B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

ANNUAL EXAMINATION (2025-26)
MATHEMATICS
MARKING SCHEME

Class: VII **Set-2** **Time: 3 hrs.**
Date: 21.03.26 **Max Marks: 80**
Admission no: **Roll no:**

Section A

Choose the correct answer **1 x 20 = 20**

1. The value of $(-1)^{50}$ is _____ .
   (a) 50 (b) – 1 (c) 1 (d) None of these

2. Which of the following is the coefficient of 'z' in the expression: $7z^2 + z + 4$
   (a)7 (b) 1 (c) 4 (d) 0

3. 100% of 450 = _____
   (a) 100 (b) 450 (c) 45 (d) 400

4. Which is the longest side of a right-angled triangle?
   (a) Base (b) Height (c) Hypotenuse (d) all sides equal

5. The constant term in the expression $5 + x + x^2$ is _____
   (a) x^2 (b) x (c) 5 (d) +

6. The solution of the equation $p \div 25 = 20$ is _____
   (a) 500 (b) 45 (c) 5 (d) 100

7. The ratio of ₹ 8 to 200 paise is _____
   (a) 4:1 (b) 1: 4 (c) 8 : 200 (d) 200 : 8

8. The area of a rectangle is 36 cm². If breadth is 6 cm, its length is ____
   (a) 6 cm (b) 12 cm (c) 216 cm (d) 30 cm

9. Angles which are both supplementary as well as vertically opposite are ___
   (a) 95º , 85º (b) 45º , 45º (c) 100º , 80º (d) 90º , 90º

10. If one angle of a complementary pair is 25°, the other angle is _____
    (a) 75º (b) 65 º (c) 90 º (d) 55 º

11. The perimeter of a triangle with sides 5 cm, 7 cm and 8 cm is _____
(a) 20 cm (b) 15 cm (c) 25 cm (d) 18 cm

12. 0.45 = _____
(a) $\frac{45}{100}$ (b) $\frac{65}{100}$ (c) $\frac{100}{100}$ (d) $\frac{5}{100}$

13. An algebraic expression having three unlike terms is called _____
(a) monomial (b) binomial (c) polynomial (d) trinomial

14. The difference between highest and lowest value of data is called _____
(a) Range (b) mean (c) median (d) mode

15. If radius of a circle is 9 cm, its diameter is _____
(a) 18 cm (b) 9 cm (c) 4.5 cm (d) 27 cm

16. Write the statement "5 added to a number gives 12" as an equation
(a) x – 5 = 12 (b) x + 5 = 12 (c) 5x = 12 (d) x ÷ 5 = 12

17. The sum of any two sides of a triangle is always _____ the third side.
(a) equal to (b) greater than (c) less than (d) half of

18. The value of 6^0 is _____
(a) 0 (b) 6 (c) 1 (d) None of these

19. Assertion: Perimeter of a square = 4 × side
Reason: All sides of a square are equal.
(a) Both assertion and reason are correct and reason is a correct explanation for the assertion.
(b) Both assertion and reason are correct, but the reason is not a correct explanation for the assertion.
(c) The assertion is correct, but the reason is false.
(d) Both assertion and reason are false.

20. Assertion: Ratio of 5 g to 5 kg is 1/1000
Reason: 5 kg = 5000 g
(a) Both assertion and reason are correct and reason is a correct explanation for the assertion.
(b) Both assertion and reason are correct, but reason is not a correct explanation for the assertion.
(c) Assertion is correct, but reason is false.
(d) Both assertion and reason are false.

Section B

Do as directed **2 x 5 =10**

21. Simplify: (a) 4×10^3 (b) $3^2 \times 3^4$

Solution:

(i) Given 4×10^3

$= 4 \times 10^3 = 4 \times 10 \times 10 \times 10$

$= 4 \times 1000$

$= 4000$

(ii) Given $3^2 \times 3^4$

$= 3^2 \times 3^4 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$= 3^7$

$= 2187$

or

Write the expanded form of (a) 508309 (b) 4025178

(a) 508309

Solution:

The expanded form of the number 279404 is,

$= (5 \times 100000) + (0 \times 10000) + (8 \times 1000) + (3 \times 100) + (0 \times 10) + (9 \times 1)$

Now we can express it using powers of 10 in the exponent form,

$= (5 \times 10^5) + (0 \times 10^4) + (8 \times 10^3) + (3 \times 10^2) + (0 \times 10^1) + (9 \times 10^0)$

(b) 4025178

Solution:

The expanded form of the number 3006194 is,

$= (4 \times 1000000) + (0 \times 100000) + (2 \times 10000) + (5 \times 1000) + (1 \times 100) + (7 \times 10) + (8 \times 1)$

Now we can express it using powers of 10 in the exponent form,

$= (4 \times 10^6) + (0 \times 10^5) + (2 \times 10^4) + (5 \times 10^3) + (1 \times 10^2) + (7 \times 10^1) + (8 \times 10^0)$

22. Find the supplement of 38°.

Solution:

Two angles are said to be complementary if the sum of their measures is 90°.

The given angle is 20°

Let the measure of its complement be x°.

Then,

$= x + 38^o = 180^o$

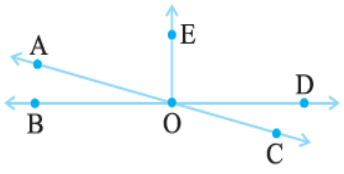
$= x = 180^o - 38^o$

$= x = 142^o$

or

In the adjoining figure, name the following pairs of angles.

(a)Complementary angles (b) adjacent angles



Solution:

(a) ∠BOA and ∠AOE

(b) ∠AOE and ∠EOD or ∠BOA and ∠AOE or ∠EOD and ∠DOC

23. The marks obtained by 10 students are:

20, 35, 40, 50, 45, 30, 25, 60, 55, 40

Find the mean marks.

Solution:

The mean of the given above data is given as = Sum of all of the observations divided by the total number of observations in the above-given data.

= (20 + 35 + 40 + 50 + 45 + 30 + 25 + 60 + 55 + 40) divided by 10

= 400 ÷ 10

= 40

24. Convert 40% into decimal and fraction (in simplest form).

Solution:-

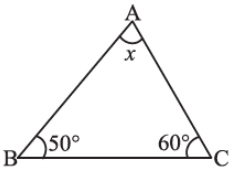
First convert the given percentage into a fraction and then put the fraction into decimal form.

= (40/100)

$= \frac{2}{5}$

= 0.4

25. Find the value of the unknown x in the following diagram:



Solution:

Given that two angles of a triangle are of measures 150 º and 30 º

Let the required third angle be x

We know that the sum of all the angles of a triangle = 180 º

50º + 60 º + x = 180 º

110 º + x = 180 º

x = 180 º – 110 º

x = 70 º

Section C

Solve the following **3 x 6 = 18**

26. If x = – 4 , find the value of: (a) $x^2 - 2x$ (b) 5x – 3

Solution:

(a) $x^2 - 2x$

$= (-4)^2 - 2x(-4)$

= 16 –(– 8)

= 16 + 8

= 24

(b) 5x – 3

= 5 x (– 4) – 3

= – 20 – 3

= – 23

or

Find , if p = – 10, find the value of $p^2 - 2p - 100$

Solution:

From the question, it is given that p = -10

We have,
= p2 – 2p – 100
Then, substitute the value of p in the equation.
= (-10)2 – (2 × (-10)) – 100
= 100 + 20 – 100
= 20

27. Identify the greater number:
(a) 3^4 or 4^3
(b) 2^5 or 5^2
(c) 6^2 or 2^6
Solution:
(i) Given 3^4 or 4^3
$3^4 = 3 \times 3 \times 3 \times 3$
$= 81$
$4^3 = 4 \times 4 \times 4$
$= 64$
Therefore, $3^4 > 4^3$

(ii) Given 2^5 or 5^2
$2^5 = 2 \times 2 \times 2 \times 2 \times 2$
$= 32$
$5^2 = 5 \times 5$
$= 25$
Therefore, $2^5 > 5^2$

(iii) 6^2 or 2^6
$6^2 = 6 \times 6$
$= 36$
$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$
$= 64$
Therefore, $2^6 > 6^2$

28. Asha donated ₹ 350 more than Riya. Total donation is ₹ 2150.
If Riya donated x rupees,
(a) Express Asha's donation.
Solution:
Asha donated ₹350 more than Riya.
So, Asha's donation = x + 350

(b) Form equation.
Total donation = ₹2150
x + (x+350)=2150
(c) Find Riya's donation.
x + x+350 = 2150
2x = 2150 − 350

2x=1800
x=1800/2
x=900

29. The perimeter of a rectangle is 180 cm. Length = 50 cm. Find breadth and area.

Solution :
Given :
Perimeter of Rectangular hall = 180 m.
Length of Rectangular hall = 50 m.
Breadth of Rectangular hall.=?
We know that,
PerimeterofRectangle = 2(l+b).
➠ 2(50 + b) = 180.
➠ 100 + 2b = 180.
➠ 2b = 180 – 100.
➠ 2b = 80.
➠ b = 80 ÷ 2.
➠ b = 40m.
Therefore, BreadthofRectangle=40m.

or

Find the height of the parallelogram if the base is 20 cm and the area is 246 cm^2

Solution:
Base of the parallelogram = 20 cm
Area of parallelogram = 246 cm^2
We know that,
Area of parallelogram = Base × Height
246 cm^2 = 20 cm × Height
Height = 246 cm^2 / 20 cm
Height = 12.3 cm

30. In a town, 35% are men, 45% are women and remaining children are 2000. Find the number of men and women and also what percent are children?

Solution:
From the question, it is given that
Percentage of men in a town =35%
Percentage of women in a town = 45%
Total percentage of both male and female = 45% + 35%
= 80%
Now we have to find the percentage of children = 100 – 80
= 20%
So, 20% are children.
20 % of P = 2000

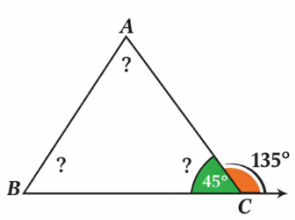
$P = 2000 \times \frac{100}{20}$

$P = 10000$

Number men = 35% of 10000 = 3500

Number women = 45% of 10000 = 4500

31. In a triangle, an exterior angle at a vertex is 135º and its one of the interiors opposite angles is 45º. Find all the angles of the triangle.



Solution:

We know that the sum of interior opposite angles is equal to the exterior angle.

Hence, for the given triangle, we can say that:

∠ABC+ ∠BAC = ∠BCO

∠ABC + 45º = 135 º

∠ABC= 135 º – 45 º

∠BAC = 90 º

We also know that the sum of all angles of a triangle is 180 º.

Hence, for the given △ABC, we can say that:

∠ABC + ∠BAC + ∠BCA = 180 º

90 º + ∠BAC + 45 º = 180 º

∠BAC = 180 º – 135 º

∠BAC = 45 º

Section D

Solve the following **5 x 4 = 20**

32. A gardener wants to fence a circular garden of diameter 21m. Find the length of the rope he needs to purchase, if he makes 2 rounds of the fence. Also, find the cost of the rope, if it costs ₹ 4 per meter. (Take π = 22/7)

Solution:

From the question, it is given that

Diameter of the circular garden = 21 m

We know that radius (r) = d/2

= 21/2

= 10.5 m

Then,

Circumference of the circle = 2πr

= 2 × (22/7) × 10.5

= 462/7

= 66 m

So, the length of rope required = 2 × 66 = 132 m

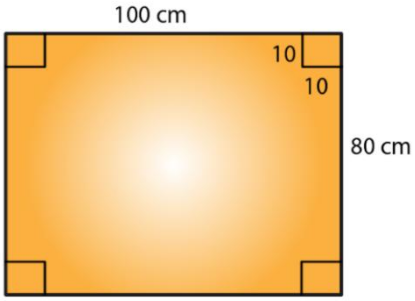
Cost of 1 m rope = ₹ 4 [given]

Cost of 132 m rope = ₹ 4 × 132

= ₹ 528

or

From a rectangular sheet of tin, of size 100 cm by 80 cm, are cut four squares of side 10 cm from each corner. Find the area of the remaining sheet.



Solution

Given that length of rectangular sheet = 100 cm
Breadth of rectangular sheet = 80 cm
Area of the rectangular sheet of tin = 100 cm x 80 cm
= 8000 c m^2
Side of the square at the corner of the sheet = 10 cm
Area of one square at the corner of the sheet = $(10\ cm)^2$
= 100 cm^2
Area of 4 squares at the corner of the sheet = 4 x 100 cm^2
= 400 cm^2
Hence, Area of the remaining sheet of tin = Area of the rectangular sheet – Area of the 4 squares
Area of the remaining sheet of tin = (8000 – 400) cm^2
= 7600 cm^2

33.(a) Simplify the expression and find its value if x = 3, a = – 1, b = – 2.

3x – 5 – a + 9b

Solution:

Let us substitute the values given in the following expressions.

3x - 5 - a + 9b

Now putting the value

$= (3 \times 3) - 5 - (-1) + [9(-2)]$
$= 9 - 5 + 1 - 18$
$= -13$
= – 13 is the required value.

(b) When a = 0, b = – 1, find the value of the given expressions $2a^2 + b^2 + 1$

Solution:

Let us substitute the values given in the following expressions.

$2a^2 + b^2 + 1$

Now putting the value

$= [2 \times (0)^2] + (-1)^2 + 1$
$= 0 + 1 + 1$
$= 2$
= + 2 is the required value

34. A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance a. Find the distance of the foot of the ladder from the wall.

Solution:

By the rule of Pythagoras' Theorem,

Pythagoras' theorem states that for any right-angled triangle, the area of the square on the hypotenuse is equal to the sum of the areas of squares on the legs.

In the above figure, RQ is the hypotenuse,

$15^2 = 12^2 + a^2$

$225 = 144 + a^2$

By transposing 144 from RHS to LHS, it becomes – 144

$a^2 = 225 - 144$

$a^2 = 81$

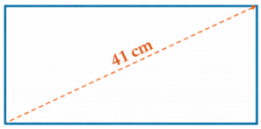
$a = \sqrt{81}$

$a = 9$ m

Hence, the length of a = 9 m

or

Find the perimeter of the rectangle whose length is 40 cm and a diagonal is 41 cm.



Solution:

Let ABCD be the rectangular plot.

Then, AB = 40 cm and AC = 41 cm

BC =?

According to Pythagoras' theorem,

From the right angle triangle ABC, we have

$= AC^2 = AB^2 + BC^2$

$= 41^2 = 40^2 + BC^2$

$= BC^2 = 41^2 - 40^2$

$= BC^2 = 1681 - 1600$

$= BC^2 = 81$

$= BC = \sqrt{81}$

$= BC = 9$ cm

Hence, the perimeter of the rectangle plot = 2 (length + breadth)

Where, length = 40 cm, breadth = 9 cm

Then,

$= 2(40 + 9)$

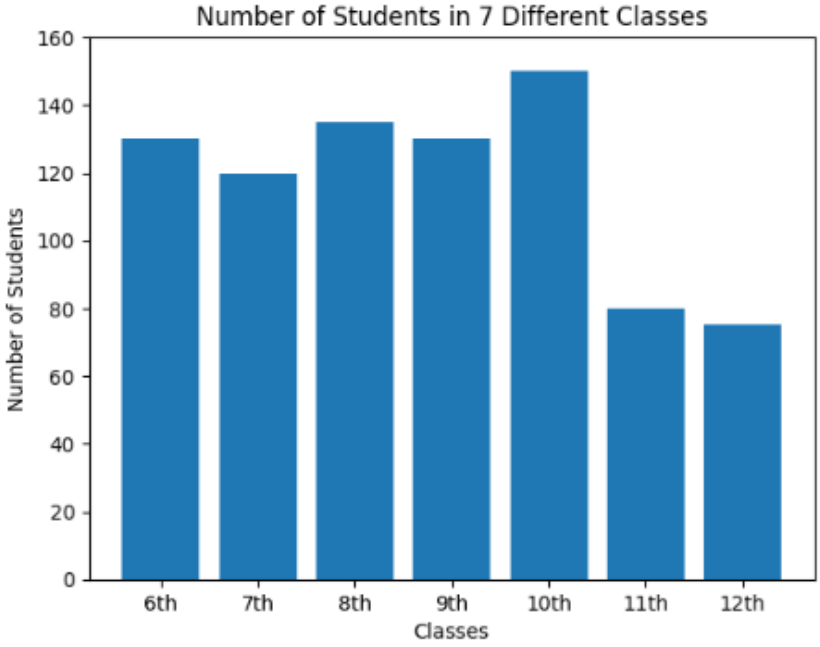
$= 2 \times 49$

$= 98$ cm

35. The number of students in 7 different classes is given below. Represent this

data on the bar graph. How would you choose a scale?

Class	6th	7th	8th	9th	10th	11th	12th
Number of Students	130	120	135	130	150	80	75



The maximum number of students = 150 (in Class 10th).

1 unit (1 cm) = 10 students

Section E

Do as directed **4 x 3 = 12**

36. A carpenter is cutting a wooden plank. He creates an angle arrangement where three angles on a straight line are 3x , 2x+10º and x+ 20º
    (a) Form an equation
    (b) Solve for 'x'
    (c) Find each angle

    Solution:

    (a) Angles on a straight line always sum to 180º

    By adding the expressions for the three given angles, we establish the following equation:

    (3x) + (2x + 10) + (x + 20) = 180º

    (b) To find the value of x, combine like terms and isolate the variable:

    Combine the x terms and constants:

    Subtract 30 from both sides: 6x = 150 º

    Divide by 6: x = 25

    (c) First angle: 3 (25) = 75 º

    Second angle: [2 (25) + 10] = 50 +10 = 60 º

    Third angle: 25 + 20 = 45 º

37. If Manvita's father's age is a half year less than 13 times of her age. Find her

age if her father's age is 32.

Solution:

Given:

Manvita's father's age is a half year less than 13 times her age.

Father's age is 32

To Find:

The Manvita's age

We are required to find the value of Manvita's age.

Let us consider Manvita's age as x and her father's age as y.

From the given data, Manvita's father's age is a half year less than 13 times her age

$13x-(1/2) = y$ ----(1)

$y = 32$

Substitute the value of y in equation(1)

$13x-0.5 = 32$

$13x = 32+0.5$

$13x = 32.5$

$x = 32.5/13$

$x = 2.5$ years

Therefore, Manvita's age is 2.5 years.

38. A computer storage unit uses bytes to store information, often in powers of 2. A smartphone has a storage capacity of 64 GB and tablet has 256 GB.

(a) Express the total capacity of 4 such smart phones in exponential form.

(b) How many times larger is the tablet storage compared to the phone's storage.

(c) If 1 byte is 8 bits, how many bits are in 2^{10} bytes.

or

Find the above storage capacity in exponential form

Solution:

To find the total capacity of 4 smartphones, express both the number of phones

and the capacity of each phone as powers of 2.

Number of smartphones: $4 = 2^2$

Capacity per smartphone: 64 GB = 26 GB

Total capacity: $2^2 \times 2^6 = 2^{2+6} = 2^8$

Divide the tablet's capacity by the smartphone's capacity to find the ratio.

Tablet capacity: $256GB = 2^8$

Smartphone capacity: $64GB = 2^6$

Ratio: $\frac{2^8}{2^6} = 2^{8-6} = 2^2 = 4$

The tablet storage is 4 times larger

Given that 1 byte = 8 bits , $8 = 2^3$

we multiply the number of bytes by the number of bits per byte.

Number of bytes: 2 10

Bits per byte: 2 3

Total bits: $2^{10} \times 2^{3} = 2^{10+3} = 2^{13}$

(a) The total capacity is 2^{8} GB

(b) The tablet storage is 4 times larger than the phone's storage.

(c) There are 2^{13} in 2^{10} bytes.

or

Tablet capacity: 256GB = 2^8

Smartphone capacity: 64GB = 2^6