.

**WEB RESOURCES:**

Multiplication of integers:

<http://goo.gl/LJW8MM>**Enrichment Exercise [Optional]:**

1. Fill in the missing positive/negative signs to make each statement true:

(a)  $\_15 + \_30 = -15$

(b)  $\_42 - \_9 \times \_10 + \_9 = -123$

(c)  $\_81 \div \_9 + \_4 = -13$

2. In each case, give *two* negative integers and *one* positive integer such that

(a) their sum is  $-12$

(b) their product is  $500$

3. If  $a = -2$  and  $b = 3$ , then find the value of  $|-a-b| - a \times b$ .**Fun Corner**

Students must complete each of the questions and then colour in the given pattern corresponding to their answers.

**Multiplying Integers**

$(2)(3)=$



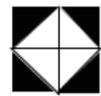
$(-4)(3)=$



$(-5)(0)=$



$(1)(-1)$



$(-5)(-1)=$



$(5)(-2)=$

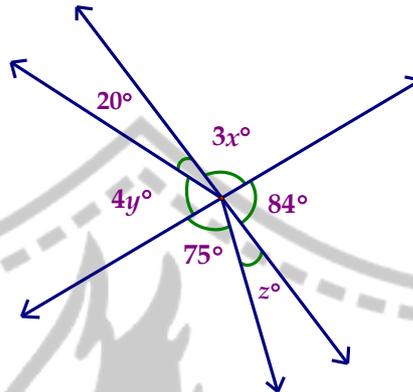


$(3)(4)$

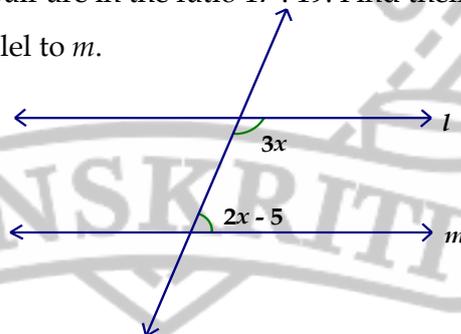
-12	-11	-10	-9	-8
-7	-6	-5	-4	-3
-2	-1	0	1	2
3	4	5	6	7
8	9	10	11	12

**Assignment - 2**  
**LINES and ANGLES**

1. Find the values of  $x$ ,  $y$  and  $z$ :

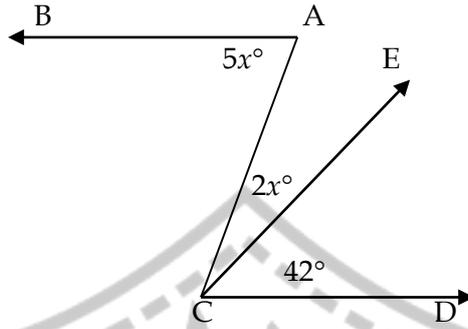


2. Fill in the blanks (*show the working wherever required*):
- A pair of supplementary angles form a \_\_\_\_\_ when placed adjacent to each other.
  - The supplement of an \_\_\_\_\_ angle is an acute angle.
  - The complement of half of  $120^\circ$  is \_\_\_\_\_.
  - If  $2x - 3$  and  $3x + 8$  form a linear pair, then the value of  $x =$  \_\_\_\_\_.
  - If  $7x$  is the complement of  $2x - 9$ , then the value of  $3x =$  \_\_\_\_\_.
  - If an angle is less than  $60^\circ$ , its complement will be greater than \_\_\_\_\_.
  - If co-interior angles are not supplementary, the lines are \_\_\_\_\_.
  - $\angle 1$  and  $\angle 2$  are complementary angles,  $\angle 2$  and  $\angle 3$  are supplementary angles. If  $\angle 1 = 45^\circ$  then,  $\angle 2 =$  \_\_\_\_\_ and  $\angle 3 =$  \_\_\_\_\_.
3. The difference between two complementary angles is  $44^\circ$ . Find them.
4. Two angles forming a linear pair are in the ratio  $17 : 19$ . Find their difference.
5. Find the value of  $x$  if  $l$  is parallel to  $m$ .



6. State true or false. Justify each *false* statement with an *example/reason*.
- Two angles forming a linear pair are supplementary.
  - Two supplementary angles form a linear pair.
  - If two lines are intersected by a transversal, then pairs of corresponding angles are equal.
  - If a transversal cuts two lines such that the co-interior angles are supplementary, then the lines are parallel.

7. Find the value of  $x$  if  $AB$  is parallel to  $CD$ .



8. Line  $AB$  intersects line  $CD$  at  $O$ . If  $\angle AOC$  is twice of  $\angle AOD$ , find the measure of all the angles. Draw the required figure.

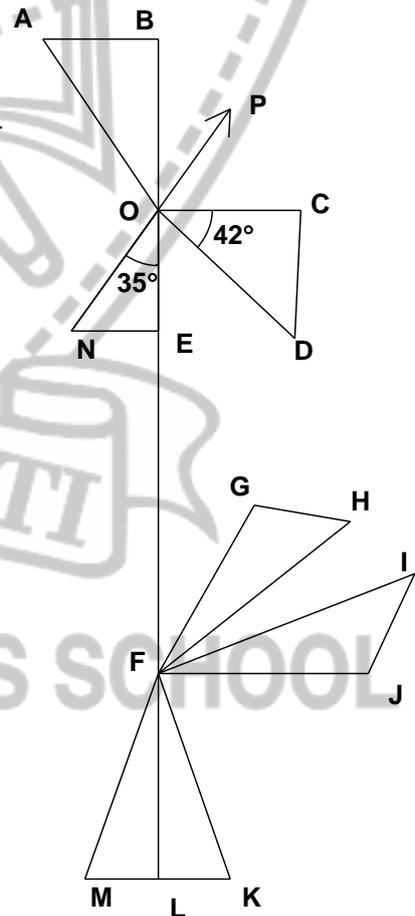
9. If the transversal  $l$  is perpendicular to line  $a$  as well as line  $b$ , is  $a \parallel b$ ? Construct a Diagram to illustrate your answer.

10. When twice an angle is added to  $45^\circ$ , you get the supplement of the angle. Find the angle.

**Enrichment Exercise**

Look at the given figure and answer the following questions:

1. Name a pair of adjacent angles.....
2. Name a pair of complementary angles.....
3. Name a pair of supplementary angles.....
4. Name a linear pair of angles.....
5. Number of obtuse angled triangles.....
6. Name an acute angled triangle.....
7.  $NE \parallel$  .....
8. Angle  $NOE =$ .....(vertical angle)
9. Measure of angle  $ONE$ .....
10. Measure of angle  $POC$ .....



**Assignment - 3**  
**RATIONAL NUMBERS**

- Fill in the blanks (*show the required working*):
  - The additive inverse of  $\left(\frac{-8}{9} + \frac{7}{3}\right)$  is \_\_\_\_\_.
  - The standard form of  $\frac{65}{-117}$  is \_\_\_\_\_.
  - If  $\frac{-18}{72} = \frac{x}{16}$ , then  $x =$  \_\_\_\_\_.
- State True or False :
  - $\frac{-4}{-7}$  is a rational number.
  - $\frac{-3}{8}$  is a fraction.
  - $\frac{3}{-5}$  is not a rational number.
  - $\frac{-7}{-8}$  is a positive rational number.
  - 106 is a positive rational number.
  - $\frac{16}{0}$  is a rational number.
- Arrange in ascending order:  $\frac{2}{-3}$ ,  $\frac{-14}{-9}$ ,  $\frac{-5}{6}$ ,  $\frac{7}{12}$
- $\frac{-11}{24}$  when subtracted from a number gives  $\frac{23}{72}$ . Find the number.
- What should be added to the sum of  $\frac{-5}{7}$  and  $\frac{3}{14}$  to get -1?
- (a) By what number should we multiply  $\frac{-17}{45}$  so that the product may be  $\frac{-17}{5}$ ?  
(b) A number when divided by  $\frac{-18}{55}$  gives the result  $\frac{-22}{9}$ . Find the number.
- The teacher asked the students to read as much as possible of a particular book during the weekend. Rohit read  $\frac{1}{2}$  of the book, Angela read  $\frac{5}{6}$  of the book and Sumit read  $\frac{2}{3}$  of the book. Arrange the three names in the order from the one who read most to the least.
- Sarita had  $87\frac{1}{2}$  m of ribbon for sale. She cut them into pieces of  $6\frac{1}{4}$  m each for streamers to decorate the school hall for Christmas. How many pieces did she get? Was there any left?
- Find the product of the additive inverse of 8, multiplicative inverse of -2, absolute value of -25 and the multiplicative identity of 6.
- In a theatre  $\frac{1}{2}$  the audience were women and  $\frac{1}{3}$  of these women were school girls. If the total audience were 600 in number, how many were school girls?

**WEB RESOURCES:**

Division by zero undefined:

<http://goo.gl/aDmGcj>

**Enrichment Exercise [Optional]:**

1. In each case, find a positive and a negative rational number whose
- (a) Sum is  $\frac{7}{15}$                       (b) Product is  $-7\frac{1}{8}$                       (c) Difference is  $\frac{-8}{21}$
2. Find  $x$  in each case:
- (a)  $\frac{-3}{7} + x = \frac{8}{3}$                       (b)  $\frac{-12}{5} - x = \frac{5}{9}$                       (c)  $x \div \frac{5}{12} = \frac{18}{25}$                       (d)  $\frac{5}{12} \div x = \frac{18}{25}$

**Fun Corner****PUZZLE on Rational Numbers**

$5\frac{1}{3}$		$\frac{6}{7}$	+		=	$\frac{9}{14}$		
x		-		x		=		
				$\frac{-5}{6}$	-		=	$\frac{-1}{4}$
=		=		=		x		-
6	=	$1\frac{1}{14}$	÷					
								=
					=	$\frac{7}{9}$	+	-1

**Assignment - 4**  
**DATA HANDLING**

1. The following data gives information about the number of children in 21 families in a locality.
- 2, 1, 3, 4, 2, 2, 1, 3, 2, 6, 4, 3, 3, 2, 1, 1, 3, 2, 1, 1, 2
- Find the mode of the data by tabulating the observations.
  - Find the median and mean of the data.

2. A textile Showroom distributes free saplings to customers who purchase clothes for a minimum amount of Rs.5000. The number of saplings they distributed for a week is shown below:

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Number of samples	98	72	83	95	102	135	208

- Find the average number of saplings distributed by the showroom per day.
  - Write two sentences on the importance of planting trees.
3. Go to each section of class VII and note down the number of girls and boys in each section. Construct a double bar graph for this data.
4. The marks obtained out of 100 by 5 students in mathematics and physics are given below. Draw a double bar graph to represent the data by taking appropriate scale.

Student	Ameena	Babita	Charlie	Susan	John
Mathematics	92	90	86	98	85
Physics	86	94	96	96	80

5. The following table gives heights(in cm) of girls and boys.

Boys	182	153	161	186	152	171	163	137
Girls	138	168	152	172	149	155	123	150

- Find the mean height of (i) boys (ii) girls
  - Find the median height of (i) boys (ii) girls
  - Find the range of the height of (i) boys (ii) girls.
  - Name the representative observation which occurs most frequently.
6. The letters of the word "PROBABILITY" are placed in a bag and one letter is taken out.
- There are \_\_\_\_\_ outcomes?
  - What is the probability of the following being the one taken out?
    - $P(P) = \underline{\hspace{2cm}}$
    - $P(B) = \underline{\hspace{2cm}}$
    - $P(\text{vowels}) = \underline{\hspace{2cm}}$
    - $P(\text{consonants}) = \underline{\hspace{2cm}}$
    - $P(X) = \underline{\hspace{2cm}}$
    - $P(\text{any letter}) = \underline{\hspace{2cm}}$
7. Write all the possible outcomes of picking a number from the first 10 composite numbers. Find the range of this list. What is the probability of getting an even number?

8. Write all the integers *between*  $-4$  and  $11$ . What is the median of this list? Also, find the probability of picking an odd number from this list.
9. An ordinary pack of 52 cards is well shuffled. The top card is then turned over. What is the probability that (a) the top card is a red card. (b) the top card is a numbered card.
10. What is the probability of:
  - (a) getting an ace from a deck of 52 cards?
  - (b) getting a number less than 7 when a die is rolled?
  - (c) a card of spades from a deck of 52 cards?
  - (d) getting at least one heads when two coins are tossed together?
  - (e) getting a prime number when a die is rolled?

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**WEB RESOURCES:**

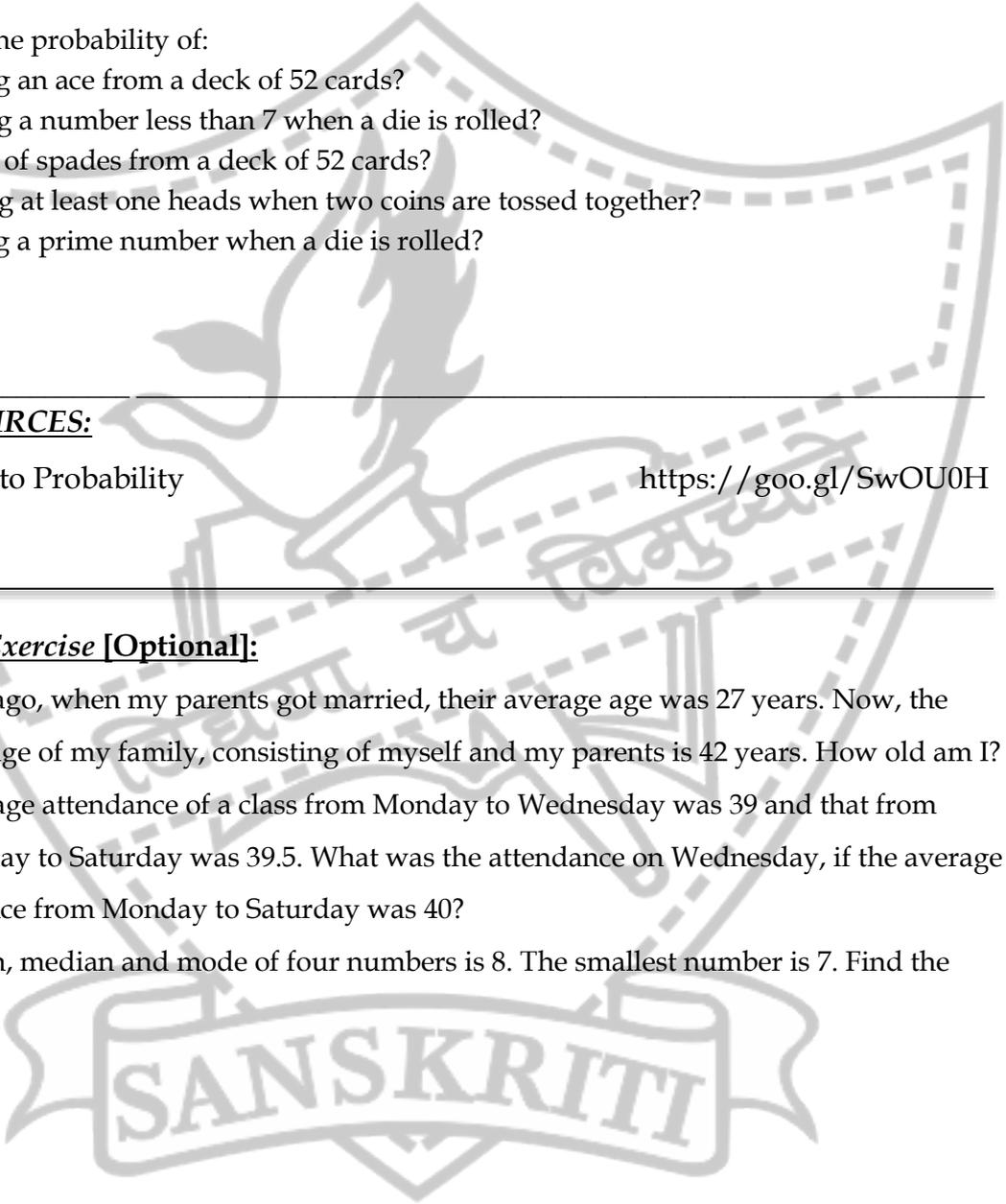
Introduction to Probability

<https://goo.gl/SwOU0H>

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**Enrichment Exercise [Optional]:**

1. 25 years ago, when my parents got married, their average age was 27 years. Now, the average age of my family, consisting of myself and my parents is 42 years. How old am I?
2. The average attendance of a class from Monday to Wednesday was 39 and that from Wednesday to Saturday was 39.5. What was the attendance on Wednesday, if the average Attendance from Monday to Saturday was 40?
3. The mean, median and mode of four numbers is 8. The smallest number is 7. Find the numbers.



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Assignment - 5EXPONENTS AND POWERS

1. a) Is the value of  $(-3)^5$  and  $-3^5$  same? Give reason.  
 b) Is the value of  $(-3)^6$  and  $-3^6$  same? Give reason.

2. Write 2187 in its exponential form.

3. Find the value of:  $2^9 \times 2^{91} - 2^{19} \times 2^{81}$ .

4. Find the value of:  $2^3 + 2^2 + 2^0$ .

5. Simplify the following using laws of exponents:

a)  $[125^5 \div 125] \div 5^8$

b)  $\left[\left(\frac{-2}{3}\right)^5\right]^3 \times \left[\left(\frac{-2}{3}\right)^2\right]^5 \times \left[\left(\frac{-2}{3}\right)^0\right]^5$

c)  $\frac{\left(\frac{4}{7}\right)^5 \times \left(\frac{4}{9}\right)^4}{\left(\frac{4}{9}\right)^2 \times \left(\frac{4}{7}\right)^4}$

d)  $5^a \times 25^b$

6. Find  $x^2$  if  $x = (-9)^2 \div [(-9)^{-2}]^0$ .

7. Using laws of exponents, determine  $x$  so that:

a)  $\left(\frac{3}{5}\right)^3 \times \left(\frac{3}{5}\right)^{x+5} = \left(\frac{3}{5}\right)^{14}$

b)  $(2^x)^6 = (2^9)^2$

c)  $\left[\left(\frac{2}{3}\right)^2\right]^4 = \left[\frac{2}{3}\right]^{3x-1}$

d)  $7^{2x-1} \times 7^3 = 49$

e)  $6^{x-1} = 1$

f)  $x^3 \times (-5)^3 = (-10)^3$

8. Simplify using laws of exponents:

(a)  $\frac{(2^2)^3 \times 3^3 \times 5^4}{8^2 \times 3^2 \times 125}$

(b)  $[729^3 \div 729] \div 3^8$

9. If  $4^x = 256$ , then find the value of  $6^{2x-8}$

10. Find the value of  $[(-2)^2]^4$

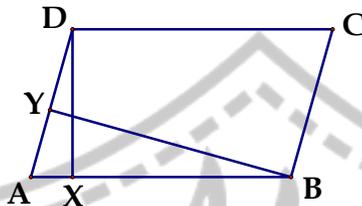
WEB RESOURCES:

Exponents and Powers

<http://goo.gl/voUSkE>

**Assignment - 6**  
**PERIMETER AND AREA**

1. Find the area of the parallelogram ABCD if  $DX \perp AB$ ,  $BY \perp AD$ ,  $BY = 30$  cm,  $DX = 20$  cm and  $AD = 25$  cm. Also find the length of AB.



2. The area of a parallelogram ABCD is equal to that of another parallelogram PQRS. In ABCD,  $AB = 40$  cm and the corresponding altitude  $DE = 18$  cm whereas in PQRS,  $QR = 36$  cm. Find the corresponding altitude PM.
3.  $\Delta PQR$  is right angled at P. PS is perpendicular to QR. If  $PQ = 8$  cm,  $QR = 17$  cm and  $PR = 15$  cm, find the area of  $\Delta PQR$ . Also find the length of PS.
4. A garden in the form of a right angled triangle has an area of 72 sq m. If the two sides comprising the right angle are equal, what could be the length of these sides?
5. The area of a parallelogram is 420 sq m. If the distance between two parallel sides is 15 m, find the length of these sides.
6. If the perimeter of a parallelogram is 140 m, the distance between a pair of opposite sides is 7 m and its area is 210 sq m, find the length of two adjacent sides of the parallelogram.
7. To fence a circular garden, the total cost is Rs 26,400 at the cost of Rs 50 per metre. Find the radius of the circle.
8. A tablecloth 350 cm long and 200 cm wide has a 15 cm border all around it inside. Find the cost of printing the border at the rate of 50 paise per 10 sq cm.
9. A rectangular garden is 200m long and 160m broad. In its middle, there is a circular tank of radius 28m. Find the cost of covering the remaining portion of the garden with grass at the rate of 50 paise per sqmetre. (Take  $\pi = 22/7$ )
10. If the length of the minute hand of a clock is 14cm, find
- (a) The distance covered by its tip in one hour.
- (b) The area swept by it in half an hour.
11. There are two concentric circles. The radius of the outer circle is 10 cm & the radius of the inner circle is 4 cm. Find the area of the shaded portion. (Take  $\pi = 22/7$ )

**WEB RESOURCES:**

CIRCLE &PI :

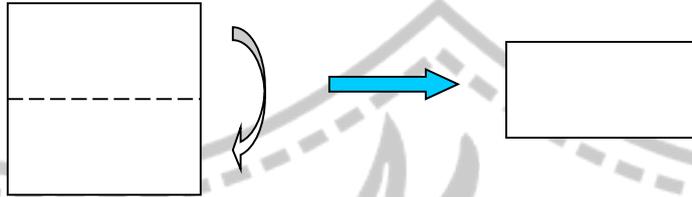
<http://goo.gl/8ORvZy>

AREA OF CIRCLE:

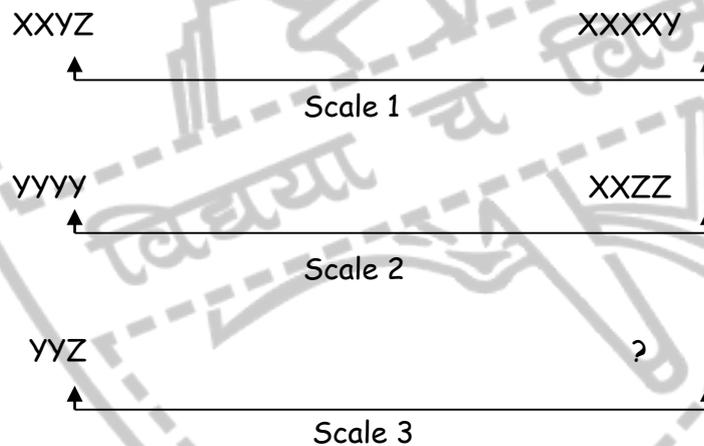
<http://goo.gl/WZL8Is>

**Enrichment Question [Optional]:**

Q. If a square paper is folded into half, the new rectangle has a perimeter of 39 inches. What is the area of the original square? Also, find its perimeter.

**Fun Corner****Balancing Act:**

Scales 1 and 2 are in perfect balance. How many X's must be put on the right side of Scale 3 to maintain the balance?



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\* Egg & Box- answer: **850 paise** (A pair of egg and box costs 250 paise)

\* Number of triangles - answer: **48**

**Assignment - 7**  
**ALGEBRAIC EXPRESSIONS**

1. Write the numerical coefficients of all the terms in the following expression:
  - (a)  $-pq + 7p^2q^2$
  - (b)  $x + 3xy - 4yz$
2. Fill in the blanks:
  - (a) The coefficient of  $x^2$  in  $-7x^3 + 4x^2 - 10x$  is \_\_\_\_\_.
  - (b) The terms of the expression  $-15x^3 - 4y^3 + 10x^3y^3$  are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
  - (c)  $3x^2y$  &  $-2yx^2$  are \_\_\_\_\_ terms.
  - (d) If  $3x = -18$ , then  $5x =$  \_\_\_\_\_.
  - (e) The coefficient of  $a^2$  in  $-21a^2b^3c$  is \_\_\_\_\_.
3. The length of rectangle is  $3x - 4y + 6z$  and the perimeter is  $7x + 8y + 17z$ , find the breadth of the rectangle.
4. What will be the value of  $a$  if  $3x^2 + x + a$  equal to 8 when  $x = 1$ ?
5. What should be added to  $3x - y + 5z^2 - 4$  to get  $19y - 6 - 8x$ ?
6. Subtract the sum of  $-7m^2 + 8n^2 - 3$  and  $4n^2 - 7$  from the sum of  $15m^2 + 11 - 6n^2$  and  $-10 - m^2 - n^2$ .
7. If  $A = 2m - 5n - 7p$ ,  $B = -9n + 6m + 10p$  and  $C = 17p - 4n + 4m$ , find  $A - B + C$ .
8. For  $x = -1$ ,  $y = 2$  and  $z = -3$ , evaluate each of the following:
  - (a)  $xy + z - y^2$
  - (b)  $2x^2 - 5y^2$
  - (c)  $-xyz + 8$
  - (d)  $\frac{y}{2} + \frac{z}{3}$
9. Rohan had  $17x^2 + 4x - 3$  rupees with him. He spent  $8x^2 - 7x - 9$  rupees for his birthday party. How much money is left with him?
10. Three sides of a triangle are  $2x^2 + 3x + 1$ ,  $x^2 + 7$ , and  $3x^2 - 2x + 3$ . What is its perimeter?

**SANSKRITI**  
**THE CIVIL SERVICES SCHOOL**

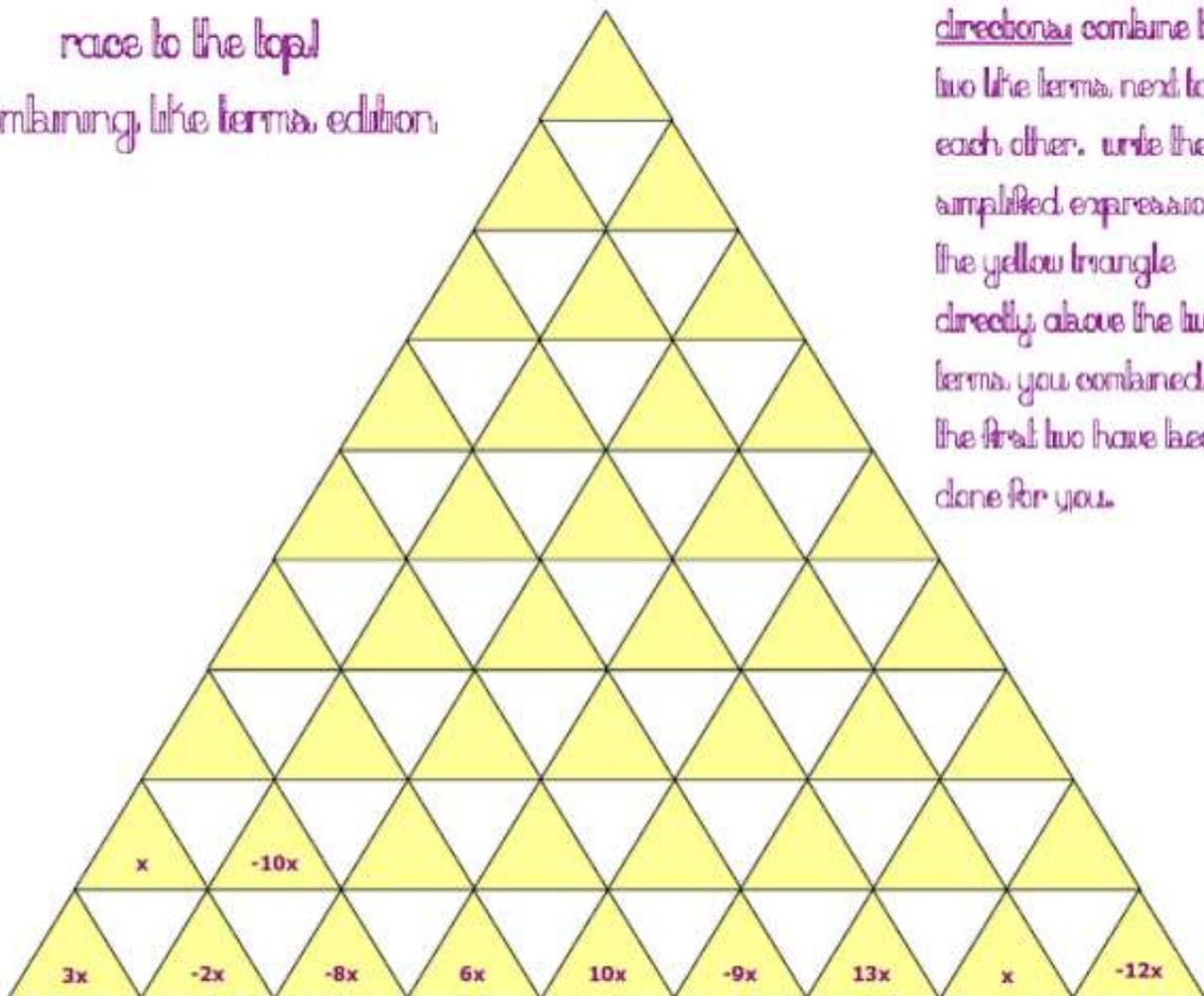
Fun Corner

Combine the two like terms next to each other and write the simplified expression in the yellow triangle directly above the two terms...



race to the top!  
combining like terms edition

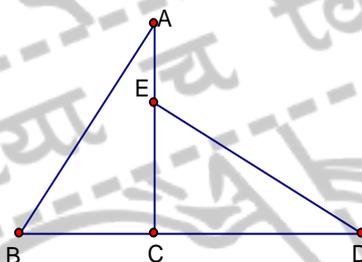
directions: combine the two like terms next to each other. write the simplified expression in the yellow triangle directly above the two terms you combined. the first two have been done for you.



THE CIVIL SERVICES SCHOOL

**Assignment - 8**  
**TRIANGLES AND ITS PROPERTIES**

- The angle at the vertex of an isosceles triangle is four times its base angles. Find the angles of the triangle.
- An exterior angle of a triangle is  $100^\circ$  and one of its interior opposite angles is 3 times the other. Find the measure of each angle of the triangle.
- One of the angles of an isosceles triangle is  $100^\circ$ . Is this a base angle or a vertical angle? Give reasons. Calculate the other two angles also.
- A 13m long ladder is placed against the wall in such a way that the foot of the ladder is 5m away from the wall. At what height does the ladder reach the wall?
- An apple orchard is in the form of a rectangle. If its length is 60m and the length of one diagonal is 75m. Find the breadth and perimeter of the orchard.
- Two poles are on the either sides of the road. Heights of the poles are 10m and 18m respectively. The distance between their tops is 17m. Find the width of the road.
- In the given figure, find  $\angle ACD$  and  $\angle AED$  if  $\angle B = 45^\circ$ ,  $\angle D = 40^\circ$  and  $\angle A = 25^\circ$ .



- Will sides 3cm, 5cm, 7cm form a *triangle*? Justify your answer.
- Will sides 3cm, 5cm, 7cm form a *right triangle*? Justify your answer.
- In  $\triangle PQR$ ,  $PQ = PR$  and  $\angle R = 40^\circ$ . Find the other two angles. **Draw the required figure.**
- The longest side of a right triangle is 65 cm. If one of the shortest side is 60 cm, find the third side.

**WEB RESOURCES:**

Properties of Triangles

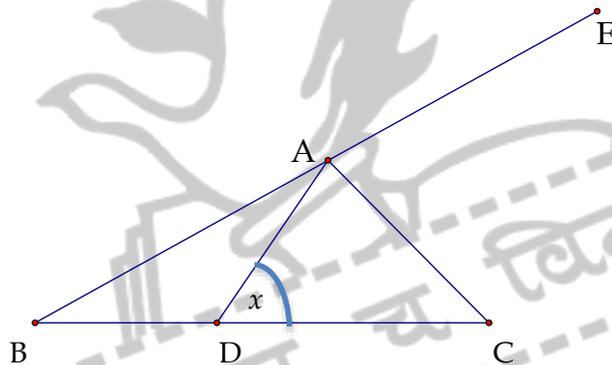
<http://goo.gl/7n2UMq>

**Enrichment Exercise (Optional):**

- 1) A 25m long ladder is placed against a vertical wall inside a room such that the foot of the ladder is 7m from the foot of the wall. If the top of the ladder slides 4m downwards, then the foot of the ladder will slide by  
 (a) 16m                      (b) 8m                      (c) 4m                      (d) 2m

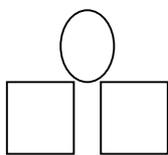
3) Equal sides of an isosceles triangle are 13cm each and base 10cm. Find the altitude from the vertex to the base of the triangle.

4) In the given figure,  $BD = AD = AC$  and  $\angle EAC = 75^\circ$ . Find the value of  $x$ .

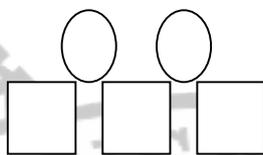


**Fun Corner**

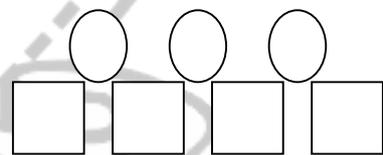
Egg & Box:



350 paise

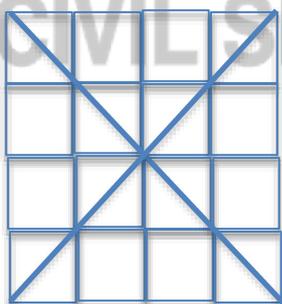


600 paise



?

Find the number of triangles in the given figure:



**Assignment - 9**  
**SIMPLE EQUATIONS**

**Part- I**

1. Solve the following linear equations:

a)  $2(x-2)+3(x-3)=4(x-5)+(2x-1)$

b)  $\frac{3x}{2} + \frac{1}{10} = \frac{5x}{3} + \frac{1}{15}$

c)  $\frac{2x-5}{3} = \frac{x-3}{2}$

d)  $3.45x - 0.75 = 2.25 + 0.45x$

e)  $\frac{2x}{3} - \frac{3x}{5} = 1 - 4x$

f)  $\frac{4-3x}{2} = \frac{2x+29}{5}$

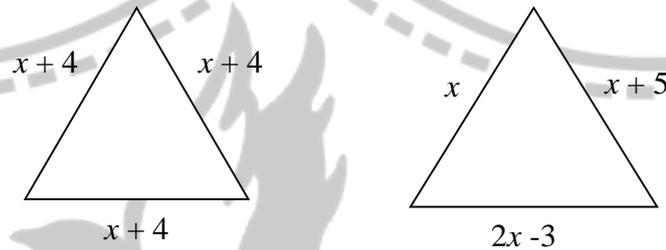
g)  $2(x+3) - 3x = 8 - 2(2x-5)$

2. If  $\frac{5m-2}{2} = -11$ , find the value of  $2m+3$ .

**Part- II**

1. Three-fourths of a number is more than half of the number by 6. Find the number.
2. Find three consecutive even integers whose sum is 108.
3. The cost of 2 tables and 5 chairs is Rs 2300. If a table costs Rs 30 more than a chair, find the price of each.
4. Two angles are supplementary. One is  $64^\circ$  more than the other. Find the angles.
5. The length of a rectangular field exceeds its breadth by 10m. If the perimeter of the field is 100m, find the length and breadth of the field.
6. A man left two-thirds of his property to his wife, one-fourth to his daughter and Rs15000 to his son. How much money did the man have?
7. Ram's age is 4 times that of his son. Five years ago, he was 9 times as old as his son was then. What are their present ages?
8. One-third of the length of a pole is under the ground, one-fourth in water and the remaining 5 m above water. Find the total length of the pole.
9. In a lottery, a total of 200 prizes are to be given. A prize is either of Rs 500 or Rs 100. Find the number of each type of prizes if the total prize money is Rs 50000.

10. Each of the two equal sides of an isosceles triangle is three times as large as the third side. If the perimeter of the triangle is 28cm, find each side of the triangle.
11. The sum of two numbers is 94. The larger number is 5 less than twice the smaller number. Find the numbers.
12. Find the value of  $x$  if the two triangles given below have the same perimeter.




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**WEB RESOURCES:**

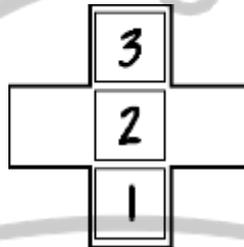
Simple Equations

<http://goo.gl/7JMM5a>

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**Fun Corner**

1. The diagram below shows a cross-shaped box containing three numbered blocks.



The puzzle is to slide the blocks around the box until the numbers read 1, 2, 3 as you go down. How do you do it?

2. Points A, B, C and D are arranged in order on a line such that  $AB = 3BC = 2CD$ . What is BD as a fraction of AD?

**Assignment - 10**  
**PRACTICAL GEOMETRY**

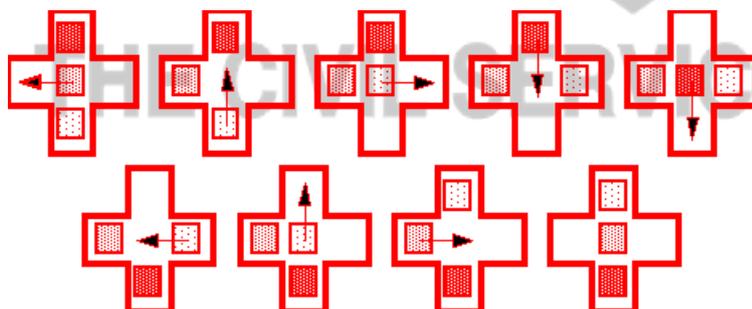
1. Construct  $\triangle ABC$  in which  $AB = 6.5\text{cm}$  and  $BC = CA = 4.5\text{cm}$ .
2. Construct  $\triangle ABC$  in which  $AB = 6\text{cm}$ ,  $BC = 5\text{cm}$  and  $\angle B = 45^\circ$ .
3. Construct  $\triangle PQR$  in which  $PQ = 5.4\text{cm}$ ,  $\angle P = 70^\circ$  and  $\angle Q = 80^\circ$ .
4. Construct  $\triangle PQR$  in which  $PQ = 6.3\text{cm}$ ,  $\angle P = 70^\circ$  and  $\angle R = 80^\circ$ .
5. Construct  $\triangle XYZ$  in which  $XY = 5\text{cm}$ ,  $XZ = 7\text{cm}$  and  $\angle Y = 90^\circ$ .
6. Construct  $\triangle DEF$  with  $DE = 5\text{cm}$ ,  $EF = 6.5\text{cm}$  and  $\angle E = 90^\circ$ .
7. Construct an equilateral triangle of side  $5.2\text{cm}$ .
8. Construct a right - angled triangle in which sides containing the right angles are  $6\text{cm}$  and  $4.5\text{cm}$ . Measure the hypotenuse.
9. Construct an isosceles right-angled triangle  $ABC$  such that its hypotenuse  $AC=5.5\text{cm}$ .
10. In each case, check if it is possible to construct a **unique** triangle with the given sides and angles:
  - (a) A triangle with sides  $7.5\text{cm}$ ,  $3\text{cm}$  and  $4\text{cm}$ .
  - (b) A triangle with angles  $50^\circ$ ,  $60^\circ$  and  $70^\circ$ .
  - (c) A right triangle with sides  $4\text{cm}$ ,  $5\text{cm}$  and  $7\text{cm}$ .
  - (d)  $\triangle ABC$  with  $\angle A = 85^\circ$ ,  $AB = 7\text{cm}$  and  $\angle B = 95^\circ$ .

**WEB RESOURCES:****Constructions:**

<http://goo.gl/VWwUjk>

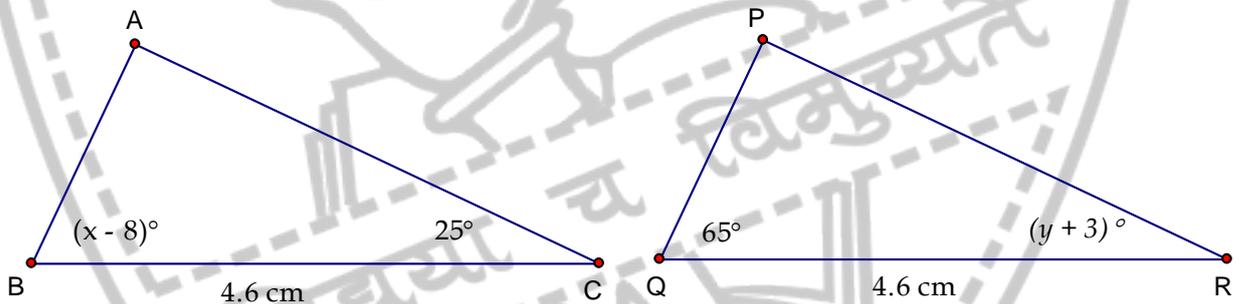
\* *Balancing Act-* answer: 5 X's will balance YYZ

\* *Fun Corner 1 answer:*



**Assignment - 11**  
**CONGRUENCE OF TRIANGLES**

- State *true* or *false*. Justify each *false* statement with an *example/reason/figure*.
  - Two circles with the same radii are congruent.
  - If two rectangles have equal areas, they are congruent.
  - Two equilateral triangles are congruent.
  - If two squares have equal areas, they are congruent.
  - Two triangles with angles  $50^\circ$ ,  $60^\circ$  and  $70^\circ$  are congruent by AAA criterion.
- If  $AB=PQ$ ,  $AC=PR$  and  $\angle A = \angle P = 40^\circ$ , then by which congruence rule  $\triangle ABC \cong \triangle PQR$ ?
- In  $\triangle ABC$  and  $\triangle PQR$ ,  $AB=3.5\text{cm}$ ,  $BC=7.1\text{cm}$ ,  $AC=5\text{cm}$ ,  $PQ=7.1\text{cm}$ ,  $QR=5\text{cm}$  and  $PR=3.5\text{cm}$ . Then  $\triangle BCA \cong$  \_\_\_\_\_.
- Find the values of  $x$  and  $y$  if  $\triangle ABC \cong \triangle PQR$ .



- In  $\triangle PQR$ ,  $PS$  is an altitude and  $PQ = PR$ . (Draw the required diagram)
  - Prove that  $\triangle PQS \cong \triangle PRS$ .
  - Is  $PS$  a median also? Why or why not?
  - Is  $\angle QPS = \angle RPS$ ? Give reason.
- In  $\triangle PQR$ ,  $\angle P = 58^\circ$ ,  $\angle R = 72^\circ$  and  $PR = 8\text{cm}$ . In  $\triangle ABC$ ,  $\angle B = 72^\circ$ ,  $\angle A = 58^\circ$  and  $AB = 8\text{cm}$ . Are the triangles congruent? If so, write the congruence of these triangles in correct correspondence.
- In  $\triangle ABC$ ,  $AD$  is the bisector of  $\angle A$ . If  $AD \perp BC$ , prove that  $AB = AC$   
(Draw the required diagram)
- $\triangle PQR \cong \triangle LMN$ ,  $PQ = 20x - 8$ . If  $LM = 92\text{cm}$ , find the value of  $x$ .
- If  $\triangle ABC \cong \triangle XYZ$ ,  $\angle X = 65^\circ$  and  $\angle C = 55^\circ$ , then find  $\angle Y$ .
- $\triangle PQR \cong \triangle LMN$ . Perimeter of  $\triangle LMN$  is  $220\text{cm}$ . If the sum of two sides of  $\triangle PQR$  is  $130\text{cm}$ , what is the length of the third side of  $\triangle LMN$ ?

Fun and Interesting Facts About Pi

# $\pi$

- 1) Pi occurs in hundreds of equations in many sciences including those describing the DNA double helix, a rainbow, ripples spreading from where a raindrop fell into water, superstrings, general relativity, normal distribution, distribution of primes, geometry problems, waves, navigation....
- 2) Pi is the 16th letter of the Greek alphabet. The first person to use the Greek letter Pi was Welshman William Jones in 1706. He used it as an abbreviation for the periphery of a circle with unit diameter. Euler adopted the symbol and it quickly became a standard notation.
- 3) Pi is irrational. An irrational number is a number that cannot be expressed in the form  $(a / b)$  where a and b are integers.
- 4) There is no zero in the first 31 digits of Pi.
- 5) The Babylonians found the first known value for Pi in around 2000BC -They used  $(25/8)$ .
- 6) The Bible uses a value of Pi of 3. Here is a verse from I Kings 7,23: And he made a molten sea, ten cubits from one brim to the other: it was round all about, and his height was five cubits: and a line of thirty cubits did compass it about.
- 7) Pi day is celebrated on March 14 at the Exploratorium in San Francisco (March 14 is 3/14) at 1:59 PST which is 3.14159.

**Here's a Pi limerick:**

*Three point one four one five nine two*

*It's been around forever - it's not new*

*It appears everywhere, here and there.*

*It's irrational I know but it's true!*

**Assignment - 12****COMPARING QUANTITIES**

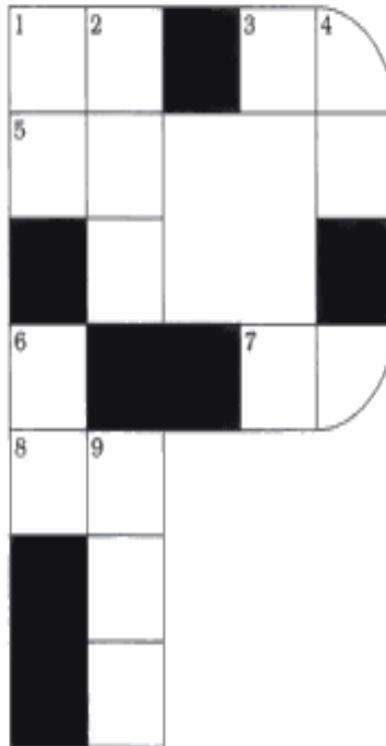
1. Ramesh and Satish contested the Delhi assembly elections. Ramesh scored 11,484 votes which was 44% of the total votes. Satish scored 26% of the votes. Calculate the number of votes cast in the village and the number of voters who did not vote for either Ramesh or Satish.
2. Lalit got 50% marks in Hindi, 75% in English and 90 marks in Maths. The maximum marks in each of the subjects were 100, 140 and 160 respectively. Find his aggregate percentage.
3. Rohit sold his chair for Rs 720 at a loss of 10%. For how much did he buy the chair?
4. A computer costing Rs 60,000 one year ago now costs Rs 40,000. Find the percentage increase or decrease in the price.
5. A man bought a car for Rs 60,000 and spent 10% of the cost of the car for the purchase of new tyres. At what price should he sell the car to make a gain of 15%?
6. I bought a washing machine for Rs 7500 and spent Rs 500 on its cartage. Due to some circumstances, I was compelled to sell it for Rs 6000. Find my loss percent.
7. Find the simple interest and amount of Rs 3500 for 2 years at 8% per annum.
8. Raju borrowed Rs 18000 from a moneylender at 12 % per annum for 5 years and Sanju borrowed the same amount at 8% per annum from the bank for 6 years. Who paid more interest and by how much?
9. Nikhil borrowed some money from a moneylender at 10% per annum. He paid Rs 3000 as interest after two years. How much money did he borrow?
10. What is the rate of interest which gives an interest of Rs 250 on a sum of Rs 5000 for 2 years?

**Enrichment Exercise [Optional]:**

1. The ratio of the cost price and selling price of an article is 5 : 6, find the gain percent.
2. If the simple interest on a certain sum of money for 2 years be one-fifth of the sum, then find the rate of interest per annum.
3. A certain brand of soap powder is sold at Rs 2.50 a sachet. They cost Rs 18 a dozen. What is the gain or loss percent on 3 dozen sachets?
4. A restaurant adds 10% service charge and 12% VAT on the basic price of meals. If the basic price of meal is Rs 1500, how much money do I pay for the meal?
5. Sudhir borrowed Rs 3,00,000 at 12% per annum from a money-lender. At the end of 3 years, he cleared the account by paying Rs 2,60,000 and a gold necklace. Find the cost of the necklace.

Fun Corner

## Percentage Crossword

**Across**

1. 25% of 128 = \_\_\_\_\_

3.  $n\%$  of 12 is 3  $n\%$  = \_\_\_\_\_

5. 12% of  $n = 7.8$   $n =$  \_\_\_\_\_

7.  $66\frac{2}{3}\%$  of 42 = \_\_\_\_\_

8.  $n\%$  of 208 = 108.16  $n\%$  = \_\_\_\_\_

**Down**

1. 6% of 600 = \_\_\_\_\_

2. 5% of  $n = 12.5$   $n =$  \_\_\_\_\_

4.  $n\%$  of 18 is 9.9  $n\%$  = \_\_\_\_\_

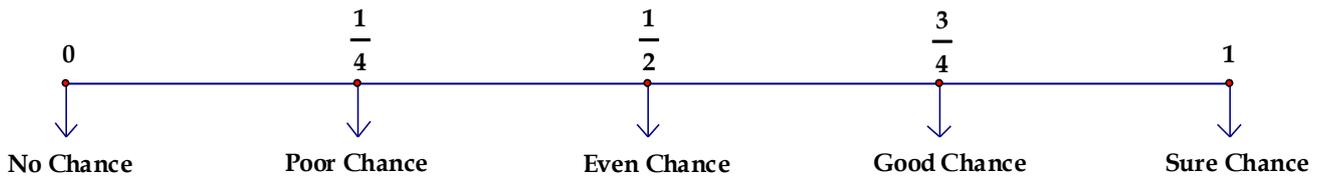
6.  $\frac{3}{5}\%$  of 2500 = \_\_\_\_\_

9. .4% of  $n = 1.024$   $n =$  \_\_\_\_\_



# *Handouts*

THE CIVIL SERVICES SCHOOL

Handout on PROBABILITY

Describe the chance of happening of each of the following events:

1. If today is 8<sup>th</sup> December, tomorrow will be 9<sup>th</sup> December. \_\_\_\_\_
2. A hundred people can fit into a car. \_\_\_\_\_
3. You throw a tail with a coin. \_\_\_\_\_
4. You throw a 3 with a die. \_\_\_\_\_
5. Throwing an odd number with a die. \_\_\_\_\_
6. You throw a number greater than 7 with a die. \_\_\_\_\_
7. A red marble is picked up from a bag containing 7 red & 3 green marbles. \_\_\_\_\_
8. If you work hard, you will pass the examination. \_\_\_\_\_
9. Three lines intersect at 4 points. \_\_\_\_\_
10. We can draw a triangle whose angles add up to 180 degrees. \_\_\_\_\_

**OUTCOMES:** An outcome is the result of a single trial of an experiment.

**PROBABILITY:** Probability =  $\frac{\text{Number of Desired Outcomes}}{\text{Number of Total Outcomes}}$

e.g. All possible outcomes when a die is thrown are: 1, 2, 3, 4, 5 and 6

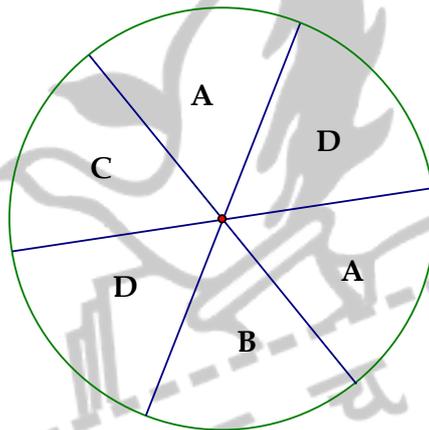
$$\begin{aligned} \text{Probability of getting an even number} &= \frac{3}{6} \begin{array}{l} \bullet \rightarrow \text{Getting a 2, 4 or 6} \\ \bullet \rightarrow \text{Total outcomes} \end{array} \\ &= \frac{1}{2} \end{aligned}$$

Exercise:

1. (a) Write all the possible outcomes of picking an odd number from first 10 whole numbers: \_\_\_\_\_
- (b) What is the probability of picking 5? \_\_\_\_\_
2. (a) Write all the possible outcomes of picking any letter from the word GAMES:  
\_\_\_\_\_
- (b) Find the probability of selecting the letter E: \_\_\_\_\_

Contd..

3. Write the probability of picking a vowel from the English alphabets: \_\_\_\_\_
4. Find the probability of picking the letter M from the word MATHEMATICS: \_\_\_\_\_
5. Tell whether the probability will be 0 or 1:
  - (a) If today is Friday then yesterday was Thursday. \_\_\_\_\_
  - (b) A die when thrown shall land up with number 0. \_\_\_\_\_
  - (c) You are younger today than tomorrow. \_\_\_\_\_
6. List the outcomes you can see in these experiments:
  - (a) Spinning the following wheel: \_\_\_\_\_

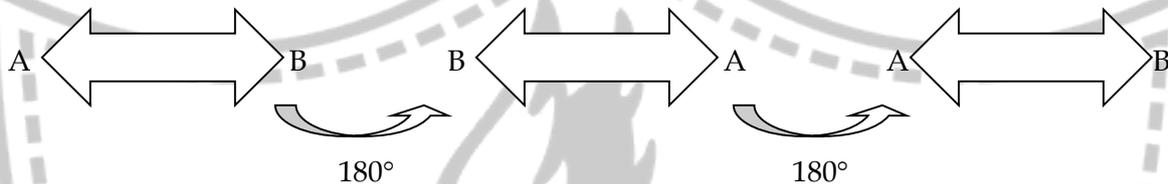


- (b) Tossing two coins together: \_\_\_\_\_
7. Write the probability of getting D in Question 6(a): \_\_\_\_\_
8. (a) Write all the possible outcomes of picking an integer from  $-7$  to  $3$ :  
\_\_\_\_\_
- (b) What is the probability of getting a positive integer? \_\_\_\_\_
9. What is the probability of drawing a black card from a deck of cards?
10. Write all the possible outcomes of getting a multiple of 3 from 20 to 45: \_\_\_\_\_  
\_\_\_\_\_

What is the probability of getting an even number? \_\_\_\_\_

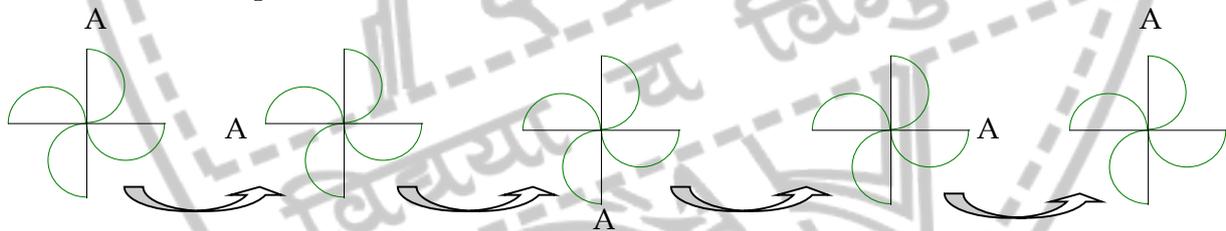
Handout on SYMMETRYRotational Symmetry:

A figure is said to have *rotational symmetry* about a point O if, by rotating it about O, it fits its outline *at least once* before it has made a complete round. The fixed point is called the *centre of rotation*. The angle by which the figure rotates is called the *angle of rotation*. The number of times a figure fits onto itself in one complete round (i.e. the number of times a figure *looks exactly the same*) is called the *order of rotational symmetry*. Look at the following figure:



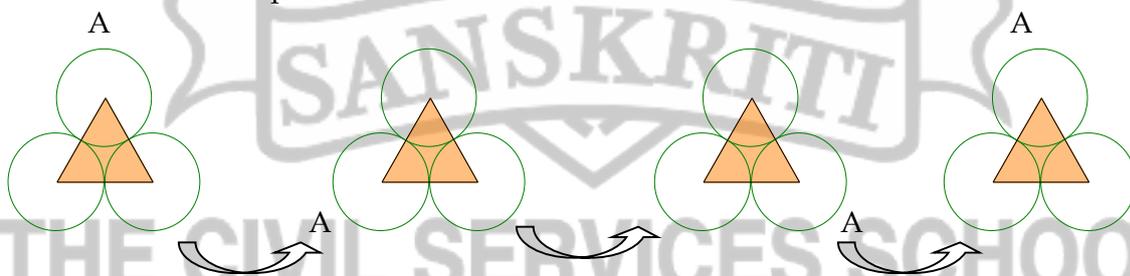
In a full turn, there are precisely **two positions** (on rotation through  $180^\circ$  and  $360^\circ$ ) when the left-right arrow looks exactly the same (apart from the points A and B). Here, the *angle of rotation* is  $180^\circ$  and the *order of rotational symmetry* is **2** (because the figure looked exactly same *twice* before completing a full round).

Now, another example:



Here, there are **four positions** when the figure looks exactly the same before completing a full turn. So, the *order of rotational symmetry* is \_\_\_\_\_. Mark the *centre of rotation*. Can you guess the *angle of rotation*? \_\_\_\_\_. How did you get that? Can you think of a formula to calculate the *angle of rotation*? \_\_\_\_\_.

Here is one more example:

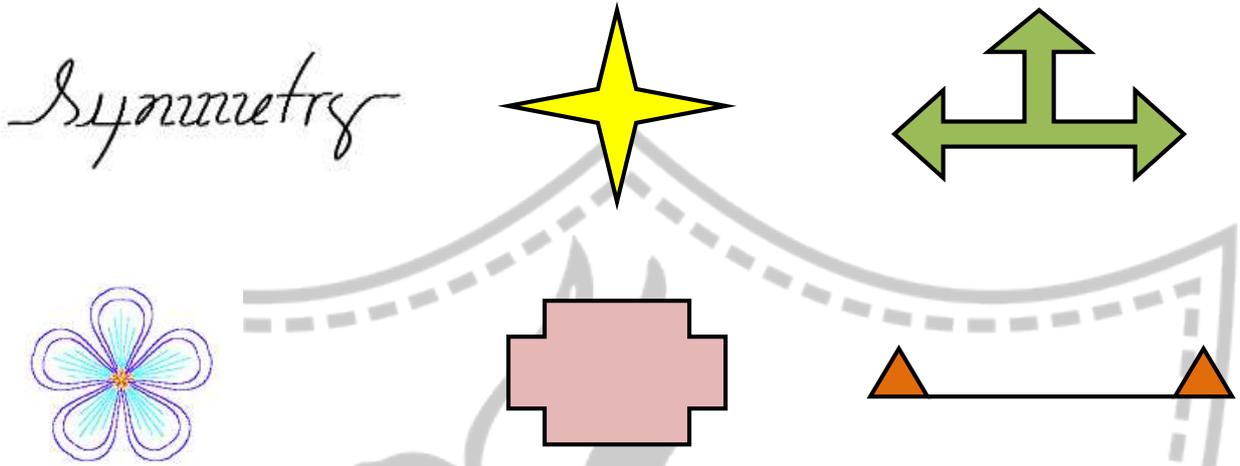


In a full turn, there are precisely **three positions** when the figure looks exactly the same. So, here the *order of rotational symmetry* is \_\_\_\_\_. Mark the approximate *centre of rotation*. Also, using the above formula, find the *angle of rotation*. \_\_\_\_\_.

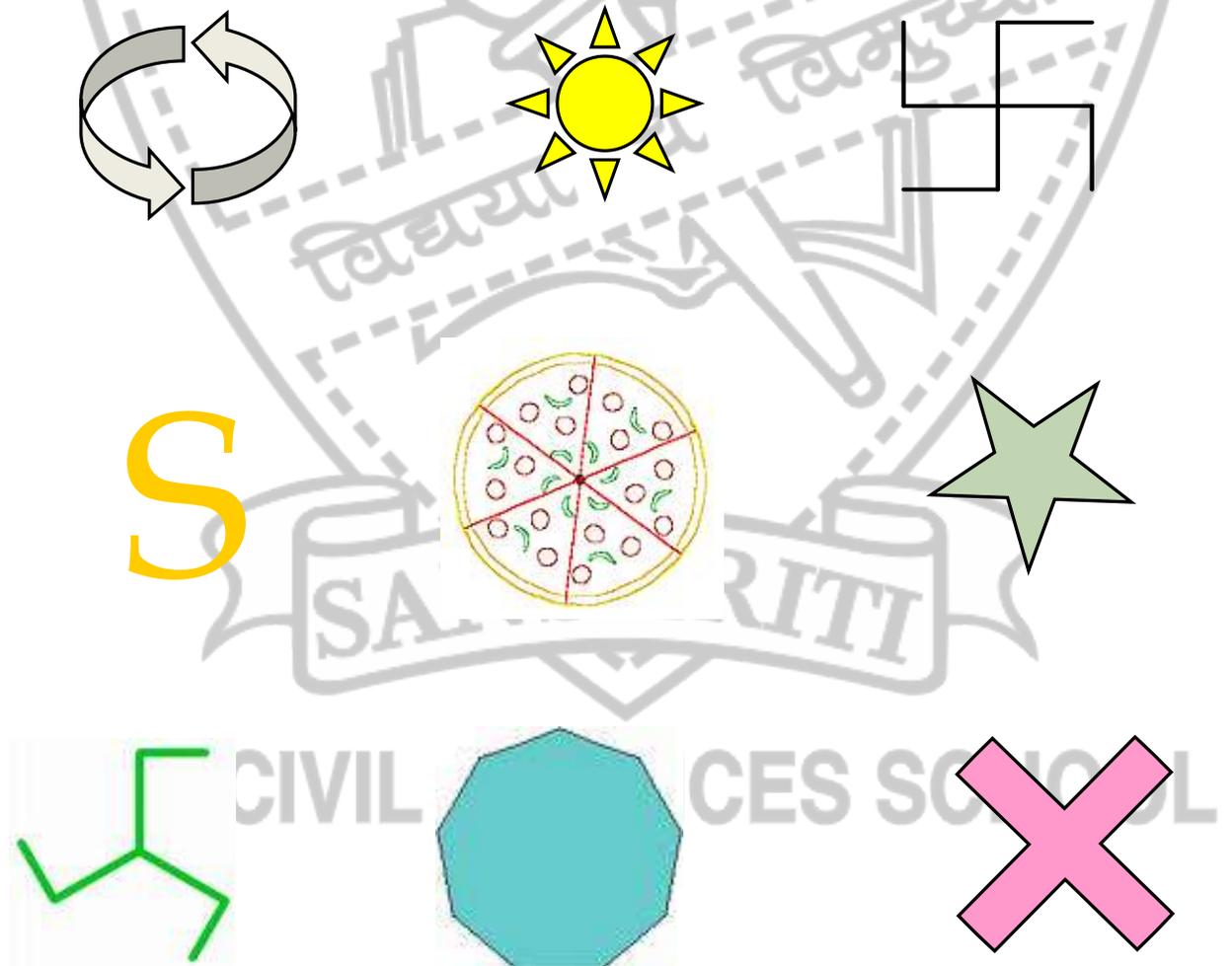
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**Exercise:**

1. Which of the following figures have rotational symmetry of order more than 1?



2. State the order of rotational symmetry and the angle of rotation for each figure:



Contd..

3. Which of the following numbers/letters/figures have *rotational symmetry*?

3

Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

Z

Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

H

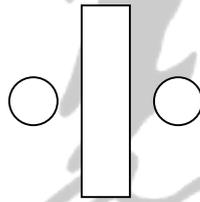
Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

96

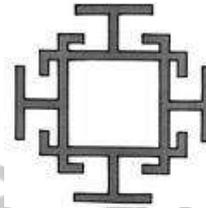
Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_



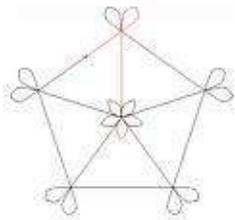
Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_



Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_



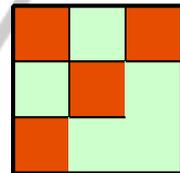
Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

A

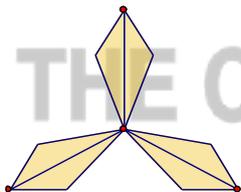
Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_



Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_



Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

M

Rotational Symmetry: \_\_\_\_\_

Order: \_\_\_\_\_

Contd..

### Worksheet on SYMMETRY

Colour exactly 6 squares in figures 1, 2 and 3 to make them symmetrical about the mirror line(s).

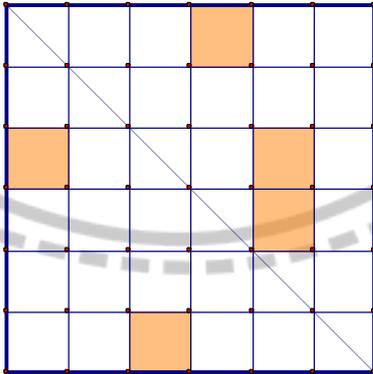


Fig 1

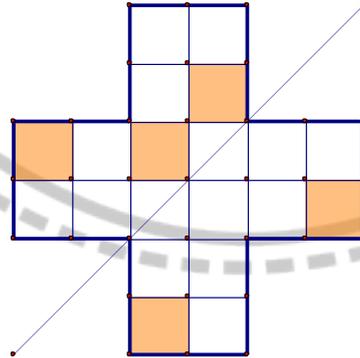


Fig 2

In fig 4, draw as many lines of symmetry as possible. Colour 8 more squares to make the figure symmetrical.

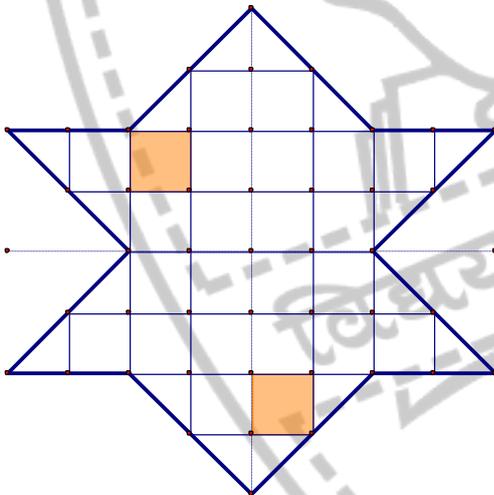


Fig 3

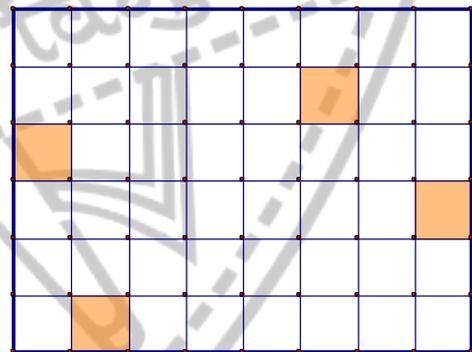
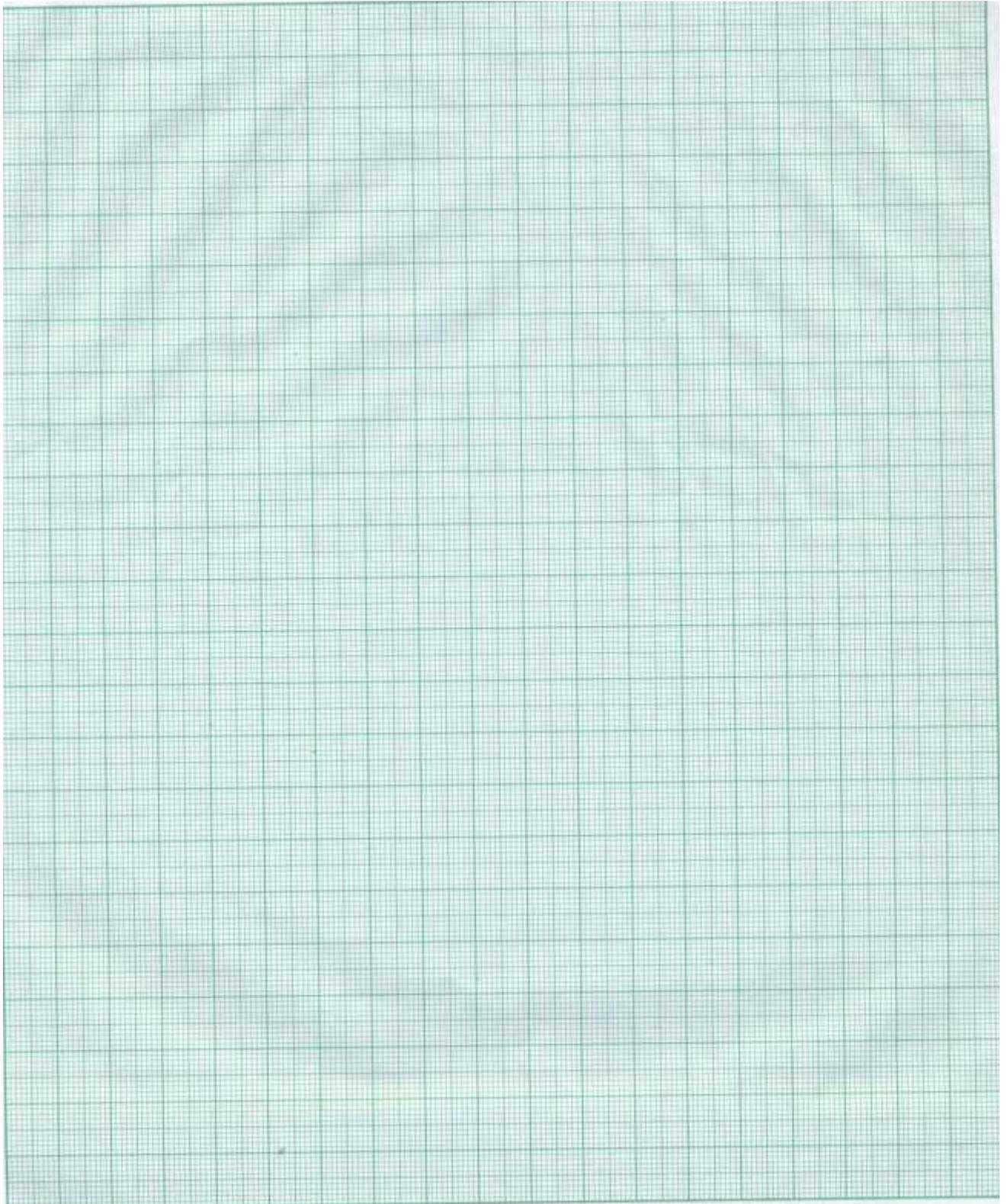


Fig 4

Complete the following figure taking dashed line as the line of symmetry.



**Extra Graph Sheet**





THE CIVIL SERVICES SCHOOL

**Project for Second Term****Visualizing Solid Shapes****Learning Objectives:**

- To visualize and describe 3D shapes.
- To investigate nets of various solid shapes.
- To explore various properties related to 3D shapes (in terms of faces, vertices, edges and surface area).
- Mapping Space around us.

**Important Notes:**

- You may refer to your textbook for details on the topic. It is a part of your curriculum but no direct question will be asked in written exam based on this.
- The Rubric for assessment is given at the end of the Project for your reference.
- There will be negative marking for delay in submission of the project.
- This project should be submitted as a file/folder including a Cover page and the activities mentioned below.

**List of Activities:**

**Activity 1:** Give a brief introduction of Solid Shapes (Hint questions: What are solid shapes? Why are they called 3D? What are their faces, vertices and edges? etc.) You must supplement your content with pictures.

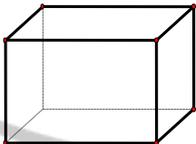
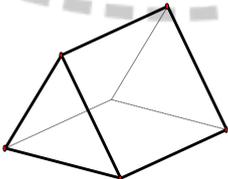
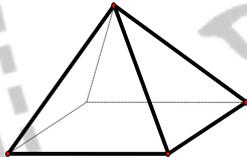
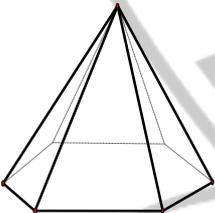
**Activity 2:** Draw labeled nets of any 3 shapes from the list given below:

- Cuboid
- Cylinder
- Cube
- Prism
- Pyramid
- Cone

**Activity 3:** Derive the formula of **Surface Area\*** for any **one** shape with the help of a 'net'.

*\*Surface Area of a 3-D shape is the sum of the areas of all its surfaces (or Faces).*

**Activity 4:** For each solid, count the number of faces, vertices & edges, and complete the table given below:

3D Shape	Faces	Vertices	Edges
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Can you observe the relation between the number of faces, vertices and edges of these solids? What is that? Find the special name given to this relation.

**Activity 5: Mapping Space Around us:**

- Draw a map of the route from your house to your school showing important landmarks.

OR

- Draw a map giving instructions to your friend so that he/she reaches your house without any difficulty.

**(Hint: You can view a route map overleaf of a marriage invitation card giving the route map for the venue.)**

**RUBRIC FOR THE PROJECT ON SOLID SHAPES**

Marks →	2	1.5	1
Activities ↓			
<b>Activity 1:</b> <b>Introduction</b>	All information is correct and relevant with proper examples/ figures.	Most information is correct and relevant with proper examples/ figures.	Some information is correct and relevant with proper examples/ figures.
<b>Activity 2:</b> <b>Nets</b>	All nets are drawn accurately and labelled properly.	Almost all nets are accurate and labelled.	Nets not drawn accurately/ labelling missing.
<b>Activity 3:</b> <b>Surface Area</b>	The formula for Surface Area derived correctly showing all the required steps.	The formula for Surface Area derived correctly showing most of the required steps.	Formula derived but steps not shown.
<b>Activity 4:</b> <b>Relation b/w F, V and E</b>	All blanks filled and relation between faces, vertices and edges derived correctly.	Most blanks filled and relation between faces, vertices and edges derived correctly.	Some blanks filled/ relation between faces, vertices and edges not correct.
<b>Activity 5:</b> <b>Route Map</b>	Clearly laid out route with arrow marks & important land marks.	Route map without landmarks marks.	Route map without arrow marks.



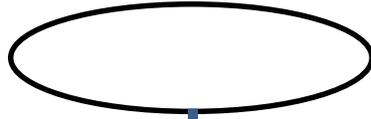
# Activity Sheets

THE CIVIL SERVICES SCHOOL

FLOWCHART

Find the missing number:

?



Add 13

Multiply by  $-5$ 

Divide by 10



3

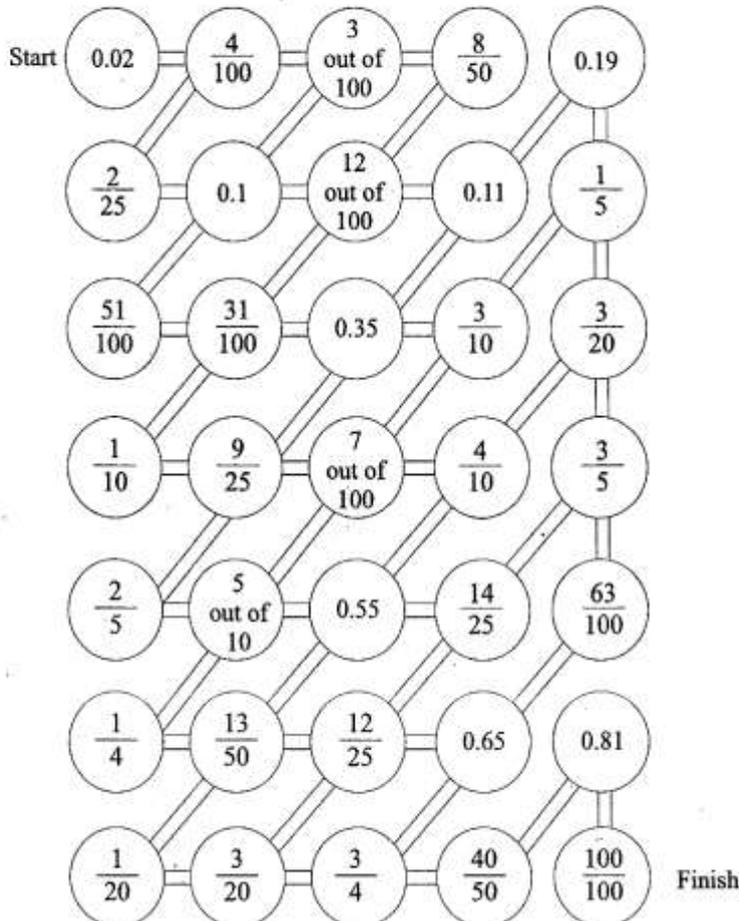
MAGIC SQUARE

A *Magic Square* is a grid of numbers in which the numbers in each row, column and diagonal add up to the same number. Complete the given magic square.

$2 \text{ of } 3^2$		$-3 \times -4$	$-4 + 2$
$-19 \frac{1}{5} \div \frac{-4}{5}$	$-7 \frac{2}{3} - 1 \frac{1}{3}$		
		21	$\frac{6}{0.3}$
$ -10 - 4 $			-5

**PERCENTAGE**

Express each number as a per cent and from the *Start* position move from a smaller number to a bigger one along the path till you reach the *Finish* point.



**'JUMBLE'**

Rearrange the letters in these five Jumbles, one letter to each square/circle, to make five words:

OGYPONL



HTENPSEUYO



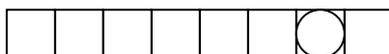
GTRHI



TACGOON

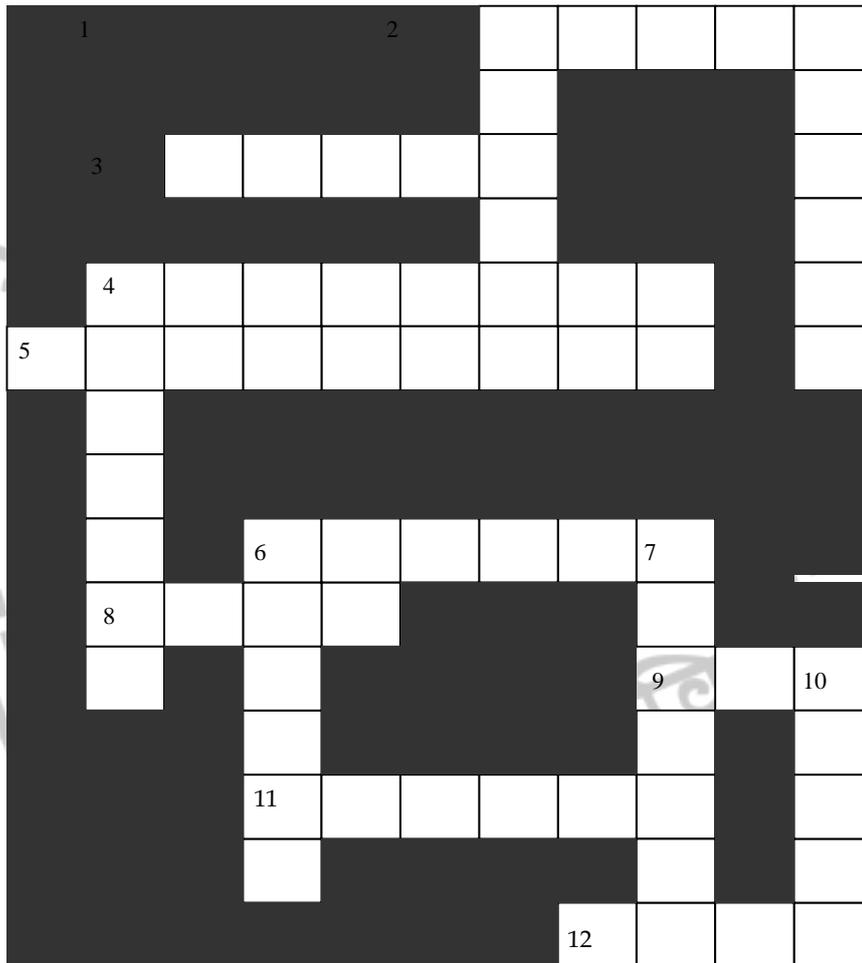


LIRTANAO



Now arrange the circled letters to form the answer to the question:

Name the famous Greek mathematician and philosopher who is also known as 'the father of numbers'.

**GEOMETRIC CONCEPTS-CROSS WORD****ACROSS:**

- 1 Line segments forming a polygon
- 3 Two exactly same triangles joined vertex to vertex (e.g. Kaleidoscope)
- 4 Lines that do not meet
- 5 Points lying on the same line
- 6 Half of diameter
- 8 A curve whose end-points do not meet
- 9 Each of the two rays forming an angle is called its \_\_\_\_\_
- 11 Angle whose measure is between  $90^\circ$  and  $180^\circ$
- 12 Drawings of unfolded 3-D figures are called \_\_\_\_\_

**DOWN:**

- 1 A curve that does not cross itself
- 2 Football is an example of which 3-D figure?
- 4 A closed curve made up of line segments only
- 6 The interior of a curve together with its boundary
- 7 A triangle with all unequal sides
- 10 Middle terms of a proportion are also called \_\_\_\_\_

SUDOKU

Sudoku is a puzzle in which numbers 1 to 9 are inserted in a 9x9 grid subdivided into further nine 3x3 squares in such a way that every number appears only *once* in each row, column and square.

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

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Word Search

I S  
 E J X R  
 U G B E M I  
 H E A C D A S R  
 Y S S T R I R O L A  
 A S F A N A A G S A D E  
 I O E N V E T M O C R C I N  
 Q L N G R V C I E L E E Y E O I  
 A Z M L T F A R O T E L T L L S B L  
 X C Q E U X E I E N E L E A I B H M U C  
 X A D U H L J R P E R L S L N A A E K C  
 F D I A T T N E T P A E I D I P A M  
 A D M R V I A S Z R E R E R E N  
 R I A T O P I T A N D R A S  
 A T R E L L D P O A E V  
 D I Y R U E E C U U  
 I O P P M M M Q  
 U N X X E A  
 S M B S  
 K Y

LINEAR VARIABLE  
 ADDITION RATIO  
 PERCENTAGE NETS  
 SHAPE PYRAMID  
 MULTIPLE ISOSCELES  
 PARALLELOGRAM QUADRILATERAL  
 AREA VOLUME  
 CONE CYLINDER  
 DIAMETER CUBOID  
 RADIUS QUARTER  
 MEDIAN MEAN  
 RECTANGLE LOSS  
 INTEREST

Try to unscramble the words below. Good Luck!

- |                  |       |                   |       |
|------------------|-------|-------------------|-------|
| 1. BAGAREL       | _____ | 2. XTRVEE         | _____ |
| 3. MYLPOCNATEIMR | _____ | 4. NPHUEOSTYE     | _____ |
| 5. GTRIH         | _____ | 6. YRPMIAD        | _____ |
| 7. GTAOCON       | _____ | 8. AOLSUTEB       | _____ |
| 9. TPENNESXO     | _____ | 10. IATOR         | _____ |
| 11. OPTRIOPNOR   | _____ | 12. ENAIOURMTNS   | _____ |
| 13. TENECPREAG   | _____ | 14. ALIARETLEQU   | _____ |
| 15. COSELISES    | _____ | 16. INEMDA        | _____ |
| 17. ODEM         | _____ | 18. CLICRE        | _____ |
| 19. LPMLEAARORAG | _____ | 20. ETINLARG      | _____ |
| 21. HRITECTMIA   | _____ | 22. CONFIASRT     | _____ |
| 23. OVIHDSN      | _____ | 24. ASBDOM        | _____ |
| 25. ECALESN      | _____ | 26. ILATQEUDLARRA | _____ |
| 27. RSIMP        | _____ | 28. NRCEDYIL      | _____ |
| 29. EONC         | _____ | 30. OSMDSNNIEI    | _____ |
| 31. LALERPLA     | _____ | 32. RCNTOCCENI    | _____ |
| 33. RNRCECUNOT   | _____ | 34. ESINL         | _____ |
| 35. IOPTN        | _____ | 36. TENGMEs       | _____ |
| 37. CEOSTR       | _____ | 38. AUSIRD        | _____ |
| 39. ECMALID      | _____ | 40. DRDNHUE       | _____ |



## SQUARES

A game for 2 - 4 players: Players take it in turns to join any two dots with a vertical or horizontal line. A player that completes a square with his line captures that square, places his initials in it and gains another turn. When all the squares are complete, players total the values of each square they have captured. The player with the lowest score wins.

●	●	●	●	●	●	●	●	●	●	●
	-1	6	-1	3	0	2	-9	3	-2	8
●	●	●	●	●	●	●	●	●	●	●
	2	-8	1	-2	-6	6	-8	5	4	0
●	●	●	●	●	●	●	●	●	●	●
	9	2	-7	1	9	-6	0	2	7	1
●	●	●	●	●	●	●	●	●	●	●
	0	-3	5	-5	7	-2	1	-7	0	-3
●	●	●	●	●	●	●	●	●	●	●
	1	8	6	-4	-5	4	-8	-7	-1	7
●	●	●	●	●	●	●	●	●	●	●
	-6	7	3	0	-8	2	-9	-4	-9	6
●	●	●	●	●	●	●	●	●	●	●
	-4	3	8	9	5	-3	-5	3	8	-2
●	●	●	●	●	●	●	●	●	●	●
	7	5	1	-2	4	-7	-3	4	-1	7
●	●	●	●	●	●	●	●	●	●	●
	-5	8	-9	-6	-3	9	4	6	-4	2
●	●	●	●	●	●	●	●	●	●	●
	0	6	-4	7	-7	9	1	-9	3	-5
●	●	●	●	●	●	●	●	●	●	●

# THE CIVIL SERVICES SCHOOL

**PUZZLE TIME**

1) I am a number, Tell my Identity!  
Take me seven times over, and add a fifty!  
To reach a triple century,  
You still need forty!

2) It's a rainy season, Let's think of the reason.  
A unit fraction remains the same,  
When, when, when!

**RHYME TIME**

Read the following poem and complete by adding your own lines.

Parks and fences  
And tiles on the wall,  
The frame of a photo  
Is something common in all?

Give it a thought,  
Don't be a cheater....  
Sometimes, we find the area  
Sometimes, the perimeter.....

**SANSKRITI**  
**THE CIVIL SERVICES SCHOOL**



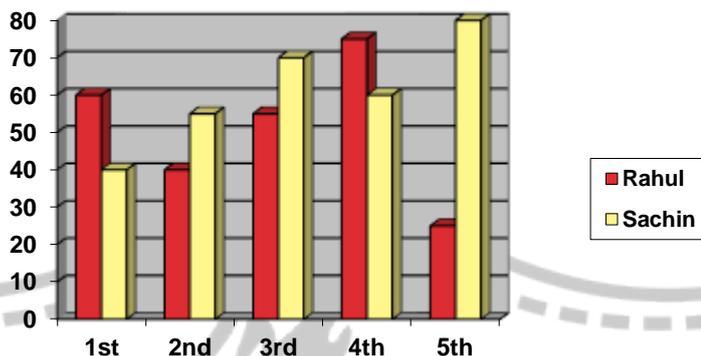
# Question Bank

THE CIVIL SERVICES SCHOOL

**Question Bank 1 for First Term**

- The product of  $\frac{-7}{9}$  and  $x$  is 1. What is the value of  $x$ ?  
 (i)  $\frac{16}{9}$     (ii)  $\frac{7}{9}$     (iii)  $\frac{9}{7}$     (iv)  $\frac{-9}{7}$
- The product of the smallest positive integer and the greatest negative integer is  
 (i) 1    (ii) 0    (iii) -1    (iv) None of the above
- The area of a parallelogram with base 12cm and altitude 6cm is  
 (i)  $36\text{cm}^2$  (ii)  $72\text{cm}^2$     (iii)  $27\text{cm}^2$  (iv)  $63\text{cm}^2$
- The average of the even numbers from 1 to 30 is  
 (i) 17    (ii) 15    (iii) 16    (iv) 19
- The absolute value of  $-17 + 24 \div 4(-2)$  is  
 (i) 29    (ii) 5    (iii) 11    (iv) 20
- 4 bags contain different number of black and white marbles as follows:  
 RED bag : 3 white and 4 black  
 BLUE bag : 3 white and 6 black  
 GREEN bag : 4 white and 5 black  
 YELLOW bag : 4 white and 7 black  
 From which bag do white marbles have the greatest chance of being drawn at random?  
 (i) Blue    (ii) Yellow    (iii) Green    (iv) Red
- The area of a triangle is  $84\text{cm}^2$ . Its base is 14cm, the altitude will be  
 (i) 6cm    (ii) 3cm    (iii) 12cm    (iv) 7cm
- Which of the following rational numbers is closest to zero?  
 (i)  $\frac{-5}{12}$     (ii)  $\frac{-2}{3}$     (iii)  $\frac{-5}{6}$     (iv)  $\frac{-3}{4}$
- The circumference of a circle is 176 cm. Its diameter is  
 (i) 5.6 cm    (ii) 28 cm    (iii) 56 cm    (iv) 42 cm
- If  $2^x \times 3^x = 216$ , then the value of  $x$  is  
 (i) 36 (ii) 3 (iii) 6 (iv) 216
- The product of 10 positive and 10 negative integers is  
 (i) Even    (ii) Zero    (iii) Positive    (iv) Negative
- If  $(-1)^x = 1$ , then  $x$  should be  
 (i) Positive    (ii) Negative (iii) Odd    (iv) Even
- In Ques 13, the mean score of Rahul is  
 (i) 50    (ii) 51    (iii) 53    (iv) 55
- Two complementary angles are in the ratio 1:5. What is the difference between their measures?  
 (i)  $15^\circ$     (ii)  $60^\circ$     (iii)  $75^\circ$     (iv)  $45^\circ$

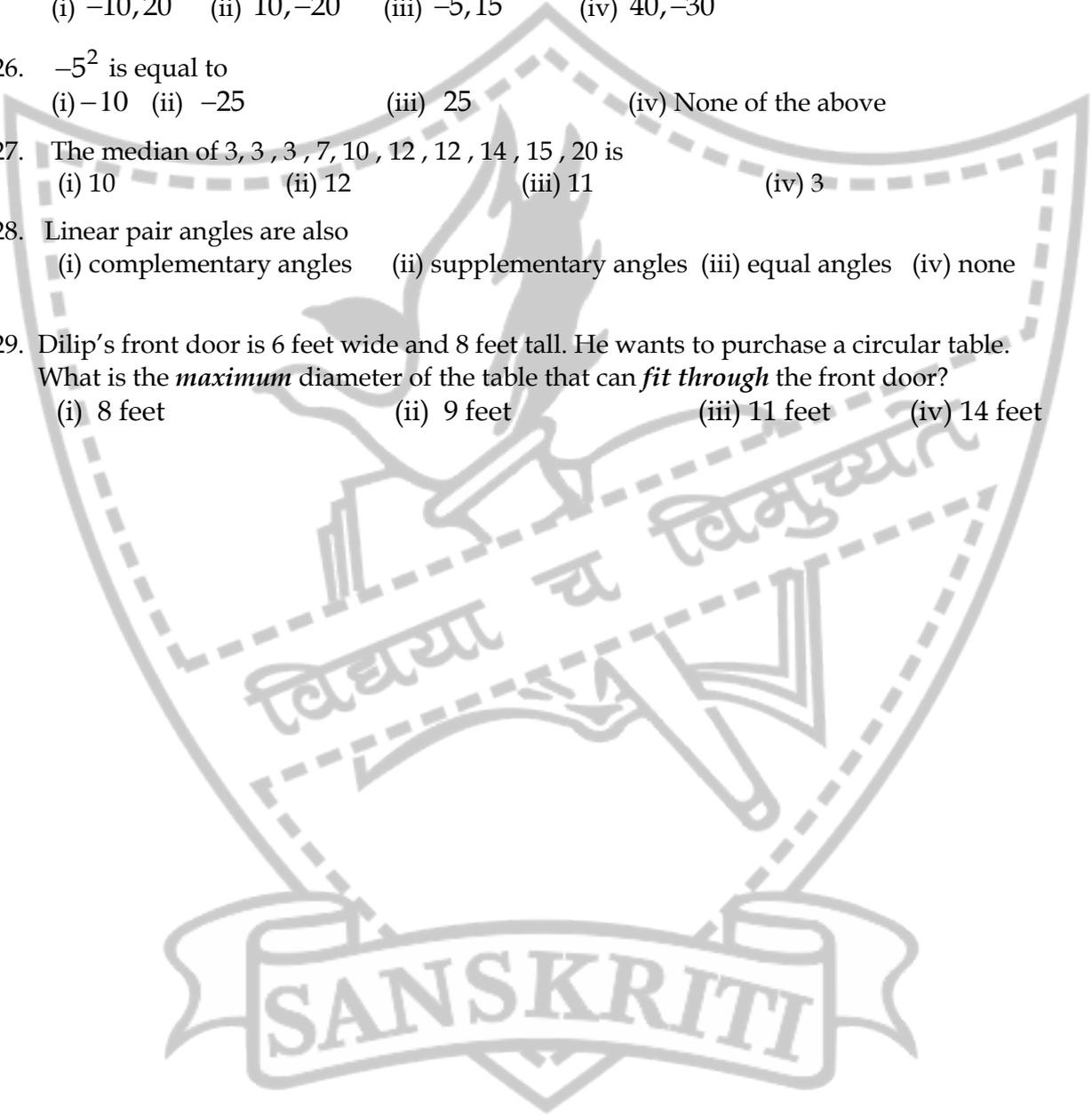
15. The following graph shows the number of runs scored by Rahul and Sachin in 5 matches during a tournament:



In which match did they score the highest number of runs together?

- (i) 1st                      (ii) 3rd (iii) 4th                      (iv) 5th
16. The range of 3.5, 2, 4.5, 8.7, 1.9, 3.2, 1.9 is  
 (i) 1.5                      (ii) 6.8 (iii) 2.6                      (iv) 3.2
17. Which of the following statements is correct?  
 (i) Two angles forming a linear pair are supplementary.  
 (ii) If a transversal cuts two parallel lines, then pairs of alternate interior angles are supplementary.  
 (iii) Two supplementary angles always form a linear pair.  
 (iv) The complement of  $80^\circ$  is  $100^\circ$ .
18. The diameter of the wheel of a car is 70 cm. How much distance will it cover in 100 revolutions?  
 (i) 220 cm                      (ii) 2200 cm                      (iii) 22 m                      (iv) 220 m
19. If  $2^3 + 1^3 = 3^x$ , then the value of  $x$  is  
 (i) 2                      (ii) 3                      (iii) 6                      (iv) 1
20. The value of  $(4^0 - 5^0) \times (-6)^2$  is  
 (i) 36                      (ii) -36                      (iii) 1                      (iv) 0
21. The value of  $(4 - 5)^0 \times (-6)^2$  is  
 (i) 36                      (ii) -36                      (iii) 1                      (iv) 0
22. The probability of drawing a black ball from a bag containing 5 black and 3 red balls is  
 (i)  $\frac{5}{3}$                       (ii)  $\frac{3}{5}$                       (iii)  $\frac{5}{8}$                       (iv)  $\frac{3}{8}$
23. Mode of a set of observations is the value which  
 (i) represents the whole data  
 (ii) is one of the given mid values  
 (iii) occurs most frequently  
 (iv) divides the data into two equal parts

24. The value of  $\frac{3^0 - 15^0}{3^0 + 15^0}$  is  
(i)  $\frac{-2}{3}$  (ii) 0 (iii) 1 (iv) Not defined
25. A pair of integers whose sum is  $-10$  is  
(i)  $-10, 20$  (ii)  $10, -20$  (iii)  $-5, 15$  (iv)  $40, -30$
26.  $-5^2$  is equal to  
(i)  $-10$  (ii)  $-25$  (iii) 25 (iv) None of the above
27. The median of 3, 3, 3, 7, 10, 12, 12, 14, 15, 20 is  
(i) 10 (ii) 12 (iii) 11 (iv) 3
28. Linear pair angles are also  
(i) complementary angles (ii) supplementary angles (iii) equal angles (iv) none
29. Dilip's front door is 6 feet wide and 8 feet tall. He wants to purchase a circular table. What is the *maximum* diameter of the table that can *fit through* the front door?  
(i) 8 feet (ii) 9 feet (iii) 11 feet (iv) 14 feet



The logo of Sanskriti School features a shield-shaped emblem. Inside the shield, there is a stylized figure of a person holding a book, with a banner below it containing the Sanskrit motto 'विद्यया च विमुच्यते'. The word 'SANSKRITI' is written in a banner at the bottom of the shield. Below the shield, the text 'THE CIVIL SERVICES SCHOOL' is written in large, bold, capital letters.

**SANSKRITI**

**THE CIVIL SERVICES SCHOOL**

**Question Bank 2 for First Term**

- Find the value of  $x$  in each case:
  - $(3)^{x-1} = 243$
  - $(2)^{3x} = 64$
  - $1^3 + 2^3 + 3^3 = x^2$
  - $\left(\frac{-7}{8}\right)^{15} \div \left(\frac{-7}{8}\right)^x = \left(\frac{-7}{8}\right)^2$
- In a quiz, if Shamit gets +10 in *each* of the first *three* rounds, -7 in the next *two* rounds each, +8 in the next *two* rounds each and -4 in each of the last *three* rounds, find his total score at the end of the quiz.
- Arrange the following in descending order:  $-3\frac{4}{3}, \frac{-5}{-6}, -2, \frac{4}{5}$
- Simplify:  $[-9 - 2\{-3 \times (-15) \div (-5 + 2)\}] \div 7$
- If  $\frac{p}{q} = \left(\frac{2}{5}\right)^5 \times \left(\frac{2}{5}\right)^{-2}$ , then find the value of  $\left(\frac{p}{q}\right)^2$ .
- Simplify using suitable property:
  - $-51 \times 48 - 49 \times 48$
  - $23 \times 61 \times 5 - 61 \times 115$
  - $-21 \times (-74) + (-26) \times (-21)$
- Simplify and answer in exponential form using laws of exponents:
  - $(3^3 \times 3^2)^7$
  - $\frac{3^6 \times 7^6 \times 11^8}{21 \times 11^3}$
  - $\left(\frac{7^8}{7^5}\right)^2$
  - $(5^2 \times 5^4) \div 5^3$
- The population of Delhi state in different census years is as given below:
 

Census year	1971	1981	1991	2001	2011
Population (in lakhs)	41	62	94	138	168

Represent the above information by means of a bar graph (taking scale of 10).
- Find the median and the mode of the given data:  
21, 24, 19, 18, 45, 14, 14, 19, 21, 24, 18, 30, 31, 26, 25, 19, 17, 18, 20, 22
- Find the product using suitable properties :
  - $(-50) \times 125 \times (-6) \times 8$
  - $213 \times (-35) + (-213) \times 65$

11. Jyoti cuts a 21m long rope into pieces of  $3\frac{1}{2}$  m length each. How many pieces of the rope did she get?
12. Two supplementary angles are such that one is  $\frac{4}{5}$  of the other. Find them.
13. Find the value of
- (a)  $7^0 \times 7^0 \times 7^0 \times (7^0 - 7^0)$       (b)  $\frac{2^0 \times 5^0 \times 8^0}{2^0 + 5^0 + 8^0}$
14. Which of the following statements is false and why?
- (a) In the pair of complementary angles, both the angles are acute.  
 (b) In the pair of supplementary angles, both the angles are obtuse.
15. Write the possible outcomes for the following :-
- (a) Choose a colour from the colours of the rainbow.  
 (b) Two coins are tossed simultaneously.
16. Simplify :  $14 - [3 + \{8 \div (5 - 3 \text{ of } 2 + 3)\}]$
17. Find  $x$  using laws of exponents :
- (a)  $8 \times 2^{x+2} = 32$       (b)  $3^3 \times x^3 = 216$
18. A number is selected at random from a set of natural numbers from 1 to 50. What is the probability that it is an (i) even number (ii) a prime number (iii) a multiple of 5 ?
19. Suman has drawn fig (i) and Sneha has drawn fig (ii). Both of them have marked line  $l$  as the transversal. Who is wrong and why?

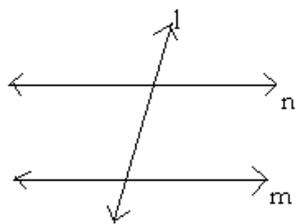


fig (i)

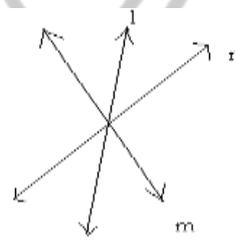
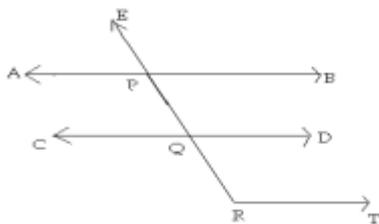


fig (ii)

20. The marks obtained by a group of students in science tests are 85, 74, 90, 85, 39, 48, 56, 95, 80, 78 and 40. Find
- (a) Mean marks obtained by the group.  
 (b) Median of marks obtained.  
 (c) Mode and range of marks obtained.

21. In the following figure  $AB \parallel CD \parallel RT$  and  $\angle EPA = 50^\circ$ . Find the value of  $\angle EQC$  and  $\angle ERT$ .

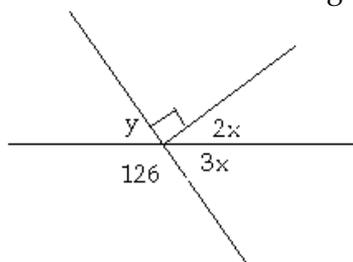


22. (a) An elevator at the ground level descends into a mine shaft at the rate of 5 metre per minute. What will be its position after  $2\frac{1}{2}$  hrs?  
 (b) If it begins to descend from 25 m above the ground, what will be its position after 35 minutes.
23. The performance of a student in the term examination is given below:

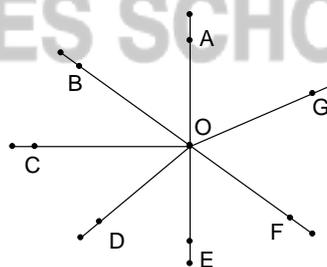
SUBJECT	MARKS
Hindi	72
English	80
Maths	95
Science	75
Social studies	67

Draw a bar graph by choosing an appropriate scale.

24. Lines  $m$  and  $n$  are parallel to each other. The two interior angles on the same side of the transversal are  $(x - 8)^\circ$  and  $(5x - 4)^\circ$ . Find the measure of each angle.
25. Find the measure of all angles in the following figure:



26. In the adjoining figure, name
- a pair of complementary angles.
  - a pair of vertically opposite angles.
  - a pair of adjacent angles.
  - a linear pair.
  - equal supplementary angles.



27. Fill in the blanks:

- (a)  $8^0 + 5^0 + 7^0 = \underline{\hspace{2cm}}$ .  
 (b) The additive inverse of  $-1$  is  $\underline{\hspace{2cm}}$ .  
 (c) If  $(5^4)^x = 5^{12}$ , then  $x = \underline{\hspace{2cm}}$ .  
 (d)  $-36 \div 4(3) = \underline{\hspace{2cm}}$

28. What additional information is needed for the following statements to be true?

- (a) Two supplementary angles form a linear pair.  
 (b) If two lines are cut by a transversal, then pairs of alternate interior angles are equal.

29. A wire in the form of a rectangle with dimensions 70cm & 40 cm is bent into the form of a circle. Find the diameter and the area of the circle.

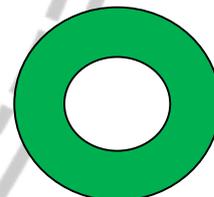
30. a) The area of a rectangular sheet is  $500 \text{ cm}^2$ . If the length of the sheet is 25cm, what is its width? Also find the perimeter of the rectangular sheet.

b) From that sheet, a right triangle of sides 6cm, 8cm and 10cm and a circle of radius 10.5cm are cut. Find the area of the remaining sheet.

31. If the diameter of a bicycle wheel is 70 cm, find how many times the wheel will revolve in order to cover a distance of 110 m.

32. The figure shows a washer with a hole in it. The outer radius is 10 cm and the inner radius is 4 cm. Find

- (1) Area of the metal used.  
 (2) Cost of painting each washer at the rate of 10 paise per sq cm.  
 (3) Cost of painting 100 such washers.



33. Sonam is wrapping this present.

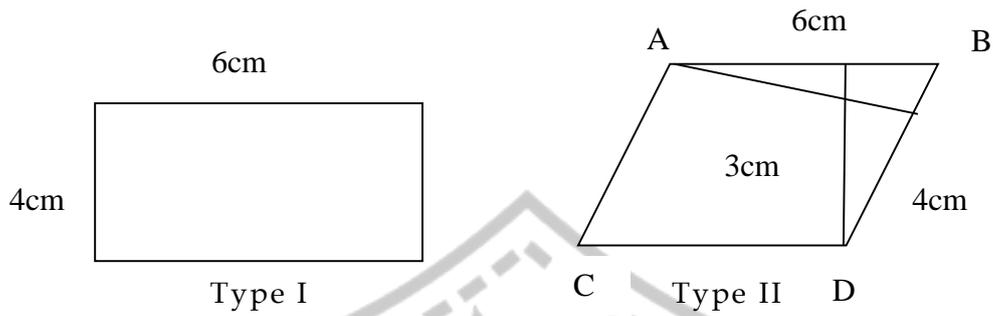


The ribbon passes around the box in one continuous piece as shown. An extra 40 cm of ribbon is needed for the bow. How much ribbon does Sonam need to wrap this present?

34. A man wants to fence the circular garden of diameter 14m with a rope. He gives Rs500 to his gardener to purchase the rope the cost of which is Rs.4 per meter. After purchasing the rope, the gardener returns Rs.124 as balance.

- (a) Find the length of the rope required to fence the garden.  
 (b) Is the gardener an honest man? Give reasons for your answer.

35. The following figures show two types of chocolates.

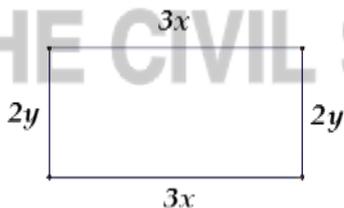


- (a) Identify the shapes of the two types of chocolates.
- (b) The company sells both the types of chocolates at Rs24 each. Do you think it is fair to charge the same price for both kinds of chocolates? Give reasons for your answer.

**SANSKRITI**  
**THE CIVIL SERVICES SCHOOL**

**Question Bank 1 for Second Term**

- A triangle can be constructed with sides (in cm) :  
 (a) 4, 8, 2                      (b) 4, 4, 8                      (c) 3, 6, 3                      (d) 7, 8, 9
- In a right angled  $\triangle ABC$  if,  $AB^2 = AC^2 + BC^2$  then the right angle is  
 (a)  $\angle BAC$                       (b)  $\angle ABC$                       (c)  $\angle ACB$                       (d)  $\angle CBA$
- The simple interest on Rs 500 at 10% p.a. for two years is  
 (a) Rs 550                      (b) Rs 50                      (c) Rs 100                      (d) Rs 150
- An article is sold at Rs 225 at a loss of 10%. Its cost price is  
 (a) Rs 235                      (b) Rs 250                      (c) Rs 240                      (d) Rs 275
- An article bought for Rs 400 is sold for Rs 472. The gain is  
 (a) 18%                      (b) 15.25%                      (c) 15%                      (d) 19%
- A chair costing Rs 450 is sold at a gain of 12%. Its selling price is  
 (a) Rs 54                      (b) Rs 595                      (c) Rs 504                      (d) Rs 395
- The triplet which does not give a right angled triangle is  
 (a) 2.5, 1.5, 4                      (b) 5, 4, 3                      (c) 5, 12, 13                      (d) 6, 8, 10
- MrKhanna had Rsx. He gave one-third of the total money to his wife and one-fourth of the remainder to his son. How much money is left with him?  
 (a)  $\frac{2x}{3}$                       (b)  $\frac{1x}{6}$                       (c)  $\frac{3x}{4}$                       (d)  $\frac{1x}{2}$
- If  $3x$  and  $4a$  represent the two opposite sides of the same rectangle, then which of The following is incorrect?  
 (a)  $3x = 4a$                       (b)  $x = \frac{4a}{3}$                       (c)  $a = \frac{3x}{4}$                       (d) Area =  $3x \times 4a$
- If  $\triangle ABC \cong \triangle DEF$ , then  
 (a) AC = EF                      (b) AB = DE                      (c) BC = DF                      (d) AC = EF
- If  $\triangle PQR \cong \triangle XYZ$ , then  
 (a)  $\angle P = \angle Z$                       (b)  $\angle Q = \angle X$                       (c)  $\angle R = \angle Z$                       (d)  $\angle P = \angle Y$
- If  $AB = PQ$ ,  $\angle A = \angle P$  &  $\angle B = \angle Q$ , then  $\triangle ABC \cong \triangle PQR$  by  
 (a) SSS rule                      (b) SAS rule                      (c) AAS rule                      (d) ASA rule
- In  $\triangle ABC$ ,  $AB = AC$  and  $AD \perp BC$ , then  $\triangle ABC \cong \triangle ACD$  by  
 (a) SSS rule                      (b) ASA rule                      (c) SAS rule                      (d) RHS rule
- Which expression gives the perimeter of the given rectangle?



- (a)  $6xy$                       (b)  $36xy$                       (c)  $9x + 4y$                       (d)  $6x + 4y$

15. The algebraic expression for the statement 'product of  $x$  and  $y$  subtracted from the Product of  $a$  and  $b$ ' is  
 (a)  $xy - ab$  (b)  $ab - xy$  (c)  $ax - by$  (d)  $ay - bx$
16. If  $\triangle ABC \cong \triangle PQR$ , then which of the following is false?  
 (a)  $\angle ABC = \angle PQR$  (b)  $AB = QR$  (c)  $AC = PR$  (d)  $\angle BCA = \angle PRQ$
17. Which of the following is a true statement?  
 (a) Two circles are congruent.  
 (b) Two equilateral triangles are congruent.  
 (c) Two squares having same perimeters are congruent.  
 (d) Two rectangles having same perimeters are congruent.
18.  $\frac{3}{4}$  when changed to percent, we get  
 (a) 7.5% (b) 0.75% (c) 75% (d) 750%
19. If  $\triangle TWN \cong \triangle PRQ$ , then  $\angle W$  is equal to  
 (a)  $\angle P$  (b)  $\angle N$  (c)  $\angle Q$  (d)  $\angle R$
20. If  $m = 1$ ,  $n = 2$  and  $k = -1$ , then the value of  $3k^2m^3n$  is  
 (a) 6 (b) -6 (c) 9 (d) None
21. If  $3x - 4 = 2 + 5x$ , then the value of  $x$  is  
 (a) -3 (b) 3 (c)  $\frac{3}{4}$  (d)  $-\frac{1}{4}$
22. From a ribbon 'y' metre long, a piece of 'x' metre has been cut. The length of the remaining piece (in metre) is  
 (a)  $y + x$  (b)  $x - y$  (c)  $y \div x$  (d)  $y - x$
23. The order of rotational symmetry in the letter N is  
 (a) 3 (b) 2 (c) 1 (d) 4
24. The result of adding 9 to the twice a number is 31. The number is  
 (a) 20 (b) 15 (c) 11 (d) 17
25. One of the possible equations of the solution  $a = 3$  is  
 (a)  $3a = 6$  (b)  $a - 2 = 5$  (c)  $a + 3 = 9$  (d)  $a + 5 = 8$
26. If  $\frac{m+3}{5} = 7$ , then the value of  $m$  is  
 (a) 20 (b) 32 (c)  $\frac{35}{3}$  (d) None of the above
27. If  $\frac{m}{5} + 3 = 7$ , then the value of  $m$  is  
 (a) 20 (b) 32 (c)  $\frac{35}{3}$  (d) None of the above

28. A triangle has sides of length 2cm, 5cm and 6cm. Which of the following statements is true for the triangle?

- (a) The triangle has a 90 degree angle.
- (b) The triangle does not have a 90 degree angle.
- (c) The hypotenuse is 6cm.
- (d) The triangle may or may not have a 90 degree angle.

29. A boy earns Rs. X in a month and spends Rs. Y in a month. His savings for the month are:

- (a) Rs. (x+y)
- (b) Rs. (x - y)
- (c) Rs. (y - x)
- (d) Rs. (-x - y)

30. The numerical coefficient of  $x^2$  in the expression  $x^3 - 7x^2 + 8x + 4$  is

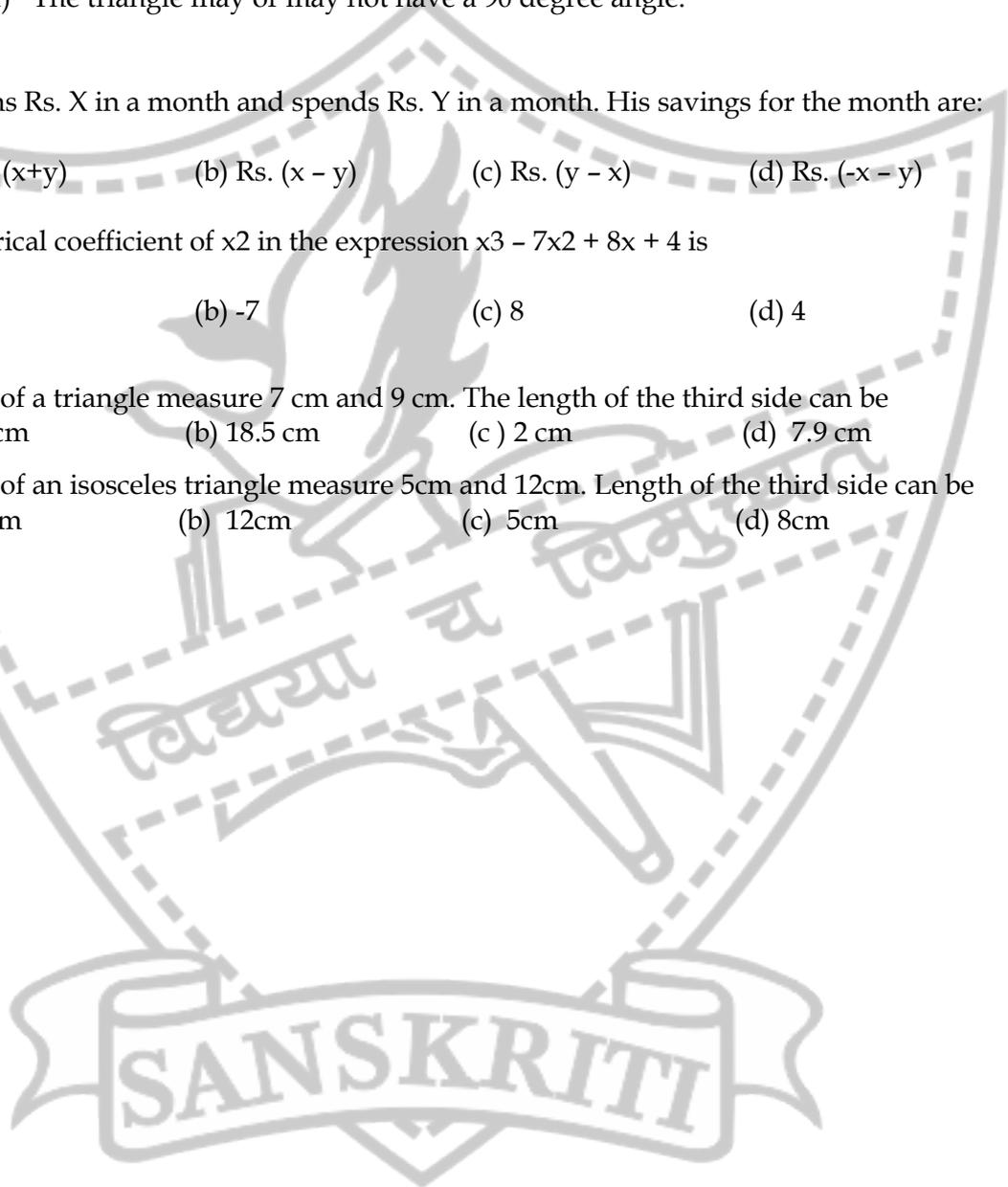
- (a) 1
- (b) -7
- (c) 8
- (d) 4

31. Two sides of a triangle measure 7 cm and 9 cm. The length of the third side can be

- (a) 17 cm
- (b) 18.5 cm
- (c) 2 cm
- (d) 7.9 cm

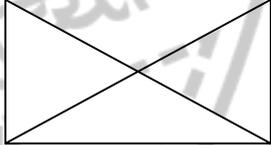
32. Two sides of an isosceles triangle measure 5cm and 12cm. Length of the third side can be

- (a) 13cm
- (b) 12cm
- (c) 5cm
- (d) 8cm

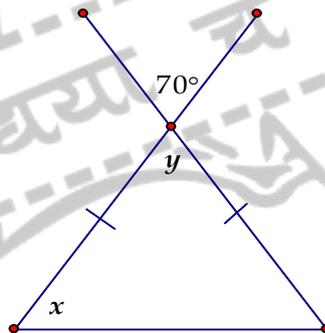


THE CIVIL SERVICES SCHOOL

**Question Bank 2 for Second Term**

1.
  - a) Find 25% of 600m.
  - b) Express  $1\frac{1}{4}$  as percent.
  - c) What percent is 120 cm of 14.4 m?
  - d) Find the number which is 27% more than 2000.
2. The sum of 4 consecutive odd numbers is 96. Find the difference between the greatest and the smallest of them.
3.  $\Delta QPR \cong \Delta ZYX$ , then
  - a)  $\angle R =$  \_\_\_\_\_
  - b)  $QR =$  \_\_\_\_\_
  - c)  $XY =$  \_\_\_\_\_
4. In  $\Delta PQR$ ,  $PX$  is the perpendicular bisector of  $QR$ . Show that  $\Delta PQR$  is an isosceles Triangle. (Draw the required diagram)
5. In the given figure,  $EF \perp FG$ ,  $HG \perp FG$  and  $FH = GE$ .
  - a. State the three pairs of equal parts in  $\Delta HGF$  and  $\Delta EFG$ .
  - b. Prove that  $\Delta HGF \cong \Delta EFG$ .
6. A man purchased a cycle for Rs 800 and sold it for Rs 1040. Find his gain percent. For how much should he have sold it to gain 35%?
7. Is it possible to have a triangle of sides 11cm, 19cm and 8cm? Justify your answer.
8. Is it possible to have a triangle with angles  $71^\circ$ ,  $64^\circ$  and  $35^\circ$ ? Why or why not?
9. An exterior angle of a triangle measures  $150^\circ$ . If one of the two *interior opposite angles* is four times the other, find the two angles. Also find the *interior adjacent angle*. (Show the required working with the help of a diagram)
10. Construct  $\Delta XYZ$  such that  $XY = 6\text{cm}$ ,  $\angle ZXY = 30^\circ$  and  $\angle XZY = 105^\circ$ .
11. Construct a right  $\Delta ABC$  right angled at B such that  $AC = 7.5\text{ cm}$  and  $AB = 4.5\text{ cm}$ .
12. The two sides of a triangle are 8 cm and 11 cm. Find the minimum and the maximum possible length (in *whole numbers*) of the third side.
13. The three angles of a triangle are in the ratio 5 : 6 : 7. Find their measures. What kind of triangle is it?
14. After rotating by  $60^\circ$  about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure?

15. What letters of English alphabet have rotational symmetry about a centre? Also, state the order of rotational symmetry in each case.
16. The price of milk rises from Rs 30 per L to Rs 34.50 per L. Find the percentage increase in the price of the milk.
17. Find the angle of rotation if the order of rotational symmetry is 24.
18. In how much time will Rs 9000 amount to Rs 9810 at 3% p.a. simple interest?
19. Reeta says that she has 7 toffees more than 5 times the toffees Pooja has. If Pooja has 37 toffees, how many toffees does Pooja have?
20. A sum of money triples itself in 10 years. Find the rate of simple interest per annum.
21. During break time, two-fifth of the total students play football, one-fourth go to canteen, one-fifth play table tennis and the remaining 6 students stay in class. Find the total number of students in the class.
22. Solve:
- (a)  $\frac{x-3}{4} = \frac{5-2x}{3}$       (b)  $\frac{2m}{5} - \frac{3}{2} = \frac{1}{10} - 3m$       (c)  $3-5x+2x = -2-2(1-x)$
23. In the given figure, find the values of  $x$  and  $y$ .



24. In his will, a father divides his property (worth Rs20 lakhs) between his two children and a servant. He gives 20% share each to his son and daughter.
- (a) How much does his servant get (in amount)?
- (b) What values of the father are reflected in this situation?
- (c) Do you think the children and the servant should get an equal share?
- (d) What does this reflect about our society's character?
25. A shopkeeper had 150 LCD television sets of different companies. During the festive season, he sold 126 of them on a no return and no guarantee basis and at an attractive price less than the market price. However, all the 126 television sets came out to be defective and the shopkeeper had to close down his shop owing to pressure from angry buyers and the companies.
- (a) What is the number of LCD television sets that were not defective? Express it as a percentage.

- (b) Comment on the character of the shopkeeper.
26. Anu donates one-third of her salary to an orphanage and keeps the remaining salary i.e. Rs20,000 to meet her expenses.
- (a) Find Anu's salary.
- (b) What value of Anu is being depicted here?
27. Solve the following equations:-

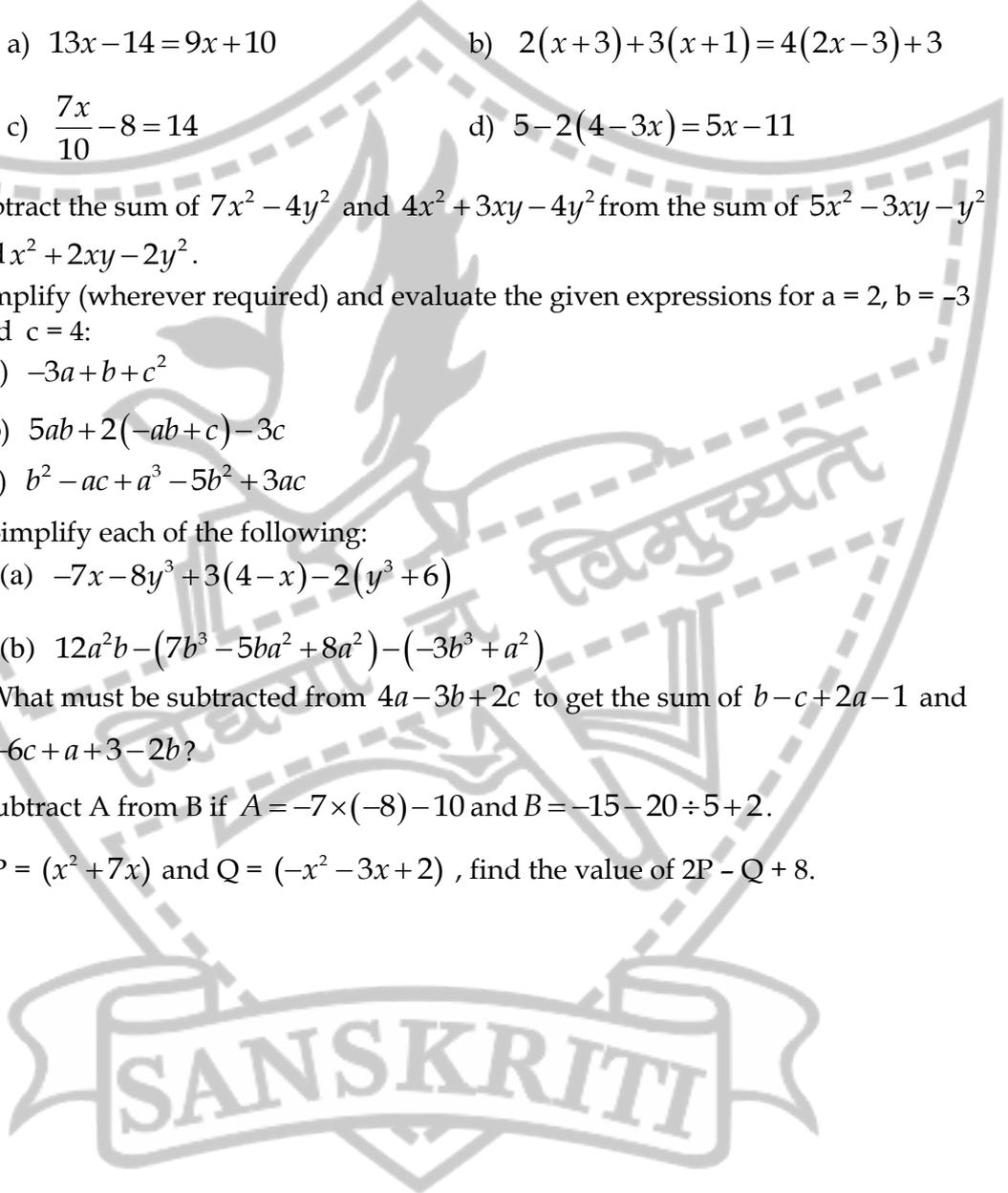
a)  $13x - 14 = 9x + 10$

b)  $2(x+3) + 3(x+1) = 4(2x-3) + 3$

c)  $\frac{7x}{10} - 8 = 14$

d)  $5 - 2(4 - 3x) = 5x - 11$

28. Subtract the sum of  $7x^2 - 4y^2$  and  $4x^2 + 3xy - 4y^2$  from the sum of  $5x^2 - 3xy - y^2$  and  $x^2 + 2xy - 2y^2$ .
29. Simplify (wherever required) and evaluate the given expressions for  $a = 2$ ,  $b = -3$  and  $c = 4$ :
- a)  $-3a + b + c^2$
- b)  $5ab + 2(-ab + c) - 3c$
- c)  $b^2 - ac + a^3 - 5b^2 + 3ac$
30. Simplify each of the following:
- (a)  $-7x - 8y^3 + 3(4 - x) - 2(y^3 + 6)$
- (b)  $12a^2b - (7b^3 - 5ba^2 + 8a^2) - (-3b^3 + a^2)$
31. What must be subtracted from  $4a - 3b + 2c$  to get the sum of  $b - c + 2a - 1$  and  $-6c + a + 3 - 2b$ ?
32. Subtract A from B if  $A = -7 \times (-8) - 10$  and  $B = -15 - 20 \div 5 + 2$ .
33. If  $P = (x^2 + 7x)$  and  $Q = (-x^2 - 3x + 2)$ , find the value of  $2P - Q + 8$ .



THE CIVIL SERVICES SCHOOL

Sample Paper 1 for First TermSection A

- Q1. Find the value of  $|-26| - |-11|$ .
- Q2. The sum of  $\frac{-1}{2}$  and its multiplicative inverse is \_\_\_\_\_.
- Q3.  $4(xy)^2$  and  $-4x^2y^2$  are \_\_\_\_\_ (like/unlike) terms.
- Q4. Write a pair of integers whose product is  $-48$ .
- Q5. Lines  $l$  and  $m$  are intersected by a transversal  $p$ . A pair of co-interior angles measures  $80^\circ$  each. Is  $l$  parallel to  $m$ ? Give reason.

Section B

- Q6. Put  $<$ ,  $>$  or  $=$  and show the required working:  $\frac{2^3}{7}$  \_\_\_\_\_  $\left(\frac{2}{7}\right)^3$
- Q7. By selling apples at the rate of Rs  $5\frac{1}{4}$  per apple, a fruit seller earns Rs 1260. Find how many dozens of apples did he sell?
- Q8. Two complementary angles are in the ratio  $1 : 3$ . Find the measures of the angles.
- Q9. Is the value of  $2^9 \times 2^{91} - 2^{19} \times 2^{81} = 1$ ? Show the required working.
- Q10. Draw a pair of:
- adjacent angles that are not forming a linear pair.
  - angles having a common vertex and a common arm but are not adjacent.
- Q11. Write 6561 in its exponential form. Show the required working.

OR

Write in the expanded form:

- $3p(qr)^2$
  - $(-4y)^3x^2$
- Q12. Find Rima's chances of winning the following game:
- If the shaded numbers are her lucky numbers, what is the probability of her picking a lucky number?
  - What is the probability of her picking the number 5?

14	7	8	11
12	5	15	13
10	3	4	9

- Q13. Use distributive property, to solve:  
 $(26 \times -4) + (13 \times 2 \times 104)$
- Q14. Consider the algebraic expression:  $a^3 + 3x^2y - 4z^3$
- Separate the terms.
  - Write the coefficient of  $y$ .

- Q15. Find the mean of the first five prime numbers.

Section C

- Q16. What should be added to  $x + 3y - 4z$  to get  $3x - 2y + z$ ?

- Q17. Find the value of:  $\frac{1}{5} \div \frac{1}{5}$  of  $\frac{1}{5}$   
 $\frac{1}{5}$  of  $5 \div \frac{1}{5}$

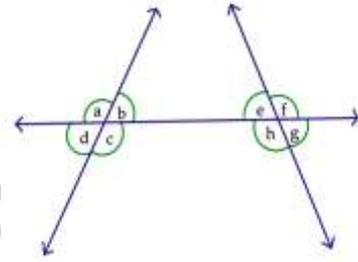
- Q18. Find the median and the mode of: 23, 43, 77, 88, 23, 42, 23, 77.

Q19. Divide the additive inverse of  $\frac{-2}{5}$  by the multiplicative inverse of 40.

Q20. Simplify using the laws of exponents:  $\frac{(2^5)^3 \times 7^3}{8^3 \times 7}$

Q21. In the given figure, name an angle:

- alternate interior to  $\angle h$ .
- corresponding to  $\angle a$ .
- forming a linear pair with  $\angle g$ .
- adjacent to  $\angle c$ .
- co-interior with  $\angle b$ .
- vertically opposite to  $\angle f$ .



Q22. Find the value of  $(8 - 24) - [-4 - 10 \div 2 + 16]$

OR

Draw a factor tree of  $2x^2 + 3xy^3 - 5$

Q23. An elevator is 25m below the ground level and it ascends at the rate of 5m per minute. Find the time taken by it to reach 50m above the ground.

Q24. 30 students were asked to choose their favourite sport according to the following codes:

A- Cricket B- Football C- Hockey D- Any other

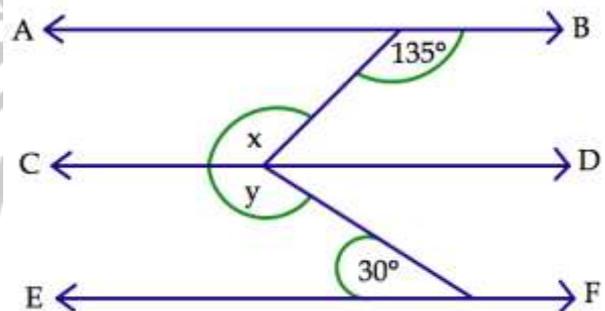
The survey resulted in the given data:

A	B	B	C	D	A	A	A	B	B
A	A	B	B	B	B	B	A	D	C
D	C	C	D	A	D	B	A	A	D

- Prepare a frequency distribution table for the above data.
- Which out of mean/median/mode will help us decide the favourite sport amongst the students?

Q25. In the given figure,  $AB \parallel CD \parallel EF$ .

Find the value of  $x$  and  $y$ .



Section D

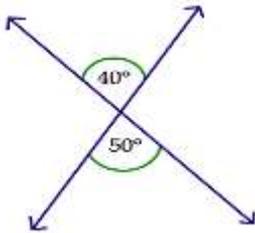
Q26. Subtract  $-4x^2 + 2y - 5$  from the sum of  $5x^2 - 8y - 9$  and  $-x^2 + 6y - 12$ . Is the algebraic expression hence formed a monomial/binomial/trinomial?

Q27. An electrical company earns a profit of Rs 1500 on every television and loss of Rs 1000 on every refrigerator.

- The company sells 250 pieces of televisions and 225 refrigerators in a month. What is its profit/loss?
- Find the number of televisions it must sell to have neither profit nor loss, if the number of refrigerators sold in a year is 1350.
- Write a way to conserve electricity.

Q28. Find the error and correct the following:

- $4^5 \times 7^5 = 11^5$
- $36p + 4p + 5q + 15q = 60pq$
- Probability of picking an ace from a deck of 52 cards is  $\frac{1}{52}$ .
- $(-1)^{40} = -1$
- 



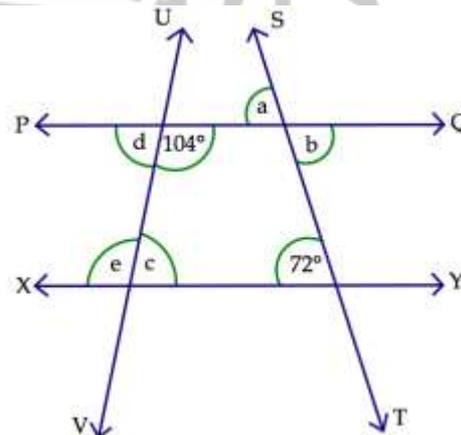
Q29. The literacy rate of women in some states in India is as follows:

STATES	Andhra Pradesh	Delhi	Assam	Uttar Pradesh	West Bengal
LITERACY RATE	52%	75%	47%	43%	69%

- Prepare a bar graph of the above data using the scale as 1 unit = 5%
- Write the importance of female literacy.

Q30. In the given figure,  $PQ \parallel XY$ .

Find the value of  $a, b, c, d, e$ .

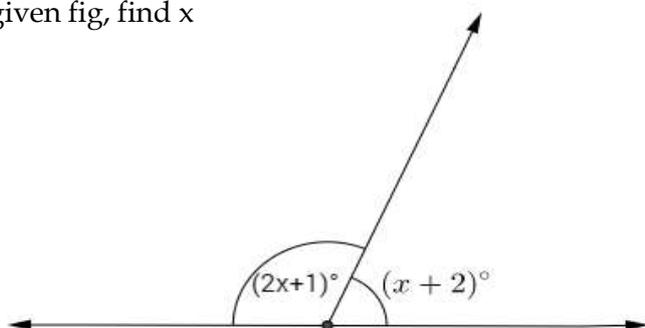


Sample Paper 2 for First TermSection A

- Write down the list of all the possible outcomes of picking a month of the year having 30 days.
- Find the angle whose complement is zero.
- Write a negative integer and a positive integer whose difference is  $-9$ .
- Among the given rational numbers  $\frac{3}{2}, \frac{5}{2}, \frac{-2}{3}, \frac{5}{3}$ , find two numbers whose product is  $\frac{-5}{3}$ .
- A '4' is required to win a game. What is the probability of winning the game on rolling a dice.

Section B

- Two supplementary angles are in the ratio  $3 : 2$ , find the angles.
- Simplify  $2 - [6 - 7 + 3 - \{2 \times 4 - (21 \div 3 + 1)\}]$
- Fill in the blanks using  $>$ ,  $<$  or  $=$ 
  - $|15| + |-29|$  \_\_\_\_\_  $|-8| + 11 - |-25|$ .
  - $12 \div 4 - 7$  \_\_\_\_\_  $16 \div 8 - 6$ .
- By what number should  $\frac{-3}{14}$  be multiplied to get  $\frac{-6}{7}$ ?
- If the base and altitude of a parallelogram are doubled, what will happen to its area?
- Find the median of first 10 prime numbers.
- In the given fig, find  $x$



- Simplify and express in exponential form:  $\left(\frac{5^8}{5^3}\right)^2 \times 5^3$ .

- Find the area of an equilateral triangle, with perimeter equal to 18 cm and altitude measuring 4cm.

OR

If the area of a right triangle is  $70 \text{ cm}^2$  and one of the sides containing the right angle is  $14 \text{ cm}$ , find the length of the other side.

15. State True or False.

- a)  $2^3 < 6^2$
- b)  $(121)^0 = 0$
- c)  $5^0 = 9999^0$
- d)  $(9^2)^3 = 9^5$

Section C

16. A bed-sheet measuring  $150 \text{ cm}$  by  $110 \text{ cm}$  is spread on the bed. If  $5 \text{ cm}$  of the bed-sheet is hanging all around the bed, find the area of the top of the bed.

17. If  $\frac{a}{b} = \left(\frac{3}{5}\right)^8 \div \left(\frac{3}{5}\right)^6$ , find the value of  $\left(\frac{a}{b}\right)^2$ .

18. What is the probability of -

- a) Picking a multiple of 3 from the first 10 odd numbers.
- b) Drawing a king of hearts from a deck of cards.
- c) Choosing the letter 'P' from the word 'PINEAPPLE'.

19. Seven participants completed a race. The time taken by them is given below (in sec)

23.2, 23.5, 22.9, 22.6, 22.8, 23.1, 22.3

- (i) What is the least time taken by the participant?
- (ii) What is the range?
- (iii) How many participants took more than  $22.9 \text{ sec}$  to complete the race?

20. What should be added to  $\left(\frac{-3}{25} + \frac{7}{15}\right)$  to make it 1?

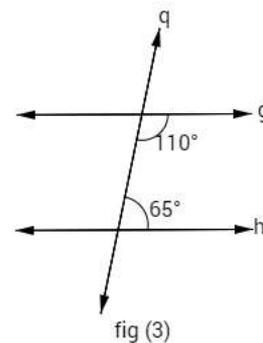
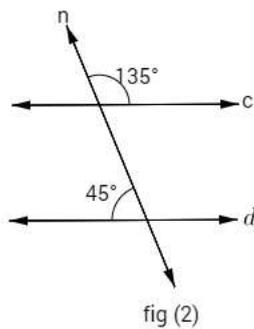
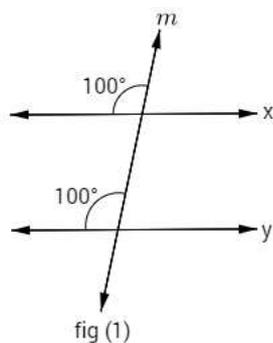
21. Divide the product of  $2\frac{1}{3}$  and  $1\frac{3}{14}$  by the sum of  $\frac{-2}{5}$  and  $3\frac{4}{5}$ .

22. An iron rod was heated to  $200^\circ\text{C}$  and left for cooling. After every  $3 \text{ min}$  it cools down by  $25^\circ\text{C}$ . What will be the temperature of the iron rod after half an hour?

OR

The temperature at 12 noon was  $15^\circ\text{C}$  above zero. If it decreases at the rate of  $3^\circ\text{C}$  per hour until midnight, at what time would the temperature be  $-3^\circ\text{C}$ ? What would be the temperature at mid night?

23. Check whether the given lines are parallel in the given figures



24. (a) Find the value of  $x$ :  $9^x = 6561$

(b) Which of the following is greater

$$\left[\frac{2^2}{3}\right]^2 \quad \text{or} \quad \left[\frac{2}{3^2}\right]^2$$

25. A table top in the shape of a parallelogram was polished at the rate of Rs 2 per sq cm. If the base of the parallelogram is 40 cm and the total cost was Rs 2240, find the altitude of the parallelogram.

#### Section D

26. Grass is to be laid in a rectangular plot 15 m long and 13m wide leaving two triangular sections at opposite edges for two flower beds. If the flower beds are to be equal right angled isosceles triangles with equal sides measuring 1.5m each, find out how much would it cost to lay grass at Rs.8 per sq m.

27. State true or false:-

- Additive inverse of -5 is 0.
- Integers are not closed under Division.
- During addition and multiplication of three Integers, the order makes a difference.
- $(a - b) - c = a - (b - c)$
- Integers are not commutative under addition.

28. Simplify the following:-

(a)  $\left(\frac{18}{23} \div \frac{90}{69}\right) \times \frac{-15}{32}$

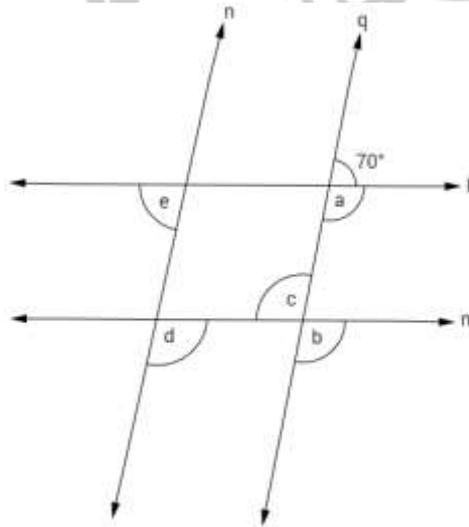
(b)  $\left(\frac{-2}{9} \times 1\frac{3}{8}\right) - \left(\frac{7}{12} - \left(\frac{-11}{36}\right)\right)$

29. The maximum and minimum temperature ( $in^{\circ}C$ ) on a particular day are given in the table below. Draw a double bar graph to represent the given data.

	Delhi	Mumbai	Chennai	Bengaluru
Max Temp ( $^{\circ}C$ )	33	31	35	30
Min Temp ( $^{\circ}C$ )	25	29	32	17

Answer the following questions:-

- Which city shows the least difference between the maximum and minimum temperature.
  - Name two cities where the maximum temperature in one city was less than the minimum temperature in the other city.
  - How does increase in temperature effects our plants and animals?
30. In the given figure,  $l \parallel m$  and  $n \parallel q$  find  $a$ ,  $b$ ,  $c$ ,  $d$  and  $e$ . ( give reasons)



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**Assignment - 1 (INTEGERS)**

1. (a)-54 1.(b) -15 1(c) multiple answers 1(d) 35 degrees 1(e) -20 3(a) 45 3(b) 17  
 3. (c) 50 3.(d) -1 3(e) -6650000 3(f) 4116 4(a) 300 4(b) -2500 4(c) -5600  
 4(d) 3200 5. 32m 6.  $-3^{\circ}C$  7. 30 sec 8.16 9.25m 10. Profit Rs 88000

**Assignment - 2 (LINES and ANGLES)**

1.  $z = 21^{\circ}$ ,  $x = 32^{\circ}$ ,  $y = 16^{\circ}$  2. a) linear pair b) obtuse angle c)  $30^{\circ}$  d) 37 e) 33 f)  $30^{\circ}$   
 g) non-parallel h)  $45^{\circ}$ ,  $135^{\circ}$  3.  $23^{\circ}$ ,  $67^{\circ}$  4.  $10^{\circ}$  5.  $x = 37^{\circ}$  7.  $14^{\circ}$   
 8.  $\angle AOD = 60^{\circ}$ ,  $\angle AOC = 120^{\circ}$ ,  $\angle BOC = 60^{\circ}$ ,  $\angle BOD = 120^{\circ}$  10.  $45^{\circ}$

**Assignment - 3 (RATIONAL NUMBERS)**

- 1(a)  $\frac{-13}{9}$  1(b)  $\frac{-5}{9}$  1(c) -4 1(d) 1 and -1 1(e) 03.  $\frac{2}{-3}$ ,  $\frac{7}{12}$ ,  $\left| \frac{-5}{6} \right|$ ,  $\frac{-14}{-9}$   
 4.  $\frac{-5}{36}$  5.  $\frac{-1}{2}$  6(a) 9 6(b)  $\frac{4}{5}$  7. Angela, Sumit, Rohit  
 8. 14, No 9. 100 10. 100

**Assignment - 4 (DATA HANDLING)**

6. (i) 11, (ii) (a)  $\frac{1}{11}$  (b)  $\frac{2}{11}$  (c)  $\frac{4}{11}$  (d)  $\frac{7}{11}$  (e) 0 (f) 1  
 7. 4,6,8,9,10,12,14,15,16,18; Range = 14; Probability =  $\frac{8}{10}$  or  $\frac{4}{5}$   
 8. -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; Median = 3.5; Probability =  $\frac{7}{14}$  or  $\frac{1}{2}$ .  
 9. (a)  $\frac{1}{2}$  (b)  $\frac{9}{13}$  10(a)  $\frac{1}{13}$  (b) 1 (c)  $\frac{1}{4}$  (d)  $\frac{3}{4}$  (e)  $\frac{1}{2}$

**Assignment -5 (EXPONENTS AND POWERS)**

- 1(a)No (b) Yes 2.  $3^7$  3. 0 4. 13 5(a) 625 (b)  $\left(\frac{-2}{3}\right)^{25}$  (c)  $\frac{64}{567}$  (d)  $5^{a+2b}$   
 6. 6561 7(a) 6 (b) 3 (c) 3 (d) 0 (e) 1 (f) 2  
 8.(a) 15 (b) 81 9. 1 10. 256

**Assignment - 10 (PERIMETER AND AREA)**

1. Area =  $750\text{cm}^2$ , AB =  $37.5\text{cm}$  2. PM =  $20\text{cm}$ . 3. Area =  $60\text{cm}^2$ , PS =  $7.06\text{cm}$   
 4. 12m 5. 28 m 6. 30 m, 40 m 7. 84 m 8. RS780  
 9. Rs 14768 10 (a) 88cm (b) 308 sq cm 11.  $264\text{cm}^2$ .

**Assignment - 7 (ALGEBRAIC EXPRESSIONS)**

1. (a)  $-1, 7$  (b)  $1, 3, -4$  3.  $\frac{1}{2}x + 8y + \frac{5}{2}z$  4.  $a = 4$  5.  $20y - 2 - 11x - 5z^2$   
 6.  $21m^2 + 11 - 19n^2$  7.  $0$  8(a)  $-9$  8(b)  $-18$  8(c)  $2$  8(d)  $0$  10.  $9x^2 + 11x + 6$   
 11.  $6x^2 + x + 11$

**Assignment - 8 (TRIANGLES AND ITS PROPERTIES)**

1.  $30^\circ, 30^\circ, 120^\circ$  2.  $25^\circ, 75^\circ, 80^\circ$  3. Each base angle =  $40^\circ$  4.  $12m$   
 5. Breadth =  $45$ , perimeter =  $210$  6.  $15$  7.  $\angle ACD = 70^\circ, \angle AED = 110^\circ$  8. Yes  
 9. No 10.  $\angle P = 100^\circ, \angle Q = 40^\circ$  11.  $25$

**Assignment - 9 (SIMPLE EQUATIONS)****PART- 1**

1. (a)  $x = 8$  (b)  $x = \frac{1}{5}$  (c)  $x = 1$  (d)  $x = 1$  (e)  $x = \frac{15}{61}$  (f)  $x = -2$   
 (g)  $x = 4$  2.  $-5$

**PART- 2**

1.  $24$  2.  $34, 36, 38$  3.  $320, 350$  4.  $58^\circ, 122^\circ$  5. Length =  $30m$ , breadth =  $20m$   
 6. RS  $180000$  7. Ram's age =  $32yrs$ , son's age =  $8yrs$  8. Total length of the pole =  $12m$ .  
 9.  $75, 125$  10.  $12\text{ cm}, 12\text{ cm}, 4\text{ cm}$  11.  $33, 61$  12.  $x = 10$

**Assignment - 11 (CONGRUENCE OF TRIANGLES)**

- 1 (a) True (b) False (c) False (d) True (e) False 2. SAS Congruence  
 3.  $\triangle PQR$  4.  $x = 73^\circ, y = 22^\circ$  8.  $5\text{cm}$  9.  $60^\circ$  10.  $90\text{ cm}$

**Assignment - 12 (COMPARING QUANTITIES)**

1.  $26, 100, 7830$  2.  $61\frac{1}{4}\%$  3. RS  $800$  4.  $33\frac{1}{3}\%$  5. RS  $75900$   
 6.  $25\%$  7.  $560$  8. Raju, RS  $2160$  9. RS  $15000$  10.  $\frac{1}{4}\%$

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