



BK BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY | CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL



MID-TERM EXAMINATION 2023-24

MATHEMATICS

Class :VII
Date :
Admission No.:

MARKING KEY

Duration : 3 Hrs
Max. Marks : **80**
Roll No.:

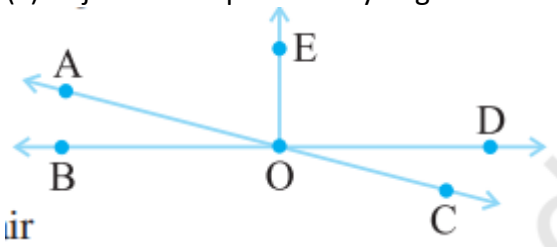
General Instructions:

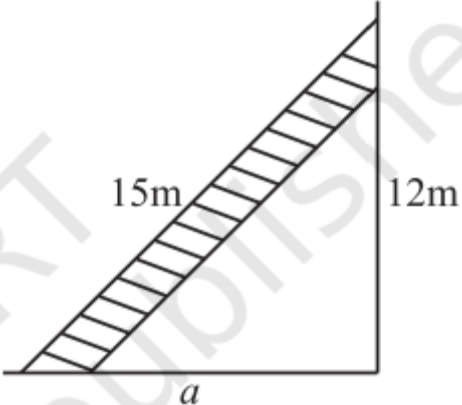
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required.

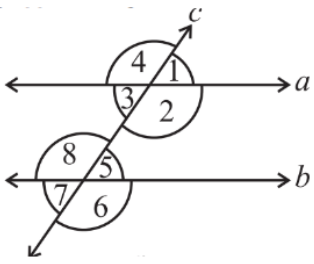
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|----|--|---|
| 1. | Closure property does not hold good in integers for (a) addition (b) multiplication (c) subtraction (d) none of these | 1 |
| 2. | Product of two integers is 256, if one of the integers is (-8), then the other is (a) 32 (b) -32 (c) +248 (d) -264 | 1 |
| 3. | The product of a positive integer and (-1) is (a) -1 (b) positive (c) negative (d) 1 | 1 |
| 4. | The multiplicative identity for integers is | 1 |

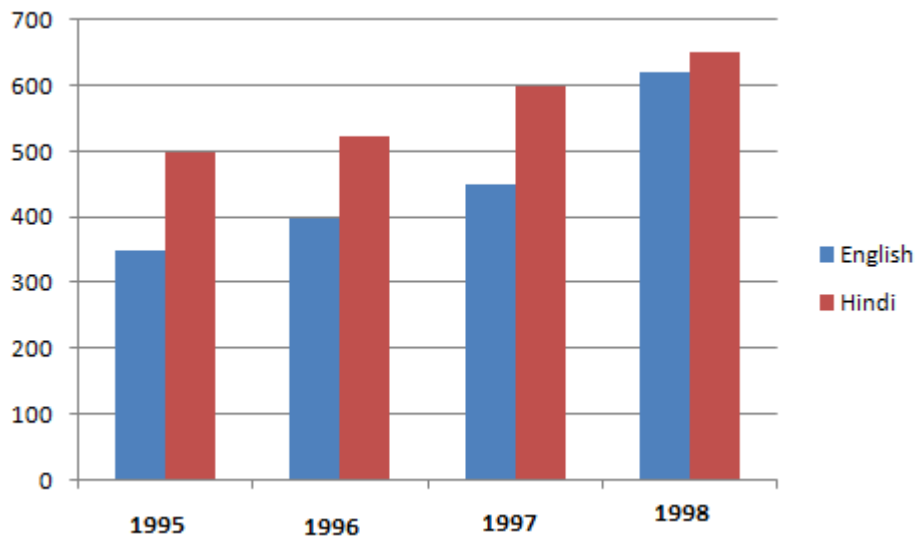
| | | |
|-----|---|---|
| | <p>(a) 1 (b) -1 (c) 0 (d) none of these</p> | |
| 5. | <p>When 0 divided by (-10), we get (a) - 10 (b) 10 (c) 1 (d) 0</p> | 1 |
| | fractions | |
| 6. | <p>Which of the following is an improper fraction? (a) $\frac{2}{7}$ (b) $\frac{3}{5}$ (c) $\frac{8}{3}$ (d) none of these</p> | 1 |
| 7. | <p>When the product of two fractions is unity, each is called the (a) denominator of the other (b) numerator of the other (c) additive inverse of the other (d) reciprocal of the other</p> | 1 |
| 8. | <p>When the sum of two fractions is unity, each is called the: (a) denominator of the other (b) numerator of the other (c) additive inverse of the other (d) reciprocal of the other</p> | 1 |
| 9. | <p>Find $\frac{1}{4}$ of 220. (a) 45 (b) 55 (c) 65 (d) 75</p> | 1 |
| | Simple equations | 1 |
| 10. | <p>Write the following statement in the form of an equation. "The sum of three times x and 10 is 23. (a) $3x - 10 = 23$ (b) $3x + 23 = 10$ (c) $3x + 10 = 23$ (d) $3x - 23 = 10$</p> | 1 |
| 11. | <p>Write the following statement in the form of an equation "The number b divided by 6 gives 5".</p> | 1 |

| | | |
|-----|---|---|
| | <p>(a) $b - 5 = 6$ (b) $5b = 6$ (c) $b + 5 = 6$ (d) none of these</p> | |
| 12. | <p>Which of the following is the value of x such that $5x - 12 = -2$? (a) 2 (b) -2 (c) 4 (d) none of these</p> | 1 |
| 13. | <p>What value of p makes the given equation true. $p/5 + 19 = 20$ (a) 5 (b) 10 (c) 15 (d) none of these</p> | 1 |
| 14. | <p>If the LHS and RHS of an equation are interchanged, then (a) The equation remains the same. (b) The value of the variable becomes half. (c) The value of the variable becomes double. (d) The value of the variable becomes zero.</p> | 1 |
| 15. | <p>When the sum of the measures of two angles is 90°, the angles are called (a) adjacent angles (b) complementary angles (c) vertically opposite angles (d) supplementary angles</p> | 1 |
| 16. | <p>If a transversal intersects two parallel lines then the interior angles on the same side of the transversal are (a) vertically opposite angles (b) supplementary angles (c) complementary angles (d) alternate angles</p> | 1 |
| 17. | <p>What is the mode of the following set of numbers? 1, 2, 3, 2, 1, 5, 6, 1 (a) 3 (b) 1 (c) 2 (d) 5</p> | 1 |
| 18. | <p>The median of 1, 4, 1, 2, 0, 1, 5, 4, 2, 2 is (a) 0 (b) 1 (c) 2 (d) 4</p> | 1 |

| | | |
|-----|--|-------------|
| 19. | How many medians can a triangle have? (a) 1 (b) 2 (c) 3 (d) 6 | 1 |
| 20. | The measure of each angle of an equilateral triangle is (a) 30° (b) 60° (c) 90° (d) 45° | 1 |
| 21. | Write down a pair of integers whose: (a) sum is -17 (b) difference is -10 | 2 |
| A- | a. $(-7) + (-10)$ b. $(-11) - (-1)$ | 1 1 |
| 22. | The scores in mathematics test (out of 25) of 15 students is as follows: 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20 Find the mode and median of this data. Are they same? | 2 |
| A- | Arranging scores in ascending order, we get 5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25 <u>Mode</u> - Mode of a given data is that value of observation that has the maximum occurrence or repetition i.e., most frequent. Therefore, 20 has the highest occurrence. \therefore Mode = 20. We have 15 observations given in total. Hence, the midmost observation will be the 8 th observation. Median = Middlemost observation (in this case, 8 th observation) \therefore Median = 20 Yes, the mode and <u>median</u> of the given observations are the same. | 1 1 1 |
| 23 | In the adjoining figure, name the following pairs of angles. (i) Obtuse vertically opposite angles (ii) Adjacent complementary angles  | 2 |
| A- | We use the geometry concepts like supplementary angles, vertically opposite angles and adjacent angles to solve the problem. (i) Obtuse vertically opposite angles mean angles greater than 90° and form a pair of vertically opposite angles. So, the angles are $\angle AOD$ and $\angle BOC$. | 1 |

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| | (ii) Adjacent complementary angles are those angle that have one common vertex and one common arm, non - common arms are on either sides of the common arm and their sum is equal to 90° . $\angle EOA$ and $\angle AOB$ are adjacent complementary angles. | 1 |
| 24 | A 15 m long ladder reached a window 12 m high from the ground by placing it against a wall at a distance 'a'. Find the distance of the foot of the ladder from the wall. | 2 |
| |  | |
| A- | <p>by applying Pythagoras theorem,</p> $(15)^2 = (12)^2 + a^2$ $225 = 144 + a^2$ $a^2 = 225 - 144 = 81$ $a = 9 \text{ m}$ <p>Therefore, the distance of the foot of the ladder from the wall is 9 m.</p> | 1 1 |
| 25 | Convert the following equations in statement form: (a) $5x = 20$ (b) $3y + 7 = 1$ | 2 |
| A- | <p>We have been given two equations a) $5x = 20$ and b) $3y + 7 = 1$. We need to find a statement for these equations.</p> <p>a) In our first equation $5x = 20$, we can see that 5 times a number 'x' is equal to 20. In generalizing it becomes: Five times a number is twenty.</p> <p>b) In our second equation $3y + 7 = 1$, we can see that 7 more than 3 times a number 'y' is equal to 1. In generalizing it becomes: Seven more than three times a number is 1.</p> | 1 1 |
| 26 | Find each of the following products: (a) $37 \times (-1)$ (b) $(-1) \times 225$ (c) $(-21) \times (-40)$ | 3 |
| A- | <p>(a) $37 \times (-1) = -37$</p> <p>(b) $(-1) \times 225 = -225$</p> <p>(c) $(-21) \times (-40) = 840$</p> | 1 1 1 |

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| 27 | The ages in years of 10 teachers of a school are: 32, 41, 28, 54, 35, 26, 23, 33, 38, 40 (i) What is the age of the oldest teacher and that of the youngest teacher? (ii) What is the range of the ages of the teachers? (iii) What is the mean age of these teachers? | 3 |
| A- | Age of oldest teachers=54 years Age of youngest teachers = 23 years \therefore Range = (54-23) years =31 years Mean = 34 | 1 1 1 |
| 28 | In the adjoining figure, identify (i) the pairs of corresponding angles. (ii) the pairs of alternate interior angles. (iii) the pairs of interior angles on the same side of the transversal  | 3 |
| A- | i) $\angle 1$ and $\angle 5$; $\angle 2$ and $\angle 6$; $\angle 4$ and $\angle 8$; $\angle 3$ and $\angle 7$ are the pairs of corresponding angles. (ii) $\angle 3$ and $\angle 5$; $\angle 2$ and $\angle 8$ are the pairs of alternate interior angles. (iii) $\angle 3$ and $\angle 8$; $\angle 2$ and $\angle 5$ are the pairs of interior angles on the same side of the transversal. | 1 1 1 |
| 29 | The sum of three consecutive multiples of 2 is 18. Find the numbers. | 3 |
| A- | As per the question, we have $2x + (2x + 2) + (2x + 4) = 18$ $\Rightarrow 2x + 2x + 2 + 2x + 4 = 18$ $\Rightarrow 6x + 6 = 18$ $\Rightarrow 6x = 18 - 6$ (Transposing 6 to RHS) $\Rightarrow 6x = 12$ $\Rightarrow x = 2$ Thus, the required multiples are $2 \times 2 = 4, 4 + 2 = 6, 6 + 2 = 8$ i.e., 4, 6 and 8. | 1 1 1 |
| 30 | A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will it cover in one litre of petrol? | 3 |
| A- | By using unitary method, we can simply divide 43.2 by 2.4 to get how much distance will the vehicle cover in 1 litre of petrol. Distance covered in 2.4 litre of petrol = 43.2 km Distance covered in 1 litre of petrol = $43.2 / 2.4$ $= 432/10 \times 10/24$ $= 18$ km | 1 1 |



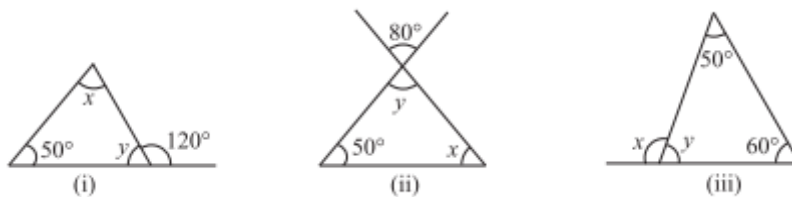
(a) In the year 1998, the difference in the sale of the two language books was least.

(b) Yes, the demand for English books increased. From the graph, it is evident that the difference in the demand for English books from 1995 to 1998 is $620 - 350 = 270$.

Whereas for Hindi books the difference is $650 - 500 = 150$.

Comparatively, the demand for English books increased

34 Find the values of the unknowns x and y in the following diagrams: 5

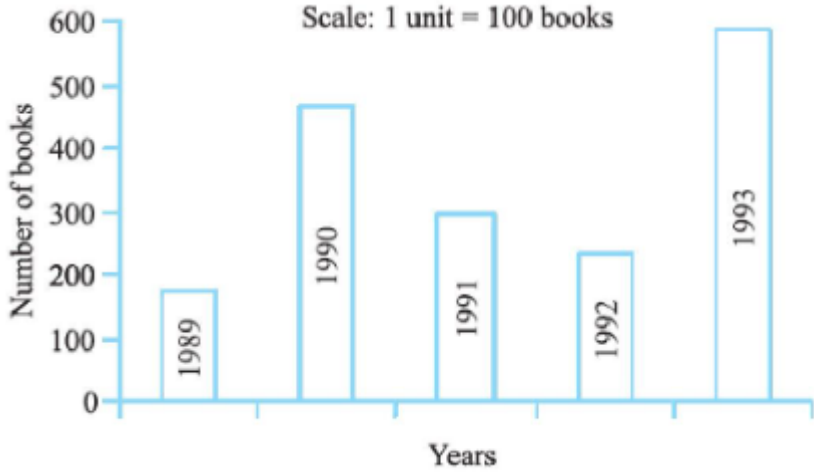


A- (i) $y = 60$
 $x = 70$ 1

(ii) $y = 80$
 $x = 50$ 2

(iii) $y = 70$
 $x = 110$ 2

35 Solve
(i) $3x + 9 = 27$
(ii) $5y - 9 = 36$ 5

| | | |
|----|--|------------------|
| | (iii) $2x + 9/2 = 45/2$ (iv) $3d = -54$ | |
| A- | (I) 6 (II) 9 (III) 9 (IV) -18 | 1 1 1 2 |
| 36 | <p>Read the bar graph, which shows the number of books sold by a bookstore during five consecutive years and answer the following questions:</p>  <p>(i) About how many books were sold in 1989? 1990? 1992? (ii) In which year were about 475 books sold? About 225 books sold? (iii) In which years were fewer than 250 books sold?</p> | 4 |
| A- | <p>i) Number of books sold in the year 1989 is about 180, in 1990 is about 490 and in 1992 is about 295. (ii) About 475 books were sold in 1990. About 225 books were sold in the year 1992. (iii) Fewer than 250 books were sold in the years 1989 and 1992.</p> | 1 1 1 |
| 37 | <p>The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight</p> <p>(i) at what time would the temperature be 8°C below zero? (ii) What would be the temperature at mid-night? (iii) What would be the temperature at 8 p.m?</p> | 4 |
| A- | <p>The temperature decreases by 18°C in $1/2 \times 18 = 9$ hours Thus, from 10°C above zero to 8°C below zero it takes 9 hours Total time = 12 noon + 9 hours = 21 hours = 9 pm Thus, at 9 pm temperature would be 8°C below zero. (ii) The temperature at 12 noon = 10°C The temperature decreases by 2°C every hour The temperature decrease in 12 hours = $-2^{\circ}\text{C} \times 12 = -24^{\circ}\text{C}$ At midnight, the temperature will be = $10^{\circ}\text{C} + (-24^{\circ}\text{C}) = -14^{\circ}\text{C}$ Therefore, the temperature at mid night will be 14°C below 0.</p> | 1 1 |

| | | |
|----|---|-----------------|
| | (III) – 8 °C | 2 |
| 38 | a = 70° b = 70° c = 110° d = 70° | 1 1 2 |
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