ICSE Board
Class VI Mathematics
Sample Paper – 2

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) Find the sum of the following: -146, -78, 124, 69   [2]
(b) Find the area of a rectangle with length 4.5 cm and breadth 3.0 cm.   [2]
(c) Use the divisibility tests to determine whether the number 378 is divisible by 2, 3, 4, 5, 6, 9 and 11.   [3]
(d) State whether true or false: [3]
    i. $n(\emptyset) = 1$
    ii. If two angles of a triangle are obtuse, then it is called an obtuse angled triangle.
    iii. $2x – 3y + 5z^2$ is a trinomial.

Question 2
(a) If two angles are supplementary and one angle is 5° more than four times the other, find the angles.   [2]
(b) The monthly income of Sanjeet and Manjeet are Rs. 18000 and Rs. 27000 respectively. What is the ratio of the income of Manjeet to that of Sanjeet in its simplest form?   [2]
(c) Find the L.C.M. of 120, 210, 225 by the division method.   [3]

(d) Simplify: $1\dfrac{2}{3} + \dfrac{5}{8} - \dfrac{7}{12} + 4\dfrac{4}{15}$ [3]

Question 3

(a) Write the greatest and the smallest 4-digit numbers using four different digits with the given conditions: [3]

    i.   Digit 3 is always at tens place

    ii. Digit 8 is always at hundreds place

    iii. Digit 5 is always at thousands place

(b) Find the value of $2a^3 - b^4 + 3a^2b^3 - 3ab^2$ when a = 2, b = -1 [3]

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

Question 4

(a) Answer the following questions for the given figure. [3]

    i.   What are lines p, q, and r called?

    ii. What is the point at which they meet called? Label it on the figure.

   iii. How many lines can pass through the labeled point?
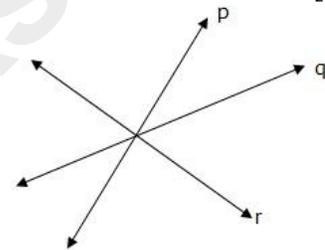
(b) Simplify: $8(a^2 - a - 1) + 5(2a - 2) - 3(a^2 + a - 1)$ [3]

(c) Alisha along with her 2 friends ordered one sandwich each at their favorite restaurant. They left a tip of 7 rupees for the waiter. If they spent a total of hundred rupees, find the cost of each sandwich.

Frame an equation for the given situation and then solve the same. [4]

Section B (40 marks)

Question 5

(a) Simplify: 53.5 - 34.68 + 64.75 - 28.9 [2]

(b) There are 1,300,000 people in a town. 786,324 of them are women, 8642 children and the rest are men. Find out the population of men in the town. [2]

(c) If the H.C.F. of two numbers is 24 and their product is 5760, find their L.C.M. [3]

(d) The following graph shows the amount of potatoes consumed in kg. [3]
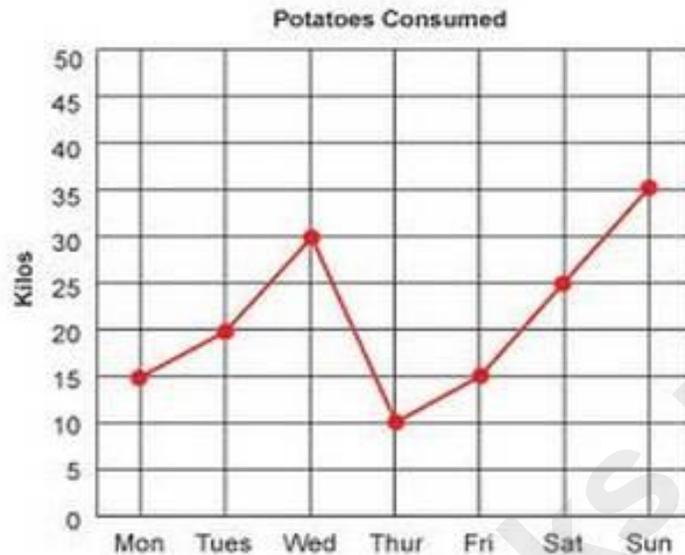
Potatoes Consumed

Read the graph and answer the following questions.

(a) On which day were maximum potatoes consumed?

(b) On which day did the consumption of potatoes went down?

(c) What is the combined consumption of potatoes on Monday, Tuesday and Wednesday?

Question 6

(a) A painter can paint a wall of area 20 m² in 10 hours. If he works at a constant speed, how much time will he take to paint a wall of area 30 m²? [3]

(b) Simplify: $15a^2 - 6a(a-2) + a(3+7a)$ [3]

(c) Let A = {x: x is a letter in the word CHANDIGARH} and

B = {x: x is a letter in the word RAJASTHAN}[4]

i. Find A ∩ B and A ∪ B

ii. Find n(A), n(B), n(A ∩ B) and n(A ∪ B)

iii. Verify: n(A ∪ B) = n(A) + n(B) − n(A ∩ B)

Question 7

(a) Express $\dfrac{1095}{1168}$ in the simplest form. [3]

(b) Find the fourth term of a proportion if the first, second and third terms are 21, 7 and 9, respectively. [3]

(c) If the area of a rectangular plot is 144 sq. m. and its length is 16 m, find the breadth of the plot. Also find the cost of painting a blue border around the plot if the cost is Rs. 3 per metre. [4]

Question 8

(a) Simplify: 16 – [5 – 2 + {7 of 2 - (6 ÷ 3 × 2 – 1 + 3)}]   [3]

(b) In the adjoining diagram, POS is a straight line. Find the value of x and hence complete the following: [3]

i) ∠POQ   ii) ∠ROS
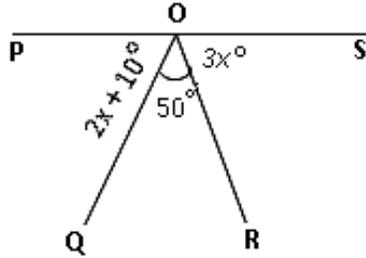
(c) Let P = {1, 2, 3, 5, 7, 11}, Q = {first five even natural numbers}. Find P ∪ Q, P ∩ Q and represent them by a Venn-Diagram.   [4]

Question 9

(a) The table represents the number of books sold in a store during four months of a year. Make a bar graph to represent the data.   [3]
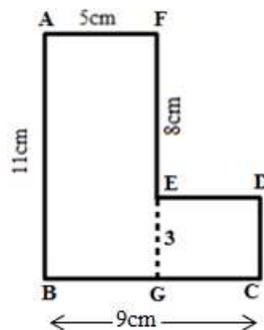
Months	January	February	March	April
No. of books	140	120	110	130

(b) Altay is a breed of a fat-tailed sheep from China. An Altay's tail weighs 8.5% of the weight of the whole sheep. The sheep weighs 82 kg in total. How much does the sheep's tail weigh?   [3]

(c) In the given figure, all the adjacent sides are at right angles.   [4]

Find:

i. The perimeter of the figure

ii. Area of the figure.

Solution

Section A (40 marks)

Question 1

(a) $-146 - 78 + 124 + 69$

$= -(146 + 78) + (124 + 69)$

$= -224 + 193 = -31$

(b) Here length = 4.5 cm and breadth = 3.0 cm

Area of a rectangle = l × b = 4.5 × 3.0 = 13.5 cm²

(c) The digit in the units place of 378 is 8.

According to the test for divisibility by 2, 278 is divisible by 2.

The sum of the digits of 378 = 3 + 7 + 8 = 18 and 18 is divisible by 3 and 9.

Hence, according to the test for divisibility by 3 and 9, 378 is divisible by 3 and 9.

378 is divisible by 2 and 3. Hence, 378 is divisible by 6.

378 is divisible by 2, 3, 6 and 9.

(d)

   i. $n(\emptyset) = 1$ –**False**

  ii.   If two angles of a triangle are obtuse, then it is called an obtuse angled triangle - **False**

 iii. $2x - 3y + 5z^2$ is a trinomial. –**True**

Question 2

(a) Let one of the angles be x, then the other angle is (4x + 5).

As the given angles are supplementary, we have

x + (4x + 5) = 180°

⇒ 5x = 180 – 5 ⇒ 5x = 175°

⇒ x = 35°

And, $4x + 5 = 4(35) + 5 = 145°$

Hence the required angles are 35° and 145°.

(b) Ratio of Manjeet's Income to Sanjeet's Income

= 27000 : 18000

= 3 : 2

(c) L.C.M. of 120, 210 and 225 is calculated as follows:

	120,	210,	225
2			
2	60,	105,	225
2	30,	105,	225
3	15,	105,	225
3	5,	35,	75
5	5,	35,	25
5	1,	7,	5
7	1,	7,	1
	1,	1,	1

L.C.M. = 2 × 2 × 2 × 3 × 3 × 5 × 5 × 7 = 12600

(d) $1\dfrac{2}{3}+\dfrac{5}{8}-\dfrac{7}{12}+4\dfrac{4}{15}=\dfrac{5}{3}+\dfrac{5}{8}-\dfrac{7}{12}+\dfrac{64}{15}$

$$=\dfrac{200+75-70+512}{120}$$

$$=\dfrac{717}{120}$$

$$=5\dfrac{39}{40}$$

Question 3

(a)

    i. Digit 3 is always at the tens place

Greatest

Th	H	T	U
9	8	3	7

Smallest

Th	H	T	U
1	0	3	2

Similarly,

    ii. Digit 8 is always at hundreds place: 9876, 1802

    iii. Digit 5 is always at thousands place: 5987, 5012

(b) Substituting a = 2, b = -1 in the given equation, we get

    $2a^3 - b^4 + 3a^2b^3 - 3ab^2$

$=2(2)^3-(-1)^4+3(2)^2(-1)^3-3(2)(-1)^2$

= 16 – 1 – 12 – 6 =–3

(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 with same radius, draw a small arc intersecting the arc drawn in step 2 at D.
   iv. Join ray OA. ∆OAB is the required angle.
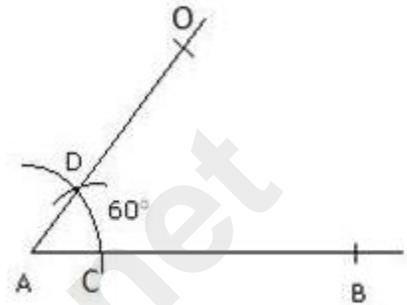
Question 4

(a)
   i.   Lines p, q and r are intersecting lines.
   ii. Point at which the lines meet is called the point of intersection. The point O represents the point of intersection.
   iii. Infinite number of lines can pass through the point O (point of intersection).
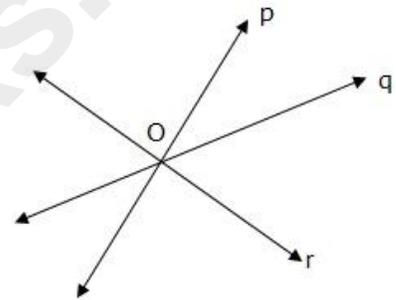
(b) $8(a^2 - a - 1) + 5(2a - 2) - 3(a^2 + a - 1)$
   $= 8a^2 - 8a - 8 + 10a - 10 - 3a^2 - 3a + 3$
   $= 8a^2 - 3a^2 - 8a + 10a - 3a - 8 - 10 + 3$
   $= 5a^2 - a - 15$

(c) Let the cost of one sandwich be Rs. x
   ∴ Cost of 3 sandwiches = Rs. 3x
   Tip given to the waiter = Rs. 7
   Total amount spent = Rs. 100
   ∴ 3x + 7 = 100
   ∴ 3x = 100 − 7
   ∴ 3x = 93
   ∴ x = 31
   Hence, cost of one sandwich = Rs. 31

Question 5

(a) The given expression:

53.5 - 34.68 + 64.75 - 28.9

= (53.5 + 64.75) - (34.68 + 28.9)

= 118.25 - 63.58

= 54.67

$$
\begin{array}{r} 53.50 \\ +64.75 \\ \hline 118.25 \end{array} \qquad \begin{array}{r} 34.68 \\ +28.90 \\ \hline 63.58 \end{array} \qquad \begin{array}{r} 118.25 \\ -\ 63.58 \\ \hline 54.67 \end{array}
$$

(b) First add the total number of women and children,

$$
\begin{array}{r} 786324 \\ +\ \ \ \ 8642 \\ \hline 794966 \end{array}
$$

Now, we need to find the number of men from the total population,

$$
\begin{array}{r} 1300000 \\ -\ 794966 \\ \hline 505034 \end{array}
$$

Hence, the total number of men is 505034.

(c) Here, product of numbers = 5760, H.C.F. = 24, L.C.M. = ?

Now, H.C.F. × L.C.M. = Product of two numbers

$\Rightarrow$ 24 × L.C.M. = 5760

$\Rightarrow$ L.C.M. = $\dfrac{5760}{24}$ = 240

(d) (a) Maximum potatoes were consumed on Sunday.

(b) The consumption of potatoes went down on Thursday.

(c) The combined consumption of potatoes on Monday, Tuesday and Wednesday

= 15 + 20 + 30 = 65 kg

Question 6

(a) Solution: Time taken by the painter to paint 20 m² of the wall = 10 hours   [Given]

$\therefore$ Time taken to paint 1 m² = $\dfrac{10}{20}$ hours = $\dfrac{1}{2}$ hour

$\Rightarrow$ Time taken to paint 30 m² = $\left(\dfrac{1}{2}\times 30\right)$ hours = 15 hours

Thus, the painter will take 15 hours to paint a wall of area 30 m².

(b) $15a^2 - 6a(a - 2) + a(3 + 7a)$

$\quad = 15a^2 - 6a \times a + 6a \times 12 + a \times 3 + a \times 7a$

$\quad = 15a^2 - 6a^2 + 12a + 3a + 7a^2$

$\quad = (15a^2 - 6a^2 + 7a^2) + 12a + 3a$

$\quad = 16a^2 + 15a$

(c) A = {C, <u>H</u>, <u>A</u>, <u>N</u>, D, I, G, <u>R</u>}, B = {<u>R</u>, <u>A</u>, J, S, T, <u>H</u>, <u>N</u>}

   i. $A \cap B$ = {H, A, N, R}

  ii. $A \cup B$ = {C, H, A, N, D, I, G, R, J, S, T}

 iii.   n(A) = 8,   n(B) = 7

 iv. $n(A \cap B)$ = 4, $n(A \cup B)$ = 11

  v.   L.H.S. = $n(A \cup B)$ = 11

       R.H.S. = $n(A) + n(B) - n(A \cap B)$ = 8 + 7 − 4 = 11

       Hence, $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Question 7

(a) First we find the factors of 1095 and 1168.

   1095 = 3 x 5 x 73

   1169 = 2 x 2 x 2 x 2 x 73

   Hence,

$$\frac{1095}{1168} = \frac{3 \times 5 \times \cancel{73}}{2\ x\ 2\ x\ 2\ x\ 2\ x\ \cancel{73}} = \frac{15}{16}$$

(b) Let the fourth term be *x.*

   21 : 7 :: 9 : *x*   or   21 : 7 = 9 : *x*

   Product of means = Product of extremes

   21 × *x* = 7 × 9

   x = 63 ÷ 21

   x = 3

(c) Area = 144 sq. m., *l* = 16 m, b = ? Perimeter =?

   Area of a rectangular plot = *l* × *b*

   ∴ 144 = 16 × b $\Rightarrow$ b = 9 m

   ∴ Breadth of the rectangular plot = 9 m

   Next, we need to find the cost of painting a blue border around the rectangular plot.

   Perimeter of the plot = 2(*l* + *b*) = 2(16 + 9) = 50 m

   Now, cost of painting the blue border = Rs. 3 per metre

   ∴ Cost of painting the entire rectangular plot = Rs. 3 × 50 = Rs. 150

Question 8

(a) 16 – [5 – 2 + {7 of 2 - (6 ÷ 3 × 2 – 1 + 3)}]

   = 16 – [5 – 2 + {7 of 2 - (2 × 2 – 1 + 3)}]

   = 16 – [5 – 2 + {7 of 2 - (4 – 1 + 3)}]

   = 16 – [5 – 2 + {7 of 2 - 6}]

   = 16 – [5 – 2 + {8}]

   = 16 – 11

   = 5

(b) Angle formed on straight line = 180°

   3x + 50° + 2x + 10° = 180°

   $\Rightarrow$ 5x + 60° = 180°

   $\Rightarrow$ 5x = 180° – 60°

   $\Rightarrow$ 5x = 120°

   $\Rightarrow$ x = 24°

   Then, m$\angle$POQ = 2x + 10 = 2(24) + 10 = 58°

   m$\angle$ROS = 3x = 3(24) = 72°
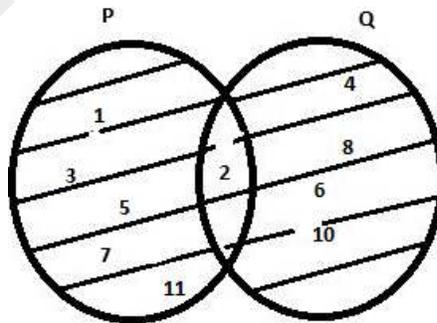
(c) Here P = {1, 2, 3, 5, 7, 11}, Q = {2, 4, 6, 8, 10}

   Then, P $\cup$ Q = {1, 2, 3, 4, 5, 6, 7, 8, 10, 11}
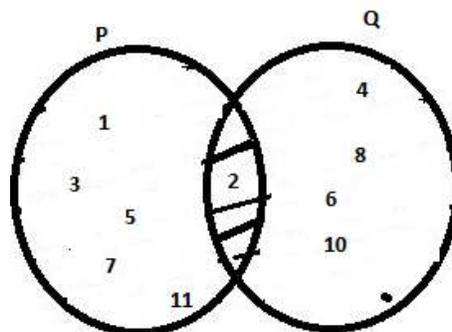
   P $\cap$ Q = {2}

   (P $\cup$ Q) and (P $\cap$ Q) are represented by the following Venn-diagrams.

   i. (P $\cup$ Q)

   ii. (P $\cap$ Q)

Question 9

(a) The bar graph is as follows:

(b) Total weight of the sheep = 82 kg

Weight of tail = 8.5% of the weight of the sheep

= 8.5% of 82

= $\dfrac{8.5}{100} \times 82$ = 6.970

Hence, weight of sheep's tail is **6.970 kg.**

(c) Perimeter = Sum of all sides

= AB + BC + CD + DE + EF + FA

= 11 + 9 + 3 + 4 + 8 + 5   ....(DE = CG = 9 – 5 = 4 cm)

= 40 cm

Area = Area of rectangle ABCF + Area of rectangle CDEG

= (11 × 5) cm² + (4 × 3) cm²

= 55 cm² + 12 cm² = 67 cm²