ICSE Board
Class VI Mathematics
Sample Paper – 1

Time: 2 hrs 30 min **Total Marks: 80**

General Instructions:

1. Answers to this paper must be written on the paper provided separately.
2. You will not be allowed to write during the first **15 minutes**.
3. This time is to be spent in reading the question paper.
4. The time given at the head of this paper is the time allowed for writing the answers.
5. Attempt **all** questions from **Section A.** Solve any four questions from **Section B.**
6. **All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.**
7. **Omission of essential working will result in loss of marks.**
8. The intended marks for questions or parts of questions are given in brackets [ ].

Section A (40 marks)

Question 1

(a) Write the following numbers in the descending order of their values and represent them on a number line.

i. 8, -6, 2, -12, 0, 3, 15 and -1

ii. Integers greater than -6 and less than 2. [2]

(b) Aruna covered $\frac{1}{2}$ the distance to school by walking and $\frac{1}{3}^{rd}$ the distance by bus and the rest by train. Find out the fraction of distance covered in the train? [2]

(c) Evaluate: $5x - 14 = x - (24 + 4x)$ [3]

(d) State whether true or false: [3]

i. {3, 5, 7, ...} is a finite set.

ii. A line has infinite number of points on it.

iii. 0.45 = 45%

Question 2

(a) What are the greatest and smallest possible numbers which can be formed using the digits 9, 8, 7 and 4 without repetition and with 7 always at the ones place? [2]

(b) Express each of the following as an algebraic expression. [2]

i. Sum of y and 7.

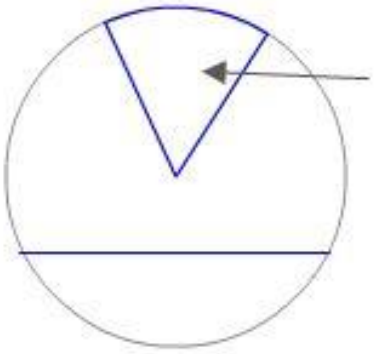
ii. number m divided by 23 and added to 5

(c) The sides of a triangle are in the ratio 3 : 2 : 4. If the perimeter of the triangle is 27cm, find the length of each side. [3]

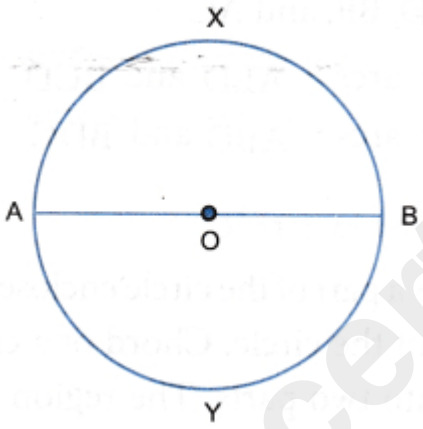
(d) The H.C.F. and L.C.M. of two numbers are 144 and 6480, respectively. If one of the numbers is 720, find the other number. [3]

Question 3

(a) Name the following: [3]



i. Name the two parts of the circle in blue.



ii. What is AB and how does it divide the circle.

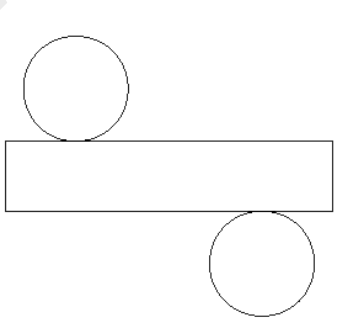
(b) Use the divisibility tests to determine whether the number 505 is divisible by 2, 3, 4, 5, 6 and 9. [3]

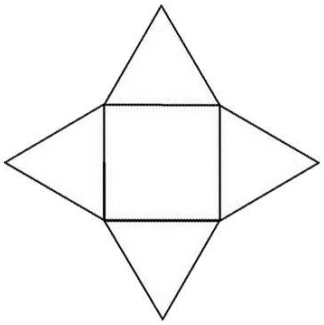
(c) Construct an angle of 60°, using a ruler and compass. [4]

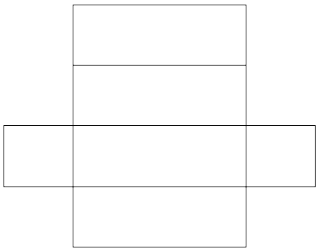
Question 4

(a) Add the expressions: $-17x^2-2xy+23y^2, -9y^2+15x^2+7xy$ and $13x^2+3y^2-4xy$ [3]

(b) Identify the 3D shapes which form the following nets: [3]







(c) Find the H.C.F. of 780 and 462 by the division method. [4]

Section B (40 marks)

Question 5

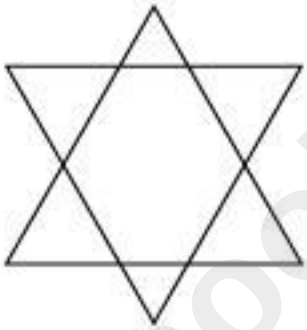
(a) Write each statement below in algebraic form: [3]

i. 28 more than twice of x is equal to 45.

ii. 3y reduced by 5z is greater than 8x.

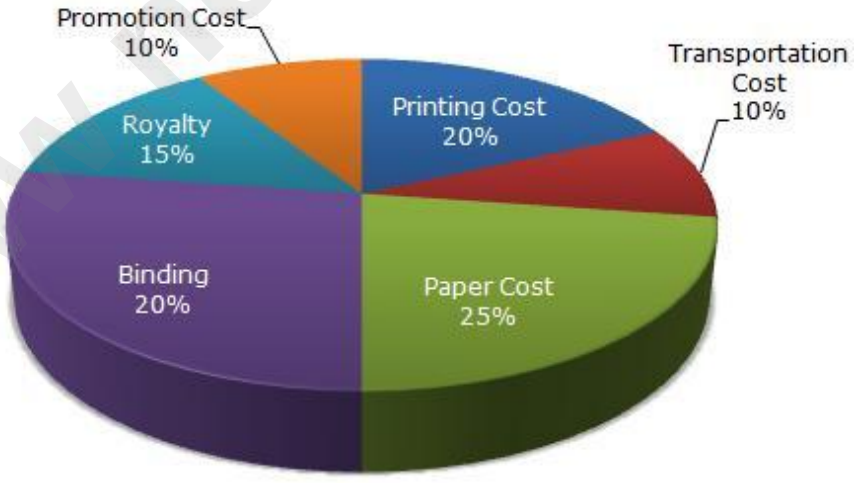
iii. 6x divided by 13y is less than 17.

(b) Mark the lines of symmetry in the given figure? [2]



(c) The area of a rectangular plot is 340 m^2. If its breadth is 17 m, find its length and perimeter. [3]

(d) The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. Study the pie-chart and the answer the questions based on it. [3]



i. If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, what will be the amount of royalty to be paid for these books?

ii. What is the central angle of the sector corresponding to the expenditure incurred on Royalty?

Question 6

(a) From the sum of x + y – 2z and 2x – y + z subtract x + y + z [3]

(b) Divide 81 into three parts in the ratio 2 : 3 : 4 [3]

(c) A vegetable trader buys some tomatoes and onions for Rs. 420 such that the ratio of the total weight of tomatoes to the total weight of onions is 2 : 3. The total weight of the tomatoes and onions is 60 kg. If the ratio of the total price of tomatoes to the total price of onions is 8 : 27, then what is the cost of 5 kg of tomatoes and 5 kg of onions. [4]

Question 7

(a) Simplify: 3(a + b) - 2(2a - b) + 4a – 7 [3]

(b) Find the cost of fencing a rectangular park of length 250 m and breadth 175 m at the rate of Rs. 12 per metre. [3]

(c) Write each of the following sets in roster form as well as in set builder form:

1) Set of factors of 48
2) Set of integers between -3 and 8 [4]

Question 8

(a) A school has 1625 students out of which 750 are girls and the rest are boys. Find the ratio between the number of boys to the number of girls in the school. [3]

(b) Construct a perpendicular line from a point not on the line. [4]

(c) Find the value of : $3x^3 - 4x^2 + 5x - 6, when\ x = -1$ [3]

Question 9

(a) The following data gives total marks (out of 500) obtained by 5 students of class VII. Represent the data by a bar graph. [3]

Student	Ayay	Raj	Desu	Deepak	Sonal
Marks obtained	350	375	400	450	485

(b) Name the types of the following sets: [3]

i. Set of even numbers which are not divisible by 2.
ii. {Number of people in India}
iii. Set of odd numbers between 7 and 19.

(c) Simplify: $\dfrac{\frac{4}{5} - \frac{1}{4}}{1\frac{9}{20} + 1\frac{3}{10}}$ [4]

Solution

Section A (40 marks)

Question 1:

(a) Descending order:

i. 15, 8, 3, 2, 0, -1, -6, -12

ii. -6, -5, -4, -3, -2, - 1, 0, 1, 2

(b) Let the total distance covered be 1 and the distance to be covered by train be *x*.

$$\frac{1}{2} + \frac{1}{3} + x = 1$$

$$x = 1 - \frac{1}{2} - \frac{1}{3}$$

$$x = \frac{1}{6}$$

Hence Aruna covers $\frac{1}{6}^{th}$ of the distance by train.

(c)

$$5x - 14 = x - (24 + 4x)$$

$$5x - 14 = x - 24 - 4x$$

$$5x - x + 4x = -24 + 14$$

$$8x = -10$$

$$x = \frac{-10}{8}$$

$$\therefore x = \frac{-5}{4}$$

$$\therefore x = -1\frac{1}{4}$$

(d)

i. {3, 5, 7, ...} is a finite set - **False**

ii. A line has infinite number of points on it - **True**

iii. 0.45 = 45% – **True**

Question 2:

(a) The greatest number which can be formed is 9847, since 9 is the biggest digit followed by 8 and then by 4 and 7 is fixed at ones place.
The smallest number which can be formed is 4897, since 4 is the smallest digit followed by 8 and then by 9, and 7 is fixed at ones place.

(b)

i. $y + 7$
ii. $5 + m/23$

(c) The sides of a triangle are in the ratio 3 : 2 : 4.
Let the common multiple be x.
So, sides are 3x, 2x and 4x cm
Since the perimeter is 27cm,
$3x+2x+4x=27$
$9x=27$
$x=27/9$
$x=3$
$3x = 3(3) = 9cm$
$2x = 2(3) = 6cm$
$4x = 4(3) = 12cm$

(d) H.C.F. = 144; L.C.M. = 6480; One of the numbers = 720;
Now, we know that
Product of both numbers = H.C.F. × L.C.M.
∴ 720 × Second number = 144 × 6480

$$\text{Second number} = \frac{144 \times 6480}{720}$$

Second number = 1296

Question 3:

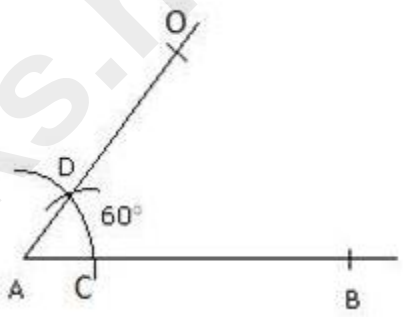
(a) Circle:

i. A sector and a chord
ii. AB is the diameter and it divides the circle in two equal halves.

(b) The digit in the units place of 505 is 5.
505 is divisible by 5.
According to the test for divisibility by 2, 505 is not divisible by 2.
The sum of the digits of 505 = 5 + 0 + 5 = 10 and 10 is not divisible by 3 and 9.
Hence, according to the test for divisibility by 3 and 9, 505 is not divisible by 3 and 9.
505 is not divisible by 2 and 3. Hence, 505 is not divisible by 6.
505 is not divisible by 2, 3, 4, 6 and 9 but is divisible by 5.

(c) Steps of Construction:

i. Draw a ray AB.
ii. With A as centre and any convenient radius draw an arc intersecting AB in point C.
iii. With C as the centre and the same radius, draw a small arc intersecting the arc drawn in step 2 at D.
iv. Join ray OA. $\angle OAB$ is the required angle



Question 4:

(a)

$$(-17x^2 - 2xy + 23y^2) + (-9y^2 + 15x^2 + 7xy) + (13x^2 + 3y^2 - 4xy)$$
$$= -17x^2 + 15x^2 + 13x^2 - 2xy + 7xy - 4xy + 23y^2 - 9y^2 + 3y^2$$
$$= 11x^2 + xy + 17y^2$$

(b) Net 1: Cylinder
Net 2: Tetrahedron
Net 3: Cuboid

(c) H.C.F. of 780 and 462

$$\begin{array}{r} 462\overline{)780}\,(1 \\ 462 \\ \hline 318\overline{)462}\,(1 \\ 318 \\ \hline 144\overline{)318}\,(2 \\ 288 \\ \hline 30\overline{)144}\,(4 \\ 120 \\ \hline 24\overline{)30}\,(1 \\ 24 \\ \hline 6\overline{)24}\,(4 \\ 24 \\ \hline 0 \end{array}$$

Section B (40 marks)

Question 5:

(a) Algebraic form:

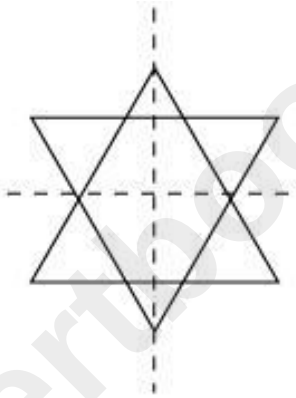
i. $2x + 28 = 45$

ii. $3y - 5z > 8x$

iii. $\frac{6x}{13y} < 17$

(b) The line of symmetry of a figure is a line which divides the figure into two equal parts such that each part is a mirror image of the other.

Lines of symmetry for the given figure are shown as dotted lines.



(c) A = 340m^2, b = 17m, l =? , P =?

Area of rectangle = l x b

340 = l x 17 $\Rightarrow$ l = 20 cm

Next,

Perimeter of a rectangle = 2(l + b) = 2(20 + 17) = 74 cm

(d)

i. Let the amount of Royalty to be paid for these books be Rs. r.

Then, 20 : 15 = 30600 : r

$$\Rightarrow r = Rs.\left(\frac{30600 \times 15}{20}\right)$$

$$= Rs.\ 22,9500$$

ii. Central angle corresponding to Royalty = 15% of 360°

$$= \frac{15}{100} \times 360° = 54°$$

Question 6:

(a) $(x + y - 2z) + (2x - y + z) - (x + y + z)$

$= x + y - 2z + 2x + y + z - x - y - z$

$= x + 2x - x + y + y - y - 2z - z - z$

$= 2x + y - 2z$

(b) Since, $2 + 3 + 4 = 9$

1st part = $\frac{2}{9} \times 81 = 18$

2nd part = $\frac{3}{9} \times 81 = 27$

3rd part = $\frac{4}{9} \times 81 = 36$

(c) It is given that the total weight of the tomatoes and onions is 60 kg and the ratio of their weights is 2 : 3.

60 kg can be divided into (2 + 3) = 5 parts

∴ Total weight of tomatoes = $\frac{2}{5} \times 60 = 24$ kg

Total weight of onions = $\frac{3}{5} \times 60 = 36$ kg

We know that the total money spent in buying the tomatoes and onions is Rs. 420 and the ratio of their prices is 8 : 27.

Therefore, Rs. 420 can be divided into (8 + 27) = 35 parts

∴ Total price of tomatoes = $\frac{8}{35} \times 420 =$ Rs. 96

Total price of onions = $\frac{27}{35} \times 420 =$ Rs. 324

Cost of 24 kg of tomatoes = Rs. 96

∴ Cost of 1 kg of tomatoes = Rs. $\frac{96}{24} = Rs.4$

⇒ Cost of 5 kg of tomatoes = Rs. $4 \times 5 =$ Rs 20

Cost of 36 kg of onions = Rs. 324

∴ Cost of 1 kg of onions = Rs. $\frac{324}{36} = Rs.9$

⇒ Cost of 5 kg of onions = Rs. $9 \times 5 =$ Rs. 45

Thus, the cost of 5 kg of tomatoes and 5 kg of onions is Rs. (20 + 45) = Rs. 65.

Question 7:

(a) 3(a + b) - 2(2a - b) + 4a – 7
= 3a + 3b - 4a + 2b + 4a – 7
= (3a - 4a + 4a) + (2b + 3b) – 7
= 3a + 5b – 7

(b) Length of the rectangular park = 250 m
Breadth of the rectangular park = 175 m
Perimeter of the rectangular park = 2(length + breadth)
=2(250 + 175)
= 850 m
Cost of fencing 1m of the park = Rs. 12
∴ Total cost of fencing the park = Rs. 12 × 850 = Rs. 10,200

(c) 1) Set of factors of 48:
Roster form = {1,2,3,4,6,8,12,16,24,48}
Set builder form = {x : x is a factor of 48}

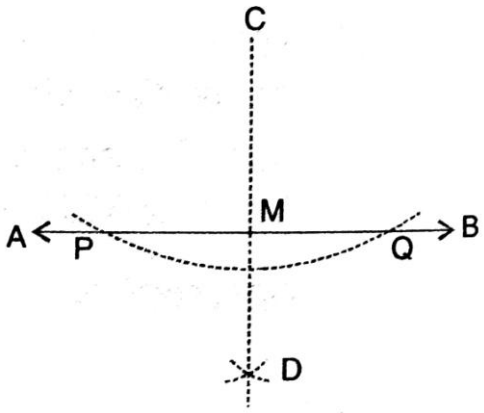
2) Set of integers between -3 and 8
Roster form = {-2,-1,0,1,2,3,4,5,6,7}
Set builder form = {x : x is an integer and $-3 \le x \le 8$}

Question 8:

(a) Total number of students = 1625
Total number of girls = 750
∴ The total number of boys = 1625 – 750 = 875
Ratio = $\frac{875}{750} = \frac{7}{6} = 7:6$

(b) To draw a perpendicular to a given line from a point outside the line.
Let AB be the given line and let C be an external point.
Steps:

i. Taking C as the centre, draw an arc of some suitable radius; which cuts AB at two points P and Q.
ii. With P and Q as centres, draw two arcs of equal radiicutting each other at point D on the other side of AB.
iii. Join C and D. Let CD cut line AB at point M. **CM is the required perpendicular on the given line AB from the exterior point C.**

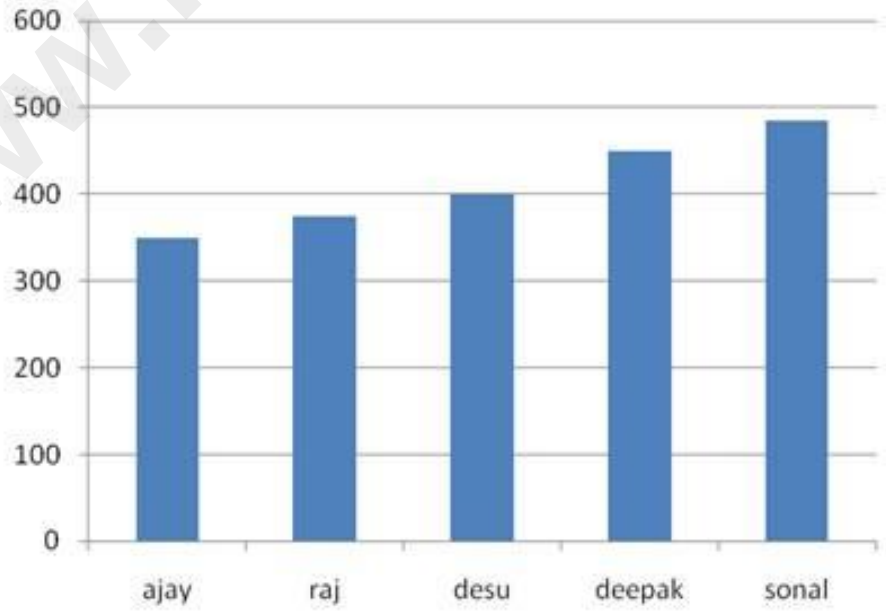


(c)

$$3x^3 - 4x^2 + 5x - 6$$
$$= 3(-1)^3 - 4(-1)^2 + 5(-1) - 6$$
$$= 3(-1) - 4(1) + (-5) - 6$$
$$= -3 - 4 - 5 - 6$$
$$= -18$$

Question 9:

(a) The bar graph is as follows:



(b) Types of sets:

i. Empty set

ii. Infinite set

iii. Finite set

(c)

$$\left(\frac{4}{5}-\frac{1}{4}\right)\div\left(1\frac{9}{20}+1\frac{3}{10}\right)$$

$$=\left(\frac{4\times4-1\times5}{20}\right)\div\left(\frac{29}{20}+\frac{13}{10}\right)$$

$$=\left(\frac{16-5}{20}\right)\div\left(\frac{29\times1+13\times2}{20}\right)$$

$$=\left(\frac{11}{20}\right)\div\left(\frac{29+26}{20}\right)$$

$$=\left(\frac{11}{20}\right)\div\left(\frac{55}{20}\right)$$

$$=\frac{\cancel{11}}{\cancel{20}}\times\frac{\cancel{20}}{\cancel{55}_{5}}$$

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