BLOOM

BMO Bloom Maths Olympiad

GRADE **6**

Bloom Maths Olympiad
Sample Paper 1

Maximum Time : 60 Minutes

Maximum Marks : 60

INSTRUCTIONS

1. There are 50 Multiple Choice Questions in this paper divided into two sections :

   Section A   40 MCQs; 1 Mark each
   Section B   10 MCQs; 2 Marks each

2. Each question has Four Options out of which **ONLY ONE** is correct.

3. All questions are compulsory.

4. There is no negative marking.

5. No electronic device capable of storing and displaying visual information such as calculator and mobile is allowed during the course of the exam.

School Name
Student's Name

Section A (1 Mark Questions)

1. $64.327 \times 257.2 \times 0.0097$ is same as

(a) $6.4327 \times 25.72 \times 0.097$ (b) $6.4327 \times 2.572 \times 0.97$

(c) $64327 \times 2572 \times 0.0000097$ (d) $6.4327 \times 2.572 \times 9.7$

2. Which of the following are like decimals?

(a) 6.5, 6.05, 6.005, 6.50   (b) 5.6, 0.66, 5.66, 43.1

(c) 1.12, 6.60, 0.70, 9.80   (d) 0.7, 0.76, 0.767, 0.7677

3. A 120 ft long pipe is cut into 3 pieces. The first piece of pipe is twice as long as the second piece of pipe. The third piece of pipe is three times as long as the second piece of pipe. What is the length of the longest piece of pipe?
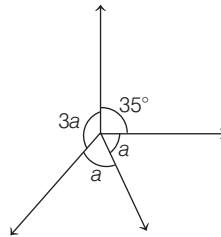
(a) 20 ft   (b) 40 ft   (c) 60 ft   (d) 80 ft

4. Which one of the following is the correct decimal notation for the following?

$$30 + 1 + \frac{3}{10} + \frac{4}{10000}$$

(a) 31.3004   (b) 31.003

(c) 31.0030   (d) 31.3003

5. Find the value of a, from the given figure.

(a) $65°$ (b) $29°$

(c) $45°$ (d) $39°$

6. Which of the following is the correct expanded form of decimal number 164.8054?

(a) $100 + 60 + 4 + \dfrac{8}{10} + \dfrac{5}{100} + \dfrac{4}{10000}$ (b) $100 + 60 + 4 + \dfrac{8}{100} + \dfrac{5}{1000} + \dfrac{4}{10000}$

(c) $100 + 60 + 4 + \dfrac{8}{10} + \dfrac{5}{1000} + \dfrac{4}{10000}$ (d) $100 + 6 + 40 + \dfrac{8}{10} + \dfrac{5}{1000} + \dfrac{2}{10000}$

7. The difference between the place values of digits 8 in whole number and in decimal number is 586.398 is ......

(a) 7999   (b) 69.993

(c) 79.556   (d) 79.992

8. Round off $37.981 + 51.73$ to nearest tenths.

(b) 89.7   (b) 90

(c) 89   (d) 89.721

02

9. Bhawna had 25 packets of sweets. Each packet contained 5 sweets. He gave $\frac{2}{5}$ of it to her sister and $\frac{2}{3}$ of the remained to her brother. How many sweets did she have left?

(a) 15　　　　　(b) 20　　　　　(c) 25　　　　　(d) 35

10. The sum of two numbers is 36.26. If one of them is 11.56, then find the product of both the numbers.

(a) 292.5　　　　　　　　　　(b) 327.461

(c) 285.532　　　　　　　　　(d) 319.561

11. The smallest number, greater than 1000, which is divisible by 2, 5 and 7 is

(a) 1500　　　　　　　　　　(b) 1005

(c) 1050　　　　　　　　　　(d) None of these

12. Which of the following is smallest decimal number?

(a) $\frac{5}{10} + \frac{8}{1000}$　　　　　　　(b) $\frac{5}{100} + \frac{8}{1000}$

(c) $5 + \frac{8}{10}$　　　　　　　　　(d) $\frac{7}{100} + \frac{8}{1000}$

13. Match the following and select the correct option.

Column A	Column B
(P) $2.346 - 0.122 + 0.453 =$	(i) 0.78
(Q) The height of Zoya and Imran is 1.26 m and 2.04 m respectively. So, Imran is ...... metres taller than Zoya.	(ii) 1840
(R) The difference between the place value of 5 in 245.701 and place value of 5 in 345721 is	(iii) 2.677
(S) If 0.55 of a number is 1265, then $\frac{4}{5}$ of the same number is	(iv) 4995

　　　(P)　(Q)　(R)　(S)　　　　　　　　　(P)　(Q)　(R)　(S)

(a) (iii)　(iv)　(ii)　(i)　　　　　(b) (iii)　(i)　(iv)　(ii)

(c) (i)　(iii)　(iv)　(ii)　　　　　(d) (iii)　(i)　(ii)　(iv)

14. Decimal representation of $\frac{1572}{1000}$ is

(a) 15.72　　　　　　　　　　(b) 1.572

(c) 0.1572　　　　　　　　　(d) 157.2

15. Simplify: $\{(0.005 + 2.00) \times 0\} \times \frac{1}{2}$

(a) 2　　　　　　　　　　　　(b) 3
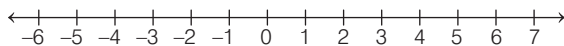
(c) 4　　　　　　　　　　　　(d) None of these

16. The simplest form of 0.628 is

(a) $\frac{257}{250}$　　　　　(b) $\frac{157}{250}$　　　　　(c) $\frac{250}{167}$　　　　　(d) None of these

03

17. Riya spent ₹ 51.55 on purchasing a basket and ₹ 20.35 on purchasing flower. How much money is left if she had ₹ 100?

(a) ₹ 29.10   (b) ₹ 30.20

(c) ₹ 28.90   (d) ₹ 28.10

18. Study the given number line carefully. Answer the following questions and select the correct option.

$$\overset{\longleftarrow\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\ \ |\longrightarrow}{\quad -6\ -5\ -4\ -3\ -2\ -1\ \ 0\ \ 1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7}$$

  (i) If we are at number -6 on the number line, then in which directions should we move so that value increases?

 (ii) At which number shall we reach, if we move 6 steps to the right of -2?

	(i)	(ii)		(i)	(ii)
(a)	Right	2	(b)	Right	4
(c)	Left	4	(d)	Left	3

19. What is the value of expression

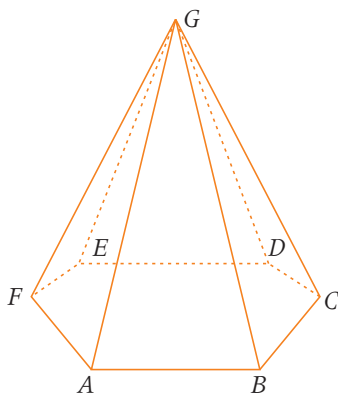$$xyz - (x + y + z),\ \text{if } x = 5,\ y = -7 \text{ and } z = 2?$$

(a) 0   (b) -70 (c) 72   (d) -68

20. 43.325 L is equal to

(a) 43225 ml   (b) 33425 ml   (c) 43325 ml   (d) 33245 ml

21. The given figure has

  (i) Faces : ....

 (ii) Edges : ....

(iii) Corners : ....

	(i)	(ii)	(iii)
(a)	6	12	7
(b)	7	12	7
(c)	7	12	6
(d)	7	11	7

04

22. Which of the following fractions is equivalent to fraction $\dfrac{6}{8}$ with numerator 186?

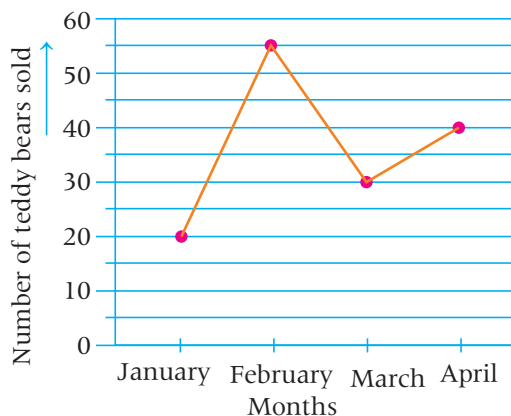(a) $\dfrac{186}{250}$ (b) $\dfrac{186}{308}$ (c) $\dfrac{186}{800}$ (d) $\dfrac{186}{248}$

23. How many fifths are there in $2\dfrac{4}{5}+1\dfrac{3}{5}$?

(a) 21 (b) 23 (c) 22 (d) 24

24. What should be subtracted from $\dfrac{a}{b}$, so that the resulting fraction will be reverse of the fraction?

(a) $\dfrac{ab}{a^2-b^2}$ (b) $\dfrac{a^2-b^2}{ab}$ (c) a^2+b^2 (d) a^2-b^2

25. The line graph shows the number of teddy bears Anita sold from January to April.

If she earned ₹ 500 for every teddy bear sold, then how much more did Anita earn in April than in March?

(a) ₹ 1480 (b) ₹ 5405
(c) ₹ 5000 (d) ₹ 484

26. The fractions have been arranged in a proper manner. Which one of the following option is in the correct ascending order?

(a) $\dfrac{3}{5}<\dfrac{5}{7}<\dfrac{7}{8}$ (b) $\dfrac{3}{5}<\dfrac{5}{7}>\dfrac{7}{8}$

(c) $\dfrac{5}{7}>\dfrac{3}{5}>\dfrac{7}{8}$ (d) $\dfrac{7}{8}>\dfrac{3}{5}>\dfrac{5}{7}$

27. If a number is first multiplied by $\dfrac{4}{7}$ and then divided by $\dfrac{12}{7}$ then it is equivalent to which of the following operations used on the number?

(a) multiplying by $\dfrac{1}{3}$ (b) dividing by $\dfrac{1}{3}$

(c) multiplying by 3 (d) dividing by $\dfrac{2}{3}$

05

28. Simplify: $\dfrac{\left(3\frac{1}{3} - 2\frac{1}{2}\right) \div \frac{1}{2} \text{ of } 2\frac{1}{2}}{\frac{1}{3} + \frac{1}{5} \div \frac{1}{9}}$

(a) $\dfrac{5}{16}$ (b) $1\dfrac{1}{5}$ (c) $1\dfrac{2}{5}$ (d) $3\dfrac{3}{4}$

29. The point P is on a mountain which is 8800 m above from the ground level and the point Q is 9600 m below from the ground level. Find the vertical distance between the points P and Q.

(a) 18300 m   (b) 13800 m   (c) 18030 m   (d) 18400 m

30. Identify the True/False in the following statements.

I. If the dividend and divisor have opposite signs, then the quotient will be negative.

II. If two numbers are of same sign, then their product is positive.

III. If the numbers are of same sign, then sign of their sum is same as the sign of the numbers.

IV. If the two numbers are of opposite signs, then their product is positive.

Codes

	I	II	III	IV
(a)	T	T	F	F
(c)	F	F	F	T

	I	II	III	IV
(b)	F	F	T	T
(d)	T	T	T	F

31. Veronica tried to solve an equation but could not reach to the correct answer. Following are the steps performed by her to solve the expression, determine which step is incorrect to start?

Solve $4x + 7(x + 2) = 36$

Step I $4x + 7x + 2 = 36$

Step II $11x + 2 = 36$

Step III $11x = 34$

Step IV $x = \dfrac{34}{11}$

(a) Step I   (b) Step II   (c) Step III   (d) Step IV

32. Consider the following statements.

1. Every prime is odd.

2. Product of any two prime numbers is odd.

Which of the above statement(s) is/are correct?

(a) Only 1   (b) Only 2   (c) Both 1 and 2   (d) Neither 1 nor 2

33. What is the value of n, if $(9 \times 4) + (n \times 3) = 9 \times (4 + 3)$?

(a) 9   (b) 4

(c) 5   (d) None of these

06

34. Study the given statements carefully and select the correct option.

Statement I 7456824 is divisible by 3.

Statement II A natural number is divisible by 3, if the sum of the digits of the number is divisible by 9.

(a) Both Statement-I and Statement-II are true

(b) Both Statement-I and Statement-II are false

(c) Statement-I is true but Statement-II is false

(d) Statement-I is false but Statement-II is true

35. Production of cars in a factory in different years is shown here.

Year	1990	1991	1992	1993	1994
Number of cars	1000	1500	2000	2400	3000

The ratio of production in the year 1991 and 1994 is ....

(a) 1 : 3   (b) 1 : 2

(c) 2 : 3   (d) 2 : 1

36. A physics book comprises of two sections, mechanical and non-mechanical in the ratio 2 : 8. How much of each type of content will be needed to make a book of 400 pages?

(a) 100 and 400   (b) 200 and 400

(c) 80 and 320   (d) None of these

37. Find the area of a circle having diameter 14 cm.

(a) 77 cm^2 (b) 110 cm^2

(c) 154 cm^2 (d) 90 cm^2

38. Each of the following given figure may has one or more line of symmetry, identify the figure that have only two lines of symmetry.
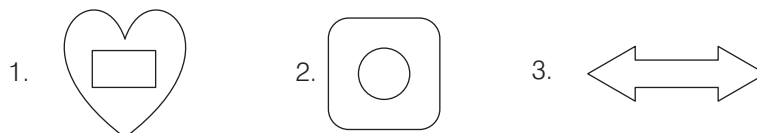
(a) Figure 1   (b) Figure 2

(c) Figure 3   (d) All of these

39. The ratio of the price of product P to that of product Q was 8 : 5. When the price of each product was increased by ₹ 70, the ratio of the price became 5 : 4. Find the original price of each product.

(a) ₹48 and ₹30   (b) ₹16 and ₹10

(c) ₹24 and ₹15   (d) ₹80 and ₹50

40. The ratio of A to B is 2 : 3 and the ratio of B to C is 6 : 5. The sum of three numbers is 180. What is the value of A?

(a) 48   (b) 72

(c) 60   (d) 120

41. Simplify: $\dfrac{\left[3\dfrac{1}{4} \div \left\{1\dfrac{1}{4} - 0.5\left(2\dfrac{1}{2} - \dfrac{1}{4} - \dfrac{1}{6}\right)\right\}\right]}{36 \times \dfrac{1}{12}}$

(a) $\dfrac{234}{11}$ (b) $\dfrac{26}{5}$ (c) $\dfrac{126}{59}$ (d) $\dfrac{123}{3}$

42. If 50 m long horizontal line is divided into 4 equal parts using a compass and name of the divided points from starting point are A, B, C, D and E. Find the length of AD.

(a) 32.40 m (b) 37.50 m (c) 30.75 m (d) None of these

43. Match the columns.

Column A		Column B
(A) The sum of 2.38, 16.3 and 72.985 is	(p)	11.131
(B) The value of $27.091 - 32.05 + 16.09$ is	(q)	13.063
(C) Sum of 0.5, 12.56 and 0.003 is	(r)	19.764
(D) When we add the decimal form of fractions $\dfrac{8}{100}, \dfrac{124}{1000}$ and $\dfrac{1956}{100}$, the result is	(s)	91.665

(a) A—r; B—q; C—s; D—p (b) A—q; B—r; C—p; D—s
(c) A—p; B—s; C—q; D—r (d) A—s; B—p; C—q; D—r

44. If $x + \dfrac{5}{6} - 3\dfrac{1}{3} = \left(\dfrac{4}{3} - \dfrac{3}{2}\right) + \left(\dfrac{1}{2} - \dfrac{1}{6}\right) + \dfrac{1}{3}$, then find the value of x.

(a) 1 (b) 2 (c) 3 (d) 4

45. Fill in the blanks and select the correct option.

(i) In a fraction, if the numerator is .... than the denominator, then the fraction is called proper fraction.

(ii) The fractions which represent the same value are called ....

(iii) Two friends ate $\dfrac{3}{5}$ and $\dfrac{2}{3}$ of a chocolate. The fraction of the chocolate they ate together is ....

(iv) .... piece of length $2\dfrac{1}{3}$ cm each can be cut from a piece 84 cm long.

	(i)	(ii)	(iii)	(iv)
(a)	smaller	like fractions	$\dfrac{13}{15}$	48
(b)	greater	unlike fractions	$\dfrac{11}{12}$	68
(c)	greater	equivalent fractions	$\dfrac{14}{15}$	36
(d)	smaller	equivalent fractions	$\dfrac{19}{15}$	36

08

46. Suppose $\frac{7}{8}$ of a tower is inside the cement. When $\frac{2}{3}$ of it is pulled out, 10 m tower still remains in the cement. What is the full length of the tower?

(a) 40 m   (b) 34.29 m   (c) 28.89 m   (d) 32 m

47. How many more squares must be unshaded to make $\frac{4}{5}$ of the given figure unshaded?
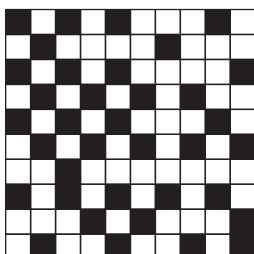
(a) 14   (b) 7   (c) 16   (d) 42

48. Rahul has a rectangular field of length and breadth 200 m and 160 m, respectively. He wants to fence it with four rounds of rope. What is the total length of rope he must use?

(a) 2880 m   (b) 2900 m   (c) 2850 m   (d) None of these

49. Find the digits represented by a and b in $a7889b$ to form the least value of the number, so that it is divisible by 15.

(a) 278895   (b) 178890   (c) 278890   (d) 478890

50. Match Column-I with Column-II and select the correct answer using the codes given below the columns.
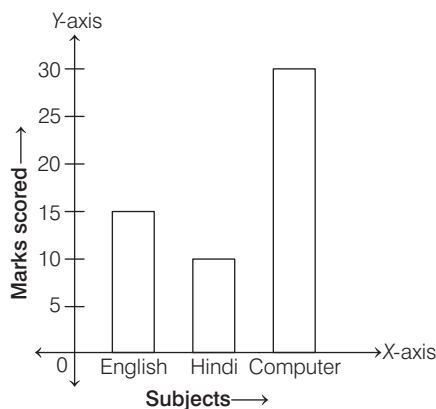
	Column I		Column II
A.	The horizontal line in the graph is called	(p)	30
B.	The vertical line in the graph is called	(q)	20
C.	Highest marks scored in any subject	(r)	X-axis
D.	The difference of highest and least marks scored in the subject is	(s)	Y-axis

(a) A → (s); B → (r); C → (q); D → (p)   (b) A → (s); B → (r); C → (p); D → (q)

(c) A → (r); B → (s); C → (q); D → (p)   (d) A → (r); B → (s); C → (p); D → (q)

09

Solutions

1. (d) Position of decimal point is shifted only.

   $\therefore 64.327 \times 257.2 \times 0.0097 = 6.4327 \times 2.572 \times 9.7$

2. (c) We know that, the decimals having equal number of digits after decimal point are called like decimals.

   $\therefore$ 1.12, 6.60, 0.70 and 9.80 are like decimals.

3. (c) Let the length of second piece of pipe be x ft. Then, first and second pieces of pipe will be $2x$ and $3x$.

   Now, according to the question,
   $$(2x) + (x) + (3x) = 120$$
   $$6x = 120$$
   $$\Rightarrow \qquad x = \frac{120}{6} = 20 \text{ ft}$$

   $\therefore$ Longest piece of pipe = third piece of pipe
   $$= 3x = 3 \times 20 = 60 \text{ ft.}$$

4. (a) Given expansion of a decimal number
   $$= 30 + 1 + \frac{3}{10} + \frac{4}{10000} = 30 + 1 + 0.3 + 0.0004$$
   $$= 31.3004$$

5. (a) We know that, total of angles around a point is $360°$.

   $\therefore$ From the figure, $a + a + 3a + 35° = 360°$
   $$5a + 35° = 360°$$
   $$5a = 360 - 35° = 325°$$
   $$a = \frac{325°}{5} = 65°$$

6. (c) Expanded form of 164.8054 is
   $$1 \times 100 + 6 \times 10 + 4 \times 1 + 8 \times \frac{1}{10} + 0 \times \frac{1}{100} + 5 \times \frac{1}{1000} + 4 \times \frac{1}{10000}$$
   $$= 100 + 60 + 4 + \frac{8}{10} + \frac{5}{1000} + \frac{4}{10000}$$

7. (d) Given, number $= 586.398$

   Place value of digit 8 in whole number $586 = 8 \times 10 = 80$

   Place value of digit 8 in decimal number $0.398 = 8 \times \frac{1}{1000} = \frac{8}{1000} = 0.008$

   $\therefore$ Their difference $= 80 - 0.008 = \frac{80000 - 8}{1000} = \frac{79992}{1000} = 79.992$

10

8. (b) Given,   37.981

        + <u>51.730</u>

        <u>89.711</u>

$\therefore$ 89.711 when rounded off to the nearest tenths becomes 90.

9. (c) Total number of packets $= 25$

Total number of sweets $= 25 \times 5 = 125$

Remaining sweets after giving $\dfrac{2}{5}$ to her sister $= 125 - 125 \times \dfrac{2}{5} = 125 - 50 = 75$

Now, remaining sweets after giving $\dfrac{2}{3}$ of the previous remaining $= 75 - 75 \times \dfrac{2}{3} = 75 - 50 = 25$

$\therefore$ She had 25 sweets left at last.

10. (c) Given, first number $= 11.56$

      Sum of two numbers $= 36.26$

$\therefore$ Second number $= 36.26 - 11.56 = 24.7$

$\therefore$ Product of both numbers $= 11.56 \times 24.7 = 285.532$

11. (c) L.C.M of the given prime numbers 2, 5 and $7 = 2 \times 5 \times 7 = 70$

Now, the smallest number is greater than 1000, which is divisible by 2, 5 and 7

To get a number just greater than 1000, we need to multiply 70 by a number such that its product should not be smaller than thousand and not much large. In this case when we multiply 70 by 14 we obtain 980 which is smaller than thousand so, we move on further and multiply 70 by 15, we get 1050 which is just greater than 1000.

$$= 70 \times 15 = 1050$$

12. (b) From option (a), $\dfrac{5}{10} + \dfrac{8}{1000} = 0.5 + 0.008 = 0.508,$

From option (b), $\dfrac{5}{100} + \dfrac{8}{1000} = 0.05 + 0.008 = 0.058,$

From option (c), $5 + \dfrac{8}{10} = 5 + 0.8 = 5.8$

From option (d), $\dfrac{7}{100} + \dfrac{8}{1000} = 0.07 + 0.008 = 0.078$

$\therefore$ 0.058 is the smallest decimal number.

13. (b) (P) $2.346 + 0.453 - 0.122 = 2.799 - 0.122 = 2.677$

(Q) Height of Zoya $= 1.26$ m

    Height of Imran $= 2.04$ m

    $\therefore$ Imran is $(2.04 - 1.26)$ m $= 0.78$ m taller than Zoya.

(R) Place value of 5 in $245.701 = 5 \times 1 = 5$

    Place value of 5 in $345721 = 5 \times 1000 = 5000$

    $\therefore$ Required difference $= 5000 - 5 = 4995$

11

(S) Let the number be x.

According to the question,

$$0.55 \text{ of } x = 1265$$

$$\Rightarrow \qquad x = \frac{1265}{0.55} = \frac{126500}{55}$$

$$\Rightarrow \qquad x = 2300$$

$$\therefore \qquad \frac{4}{5} \text{ of } 2300 = \frac{4}{5} \times 2300 = 1840$$

14. (b) Given fraction $= \dfrac{1572}{1000}$

$\therefore$ Decimal representation $= 1572 \times \dfrac{1}{1000} = 1.572$

15. (d) Given, $\left\{(0.005 + 2.00) \times 0\right\} \times \dfrac{1}{2} = \left\{2.005 \times 0\right\} \times \dfrac{1}{2}$

We know, multiplication by 0 to any number gives 0 in the product.

$\therefore \qquad \text{Product} = 0$
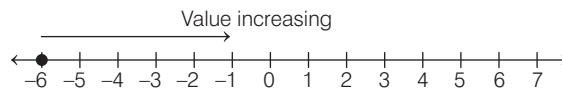
16. (b) Given decimal $= 0.628$

Its equivalent fraction $= \dfrac{628}{1000}$

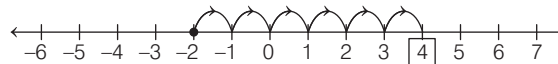On simplifying the fraction, divide numerator and denominator by 4.

$$\frac{628}{1000} = \frac{157}{250}$$

17. (d) Money left $= 100 - 51.55 - 20.35 = ₹\, 28.10$

18. (b) (i) If we are at number -6 on the number line, then we should move in right direction so that the value increases.

(ii) If we move 6 steps to the right direction of -2, we shall reach at 4.

19. (b) If $x = 5$, $y = -7$ and $z = 2$

$$\therefore \ xyz - (x + y + z) = (5 \times (-7) \times 2) - (5 - 7 + 2)$$

$$= -70 - 0 = -70$$

20. (c) We know that, $1\,L = 1000\,ml$

$$\therefore \qquad 43.325\,L = 43.325 \times 1000 = 43325\,ml$$

12

21. (b) (i) **Faces : 7** (*ABG, BCG, CDG, DEG, AFG, FEG, ABCDEF*)

(ii) **Edges : 12** (*AB, BC, CD, DE, EF, FA, AG, BG, CG, DG, EG, FG*)

(iii) **Corners : 7** (*A, B, C, D, E, F, G*)

22. (d) Fraction equivalent to fraction $\dfrac{6}{8}$ with numerator 186 is

$$\frac{6 \times 31}{8 \times 31} = \frac{186}{248}$$

[∵ when we divide 186 by 6 we get quotient 31. This quotient obtained should be multiplied by both numerator and denominator, in order to get an equivalent fraction]

23. (c) Given expression,

$$2\frac{4}{5} + 1\frac{3}{5} = \frac{14}{5} + \frac{8}{5} = \frac{14+8}{5} = \frac{22}{5}$$

∴ 22 fifths are there in $\dfrac{22}{5}$.

24. (b) Given fraction $= \dfrac{a}{b}$

Reverse of the fraction $= \dfrac{b}{a}$

According to the question,

$$\frac{a}{b} - \frac{b}{a} = \frac{a^2 - b^2}{ab}$$

∴ $\dfrac{a^2 - b^2}{ab}$ must be subtracted from $\dfrac{a}{b}$ to get $\dfrac{b}{a}$.

25. (c) From the data, we see that, number of teddy bears sold in April $= 40$

and number of teddy bears sold in March $= 30$

Now, number of more teddy bears sold in April than in March $= 40 - 30 = 10$

∴ The more amount earned by Anita in April than in March $= ₹(10 \times 500)$

$$= ₹ 5000$$

26. (a) We know, $\dfrac{3}{5} = 0.6, \dfrac{5}{7} = 0.714$ and $\dfrac{7}{8} = 0.875$

∵ $\qquad\qquad 0.6 < 0.714 < 0.875$

∴ $\qquad\qquad \dfrac{3}{5} < \dfrac{5}{7} < \dfrac{7}{8}$

So, the order in option (a) is in correct ascending order.

27. (a) Let the number be x.

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According to the question, $\dfrac{(x) \times \left(\dfrac{4}{7}\right)}{\dfrac{12}{7}} = (x) \times \left(\dfrac{4}{7}\right) \times \left(\dfrac{7}{12}\right) = (x) \times \left(\dfrac{1}{3}\right)$
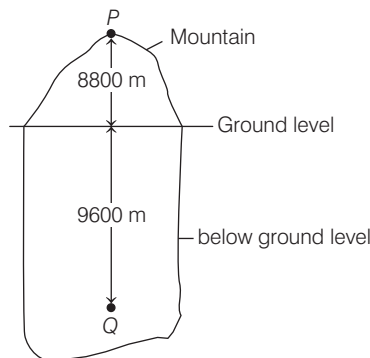
$\therefore x$ is multiplying by $\dfrac{1}{3}$

28. (a) $\dfrac{\left(3\dfrac{1}{3} - 2\dfrac{1}{2}\right) \div \dfrac{1}{2} \text{ of } 2\dfrac{1}{2}}{\dfrac{1}{3} + \dfrac{1}{5} \div \dfrac{1}{9}} = \dfrac{\left(\dfrac{10}{3} - \dfrac{5}{2}\right) \div \dfrac{1}{2} \text{ of } \dfrac{5}{2}}{\dfrac{1}{3} + \dfrac{1}{5} \text{ of } 9}$

$= \dfrac{\left(\dfrac{20 - 15}{6}\right) \div \dfrac{1}{2} \text{ of } \dfrac{5}{2}}{\dfrac{1}{3} + \dfrac{9}{5}}$

$= \dfrac{\dfrac{5}{6} \div \dfrac{5}{4}}{\dfrac{5 + 27}{15}} = \dfrac{\dfrac{5}{6} \times \dfrac{4}{5}}{\dfrac{32}{15}} = \dfrac{2}{3} \times \dfrac{15}{32} = \dfrac{5}{16}$

29. (d) Given,

$\therefore$ **Vertical distance between the points** P **and** $Q = 8800 + 9600 = 18400$ **m**

30. (d) I. True,

e.g. $-4 \div 2 = -2$ (Negative)

II. True,

e.g. $(-2) \times (-2) = 4$ (Positive) and $(3) \times (2) = 6$ (Positive)

III. True,

e.g. $5 + 6 = 11$ (same sign) and $(-3) + (-5) = -3 - 5 = -8$ (same sign)

IV. False,

e.g. $(-6) \times 3 = -18$ (Negative)

31. (a) **Given expression** : $4x + 7(x + 2) = 36$

$\Rightarrow$ $\qquad\qquad 4x + 7x + 14 = 36$

$\therefore$ **Step I is incorrect to start the solution.**

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32. (d) Every prime is odd except 2.

and product of any two prime numbers may be odd or even.

e.g. $\qquad 2 \times 3 = 6$, which is even.

∴ Neither 1 nor 2 is correct.

33. (a) Given, $(9 \times 4) + (n \times 3) = 9 \times (4 + 3)$

By distributive property,

$$9 \times (4 + 3) = (9 \times 4) + (9 \times 3)$$

∴ $\qquad (9 \times 4) + (n \times 3) = (9 \times 4) + (9 \times 3)$

On comparing, we get

$$n = 9.$$

34. (a) **Statement I** If the sum of digits of a number is divisible by 3, the number is divisible by 3.

∴ Sum of digits of $7456824 = 7 + 4 + 5 + 6 + 8 + 2 + 4 = 36$

Since, 36 is divisible by 3.

∴ The number 7456824 is divisible by 3.

Statement II If any number is divisible by 9, it will be divisible by 3 also.

∴ Both statement I and statement II are true.

35. (b) According to the given table,

Ratio of production in year 1991 and 1994

$$= \frac{1500}{3000} = \frac{1}{2} = 1 : 2$$

36. (c) Total number of pages in a book $= 400$

Ratio of mechanical and non-mechanical sections $= 2 : 8$

∴ Number of pages in mechanical section $= 2 \times \dfrac{400}{(2 + 8)}$

$$= 2 \times \frac{400}{10} = 80$$

and number of pages in non-mechanical section

$$= 400 - 80 = 320$$

37. (c) Given, diameter of circle $= 14\,\text{cm}$

∴ $\qquad$ Radius $= \dfrac{\text{diameter}}{2} = \dfrac{14}{2} = 7\,\text{cm}$

∴ $\qquad$ Area of a circle $= \pi \times (\text{radius})^2$

$$= \frac{22}{7} \times (7)^2 \qquad\qquad \left[\because \pi = \frac{22}{7} \right]$$

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$$= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$

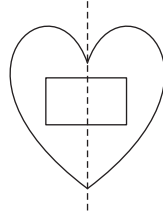**38.** (a) Figure 1 has only one line of symmetry i.e. vertical.
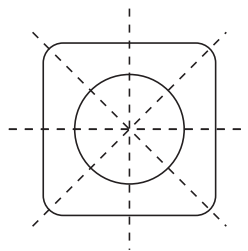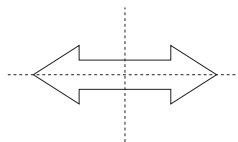
Figure 2 has more than two lines of symmetry.

Figure 3 has only two lines of symmetry i.e. Vertical and Horizontal.

39. (d) Let the product P be $8x$ and Q be $5x$. Then,

According to the question,

$$\frac{8x + 70}{5x + 70} = \frac{5}{4}$$

$\Rightarrow \qquad 32x + 280 = 25x + 350$

$\Rightarrow \qquad 32x - 25x = 350 - 280$

$\Rightarrow \qquad 7x = 70$

$\Rightarrow \qquad x = \frac{70}{7} = 10$

$\therefore$ Original price of product $P = 8x = 8 \times 10 = ₹80$ and

Original price of product $Q = 5x = 5 \times 10 = ₹50$

40. (a) Given, $A:B = 2:3$ and $B:C = 6:5$

$\Rightarrow \qquad A:B = 4:6$ and $B:C = 6:5$

$\therefore \qquad A:B:C = 4:6:5$

Let the values of A, B and C be $4x$ and $6x$ and $5x$ respectively. Then,

$$4x + 6x + 5x = 180$$

$$15x = 180$$

$$x = \frac{180}{15} = 12$$

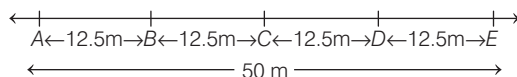$\therefore$ Value of $A = 4x = 4 \times 12 = 48$

41. (b) Given, $\dfrac{\left[3\frac{1}{4} \div \left\{1\frac{1}{4} - 0.5\left(2\frac{1}{2} - \frac{1}{4} - \frac{1}{6}\right)\right\}\right]}{36 \times \frac{1}{12}} = \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{5}{2} - \frac{1}{4} - \frac{1}{6}\right)\right\}\right]}{3}$

$= \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{30 - 3 - 2}{12}\right)\right\}\right]}{3} = \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2} \times \frac{25}{12}\right\}\right]}{3}$

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$$= \dfrac{\left[\dfrac{13}{4} \div \left\{\dfrac{5}{4} - \dfrac{25}{24}\right\}\right]}{3} = \dfrac{\left[\dfrac{13}{4} \div \left\{\dfrac{30-25}{24}\right\}\right]}{3} = \dfrac{\left[\dfrac{13}{4} \div \dfrac{5}{24}\right]}{3}$$

$$= \dfrac{\left[\dfrac{13}{4} \times \dfrac{24}{5}\right]}{3} = \dfrac{13 \times 6}{5 \times 3} = \dfrac{26}{5}$$

42. (b) A 50m long horizontal line is divided into 4 equal parts.

∴ Length of each equal part $= \dfrac{50}{4} = 12.5$ m

$$\overset{\longleftarrow}{\underset{A \leftarrow 12.5m \rightarrow B \leftarrow 12.5m \rightarrow C \leftarrow 12.5m \rightarrow D \leftarrow 12.5m \rightarrow E}{\vdash \quad \vdash \quad \vdash \quad \vdash \quad \vdash}}\overset{\longrightarrow}{}$$

$$\longleftarrow \text{—————— 50 m ——————} \longrightarrow$$

∴ Length of $AD = 12.5 \times 3 = 37.50$ m

43. (d) A : $2.38 + 16.3 + 72.985 = 91.665$

B : $27.091 - 32.05 + 16.09 = 11.131$

C : $0.5 + 12.56 + 0.003 = 13.063$

D: Decimal forms of $\dfrac{8}{100}, \dfrac{124}{1000}$ and $\dfrac{1956}{100}$ are 0.08, 0.124 and 19.56 respectively.

Their sum $= 00.080 + 00.124 + 19.560 = 19.764$

  A → (s); B → (p); C → (q); D → (r)

44. (c) $x + \dfrac{5}{6} - 3\dfrac{1}{3} = \left(\dfrac{4}{3} - \dfrac{3}{2}\right) + \left(\dfrac{1}{2} - \dfrac{1}{6}\right) + \dfrac{1}{3}$

On simplifying,

$$\dfrac{6x+5}{6} - \dfrac{10}{3} = \left(\dfrac{8-9}{6}\right) + \left(\dfrac{3-1}{6}\right) + \dfrac{1}{3}$$

$\Rightarrow \quad \dfrac{6x+5}{6} - \dfrac{10}{3} = -\dfrac{1}{6} + \dfrac{1}{3} + \dfrac{1}{3}$ $\qquad \Rightarrow \quad \dfrac{6x+5}{6} - \dfrac{10}{3} = \dfrac{-1+2+2}{6}$

$\Rightarrow \quad \dfrac{6x+5}{6} - \dfrac{10}{3} = \dfrac{1}{2}$ $\qquad \Rightarrow \quad \dfrac{6x+5}{6} = \dfrac{1}{2} + \dfrac{10}{3} = \dfrac{3+20}{6} = \dfrac{23}{6}$

$\Rightarrow \quad 6x + 5 = \dfrac{23}{6} \times 6 = 23$ $\qquad \Rightarrow \quad 6x + 5 = 23$

$\Rightarrow \quad 6x = 23 - 5 = 18$ $\qquad \Rightarrow \quad x = \dfrac{18}{6} = 3$

45. (d) (i) Smaller

(ii) Equivalent fractions

(iii) Fraction of chocolate they ate together $= \dfrac{3}{5} + \dfrac{2}{3} = \dfrac{9+10}{15} = \dfrac{19}{15}$

(iv) Length of the piece $= 84$ cm

  Length of each small piece $= 2\dfrac{1}{3}$ cm $= \dfrac{7}{3}$ cm

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$$\therefore \text{ Number of pieces can be cut} = 84 \div \frac{7}{3} = \left(84 \times \frac{3}{7}\right) = 36$$

46. (b) Let full length of tower be x m.

Then $\dfrac{7x}{8}$ part of tower be inside the tower.

According to question, $\left(\dfrac{7}{8}x\right) - \dfrac{2}{3}\left(\dfrac{7}{8}x\right) = 10 \quad \Rightarrow \quad \dfrac{7}{8}x - \dfrac{14}{24}x = 10$

$$\Rightarrow \qquad \frac{21x - 14x}{24} = 10 \quad \Rightarrow \qquad \frac{7x}{24} = 10$$

$$\Rightarrow \qquad x = \frac{10 \times 24}{7} = \frac{240}{7} \Rightarrow \qquad x = 34.29$$

Hence, length of tower = 34.29 m

47. (c) Number of unshaded squares $= 64$

Total number of squares $= 10 \times 10 = 100$

$\dfrac{4}{5}$ of the total squares $= \dfrac{4}{5} \times 100 = 80$

To make 80 squares unshaded, then number of shaded square must be unshaded

$$= 80 - 64 = 16$$

48. (a) The length of the rope required by Rahul to fence the field with four rounds of rope will be four times the perimeter of the field. It is given that,

Length of the rectangular field $= 200$ m

Breadth of the rectangular field $= 160$ m

Perimeter of a rectangle $= 2$ (Length $+$ Breadth) $= 2(200 + 160) = 2 \times 360 = 720$ m

Rahul needs 720 m of rope to fence the field once. Therefore, to fence the field with four rounds of rope, total rope needed by Rahul $= 4 \times 720 = 2880$ m

Rahul needs 2880 m of rope to fence his field with four rounds of rope.

49. (b) If any number is divisible by 15, it must be divisible by both 3 and 5.

So, for divisibility by 5, $b = 0$ or 5

and for divisibility by 3, sum of all the digits must be divisible by 3.

If we take $b = 0$

$\therefore \qquad\qquad\qquad a + 7 + 8 + 8 + 9 + 0 = 32 + a$

$\therefore$ It is divisible by 3, so a must be 1.

$\therefore \qquad\qquad\qquad$ Number $= 178890$

If we take $b = 5$, $a + 7 + 8 + 8 + 9 + 5 = 37 + a$

$\therefore a$ must be 2.

$\therefore \qquad\qquad\qquad$ Number $= 278895$

But the least number $= 178890$

50. (d) (A) The horizontal line in the graph is called X-axis.

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(B) The vertical line in the graph is called Y-axis.

(C) Highest marks scored in any subject is 30.

(D) Least marks scored in the Hindi subject is 10.

$\therefore$ The difference of highest and least marks scored in the subject $= 30 - 10 = 20$

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