B.K. BIRLA CENTRE FOR EDUCATION

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

ANNUAL EXAMINATION (2025-26)
MATHEMATICS

Class: VII | **MARKING SCHEME** | **Time: 3 hrs.**
Date: 16.03.26 | **Set-1** | **Max Marks: 80**
Admission no: | **Roll no:**

Section A

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

1. The value of 7^0 is _____ .
   (a) 7 (b) 21 (c) 1 (d) None of these

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

3. The value of $(-1)^{101}$ is _____
   (a) -1 (b) 1 (c) 0 (d) None of these

4. An expression which contains two unlike terms is called _____.
   (a) binomial (b) monomial (c) trinomial (d) None of these

5. If the angle P and angle Q are complementary angles and the measure of angle P is 60 degrees, then the measure of the angle Q is _____
   (a) 120 (b) 60 (c) 30 (d) 20

6. The constant term in the expression $1 + x^2 + x$ is _____
   (a) 1 (b) x (c) x^2 (d) None of these

7. What are the coefficients of y in the expression $yz^2 + 5$?
   (a) z (b) z^2 (c) 1 (d) 5

8. The ratio of ₹ 5 to 50 paise is ____
   (a) 10:1 (b) 1:10 (c) 5 : 50 (d) 50 : 5

9. 0.65 = _____
   (a) $\frac{65}{100}$ (b) $\frac{76}{100}$ (c) $\frac{100}{65}$ (d) $\frac{6}{5}$

10. 100% of 250 = _____
    (a) 100 (b) 50 (c) 25 (d) 250

11. Find the perimeter of a triangle with sides 4 cm, 6 cm and 10 cm

(a) 9 cm (b) 24 cm (c) 20 cm (d) 18 cm

12. The area of a rectangle is 16 cm^2. If the breadth of the rectangle is 8 cm, find its length

(a) l = 1 m (b) l = 2 cm (c) l = 2 cm (d) l = 1 hm

13. If the radius of a circle is 4 m, find its diameter,

(a) 6 m (b) 4 m (c) 1 m (d) 8 m

14. The sum of the lengths of any two sides of a triangle is _____the third side of the triangle.

(a) greater than (b) half (c) less than (d) double

15. Which is the longest side of a right angled triangle?

(a) Base (b) Perpendicular (c) Hypotenuse (d) 3 sides

16. The difference between maximum and minimum value of a data is called ___

(a) frequency (b) median (c) mean (d) range

17. The solution of the equation m ÷ 40 = 40 then m = ?

(a) 1 (b) 160 (c) 1600 (d) None of these

18. Write the statement "2 subtracted from a number is 8"in the form of equations:

(a) x – 8 = 2 (b) x – 2 = 8 (c) x – 5 = 8 (d) None of these

19. Assertion: The perimeter of a rectangle is twice the sum of its length and breadth.

Reason: Perimeter is the total distance around the figure.

(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: The ratio of 10m to 10 km is 1/1000

Reason: 10m/10km = 10m/10000m = 1/1000

(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. Convert the given percent to decimal fractions and also fractions in simplest form: 25%

Solution:-

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

= (25/100)

$= \frac{1}{4}$

= 0.25

22. The runs scored in the cricket match by the 11 players are as follows: 6, 15, 80, 120, 50, 100, 10, 15, 8, 10 and 15. Find the Mean

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.

= (6 + 8 + 10 + 10 + 15 + 15 + 15 + 50 + 80 + 100 + 120) divided by 11

= 429 ÷ 11

= 39

23. Find the angles which are equal to the complement angle.

Solution:

Let the measure of a required angle be x degrees.

So, we know that the sum of measures of the complementary angle pair is 90.

Then,

= x + x = 90

= 2x = 90

= x = 90/2

= x = 45

Hence, the required angle measure is 45.

Find the complement angle of the adjoining figure

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 + 20° = 90°

= x = 90° – 20°

= x = 70°

24. Two angles of a triangle are of measures 105º and 30º. Find the measure of the third angle.

Solution:

Given that two angles of a triangle are of measures 105 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

105º + 30 º + x = 180 º

135 º + x = 180 º

x = 180 º – 135 º

x = 45 º

25. Simplify:

(a) 3×10^2

(b) $2^2 \times 5^3$

Solution:

(i) Given 3×10^2

$=3 \times 10^2 = 3 \times 10 \times 10$

$= 3 \times 100$

$= 300$

(ii) Given $2^2 \times 5^3$

$=2^2 \times 5^3 = 2 \times 2 \times 5 \times 5 \times 5$

$=4 \times 125$

$= 500$

or

Write the following numbers in the expanded forms

(a) 279404

Solution:

The expanded form of the number 279404 is,

$= (2 \times 100000) + (7 \times 10000) + (9 \times 1000) + (4 \times 100) + (0 \times 10) + (4 \times 1)$

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

$= (2 \times 10^5) + (7 \times 10^4) + (9 \times 10^3) + (4 \times 10^2) + (0 \times 10^1) + (4 \times 10^0)$

(b) 3006194

Solution:

The expanded form of the number 3006194 is,

$= (3 \times 1000000) + (0 \times 100000) + (0 \times 10000) + (6 \times 1000) + (1 \times 100) + (9 \times 10) + (4 \times 1)$

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

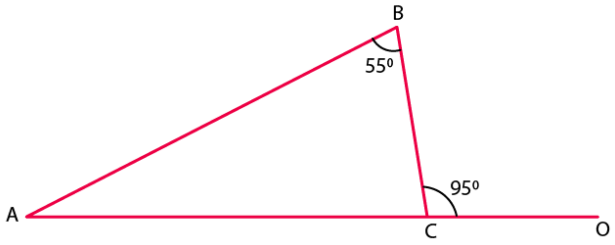
$= (3 \times 10^6) + (0 \times 10^5) + (0 \times 10^4) + (6 \times 10^3) + (1 \times 10^2) + (9 \times 10^1) + (4 \times 10^0)$

Section C

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

26. In a triangle, an exterior angle at a vertex is 95º and its one of the interiors opposite angles are 55º. 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:
$\angle ABC + \angle BAC = \angle BCO$
$55º + \angle BAC = 95º$
$\angle BAC = 95º - 55º$
$\angle BAC = 40º$
We also know that the sum of all angles of a triangle is 180 º.
Hence, for the given $\triangle ABC$, we can say that:
$\angle ABC + \angle BAC + \angle BCA = 180º$
$55º + 40º + \angle BCA = 180º$
$\angle BCA = 180º - 95º$
$\angle BCA = 85º$

27. Identify the greater number in each of the following:
(a) 2^5 or 5^2
(b) 3^4 or 4^3
(c) 3^5 or 5^3

Solution:
(i) 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, $2^5 > 5^2$

(ii) 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, $3^4 > 4^3$

(iii) Given 3^5 or 5^3

$3^5 = 3 \times 3 \times 3 \times 3 \times 3$

$= 243$

$5^3 = 5 \times 5 \times 5$

$= 125$

Therefore, $3^5 > 5^3$

28. Find, if z = 10, find the value of $z^3 - 3(z - 10)$.

Solution:

From the question, it is given that z = 10

We have,

$= z^3 - 3z + 30$

Then, substitute the value of z in the equation.

$= (10)^3 - (3 \times 10) + 30$

$= 1000 - 30 + 30$

$= 1000$

or

If m = 2, find the value of:

(i) m – 2

Solution:

From the question, it is given that m = 2

Then, substitute the value of m in the question.

$= 2 - 2$

$= 0$

(ii) 3m – 5

Solution:

From the question, it is given that m = 2

Then, substitute the value of m in the question.

$= (3 \times 2) - 5$

$= 6 - 5$

$= 1$

(iii) 9 – 5m

Solution:

From the question, it is given that m = 2

Then, substitute the value of m in the question.

$= 9 - (5 \times 2)$

$= 9 - 10$

$= -1$

29. Subhash and Neethu donate to a flood relief fund. Subhash donated ₹ 567 more than Neethu. The total donation is ₹ 1245.

(a) If Neethu donated x rupees, express Subhash's donation.

Solution:

$x+567$

(b) Form the equation for the total donation.

Solution:

$x + (x + 567) = 1245$

(c) Find the amount Neethu donated.

Solution:

$2x+567=1245$

$\Longrightarrow 2x = 678$

$\Longrightarrow \quad = 339$

30. The perimeter of a rectangle is 230 cm. If the length of the rectangle is 70 cm. Find its breadth and area.

Solution:

Perimeter of rectangle = 2(Length +Breadth) $\Longrightarrow P = 2 (L + B)$

Substitute the known values into the formula : $230 = 2 (70 + B)$

Divide both sides by 2 to simplify

$\Longrightarrow 115 = 70 + B$

Subtract 70 from both sides to find B

$\Longrightarrow B = 115-70$

$= 45$ cm

Area = L x B

$= 70 \times 45$

$= 3150 \text{ cm}^2$

or

Find the area of a square park whose perimeter is 320m.

Solution:

From the question, it is given that

Perimeter of the square park = 320 m

4 × Length of the side of park = 320 m

Then,

Length of the side of the park = 320/4

= 80 m

So, the area of the square park = (Length of the side of the park)^2

$= 80^2$

$= 6400 \text{ m}^2$

31. In a city, 30% are females, 40% are males and remaining children are 3000. Find the number males and females and also what percent are children?

Solution:

From the question, it is given that

Percentage of female in a city =30%

Percentage of male in a city = 40%

Total percentage of both male and female = 40% + 30%

= 70%

Now we have to find the percentage of children = 100 – 70

= 30%

So, 30% are children.

30 % of P = 3000

$P = 3000 \times \frac{100}{30}$

$P = 10000$

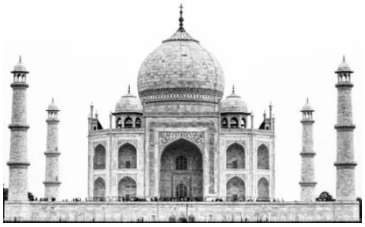
Number females = 30% of 10000 = 3000

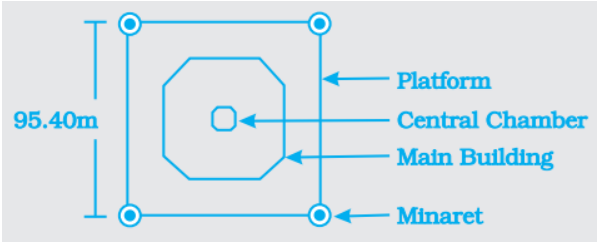
Number males = 40% of 10000 = 4000

Section D

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

32. The Taj Mahal stands on a square platform that is 95 m on each side. What is the area of this square in square metres? The floor area of the main building is 3214 m^2. What is the area of the part of the platform that is not covered by the main building?





Solution:

Given that the platform is in square shape

A square platform each side = 95 m

Area = $S^2 = (95\ m)^2$

Area = 9025 m^2

Total: 9025 m^2

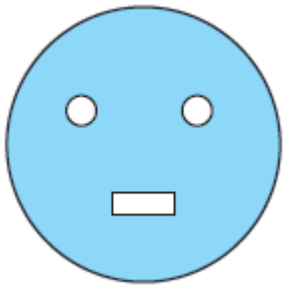
Given the building area is 3214 m^2

The area of the platform that is not covered by the main building =

9025 – 3214 = 5811m^2

or

33. From a circular card sheet of radius 14 cm, two circles of radius 3.5 cm and a rectangle of length 3 cm and breadth 1cm are removed. (As shown in the adjoining figure.) Find the area of the remaining sheet. (Take $\pi = 22/7$)



Solution:

From the question, it is given that

Radius of the circular card sheet = 14 cm

Radius of the two small circles = 3.5 cm

Length of the rectangle = 3 cm

Breadth of the rectangle = 1 cm

First, we have to find out the area of the circular card sheet, two circles and the rectangle to find out the remaining area.

Now,

Area of the circular card sheet = πr^2

$= 22/7 \times 142$

$= 22/7 \times 14 \times 14$

$= 22 \times 2 \times 14$

$= 616\ cm^2$

Area of the 2 small circles = $2 \times \pi r2$

$= 2 \times (22/7 \times 3.52)$

$= 2 \times (22/7 \times 3.5 \times 3.5)$

$= 2 \times ((22/7) \times 12.25)$

$= 2 \times 38.5$

$= 77\ cm^2$

Area of the rectangle = Length × Breadth

$= 3 \times 1$

$= 3\ cm^2$

Now,

The area of the remaining part = Card sheet area – (Area of two small circles + Rectangle area)

$= 616 – (77 + 3)$

$= 616 – 80$

$= 536\ cm^2$

34. (a) Simplify the expression : $2(a^2 + ab) + 3 – ab$, and find its value when a = 5 and b = – 3.

Solution:-

From the question, it is given that a = 5 and b = -3

We have,

$= 2a^2 + 2ab + 3 – ab$

$= 2a^2 + ab + 3$

Then, substitute the value of a and b in the equation.

$= (2 \times 5^2) + (5 \times (-3)) + 3$

$= (2 \times 25) + (-15) + 3$

$= 50 – 15 + 3$

$= 53 – 15$

$= 38$

(b) If p = – 10, find the value of $p^2 – 2p – 100$

Solution:-

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

We have,

$= p^2 – 2p – 100$

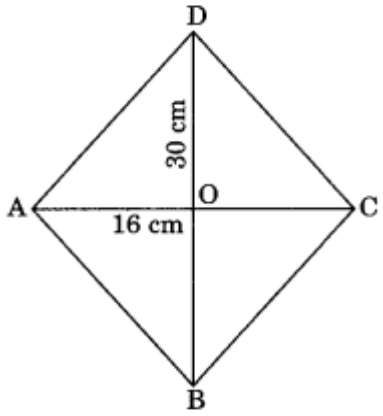
Then, substitute the value of p in the equation.

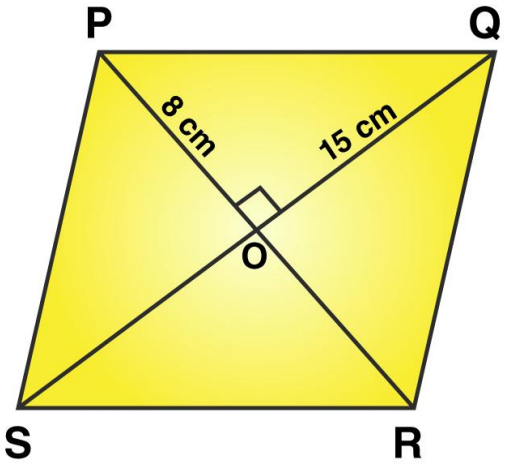
$= (-10)^2 – (2 \times (-10)) – 100$

$= 100 + 20 – 100$

$= 20$

35. The diagonals of a rhombus measure 16 cm and 30 cm. Find its perimeter.





Solution:
Let PQRS be a rhombus, all sides of rhombus has equal length and its diagonal PR and SQ are intersecting each other at a point O. Diagonals in rhombus bisect each other at 90o.
So, PO = (PR/2)
= 16/2
= 8 cm
And, SO = (SQ/2)
= 30/2
= 15 cm
Then, consider the triangle POS and apply the Pythagoras theorem,
$PS^2 = PO2 + SO2$
$PS^2 = 82 + 152$
$PS^2 = 64 + 225$
$PS^2 = 289$
PS = √289
PS = 17 cm
Hence, the length of side of rhombus is 17 cm
Now,
Perimeter of rhombus = 4 × side of the rhombus
= 4 × 17

= 68 cm

∴ Perimeter of rhombus is 68 cm.

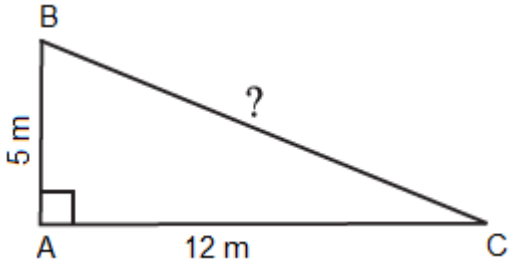
or

A tree is broken at a height of 5 m from the ground, and its top touches the ground at a distance of 12 m from the base of the tree. Find the original height of the tree.

Solution:

Let ABC is the triangle and B be the point where the tree is broken at the height of 5 m from the ground.

Treetop touches the ground at a distance of AC = 12 m from the base of the tree,



By observing the figure, we came to conclude that a right-angle triangle is formed at A.

From the rule of Pythagoras' theorem,

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

$BC^2 = 5^2 + 12^2$

$BC^2 = 25 + 144$

$BC^2 = 169$

$BC = \sqrt{169}$

BC = 13 m

Then, the original height of the tree = AB + BC

= 5 + 13

= 18 m

36. Number of children in six different classes are given below. Represent the data on a bar graph.

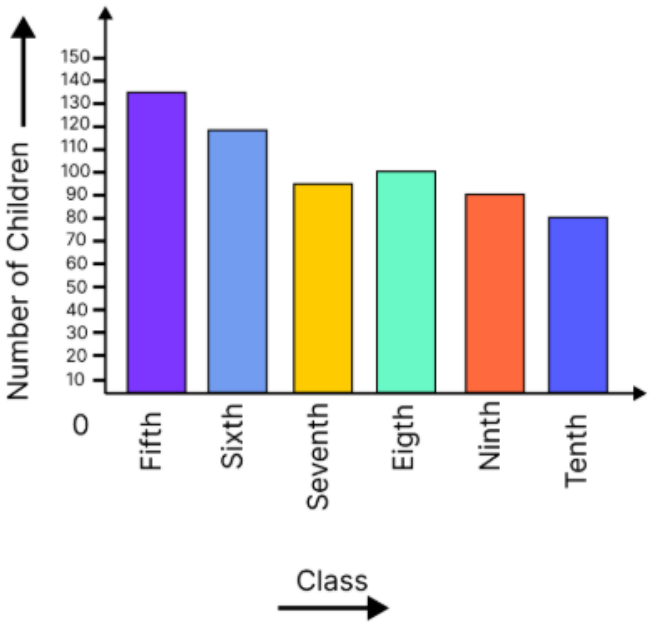
Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
No.of children	135	120	95	100	90	80

How would you choose a scale?

Solution:

We will choose a scale as 1 unit = 10 children because we can represent a more clear difference between the number of students of class 7th and that of class 9th by this scale.

Scale: 1cm = 10 Children



Section E

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

37. A mathematics teacher gives a worksheet to students to test their understanding of laws of exponents. The worksheet contains different situations where powers of numbers are compared or simplified to find the value of an unknown exponent n.
Read the situations carefully and answer the questions that follow.
Case:
(a) In the first situation, a student simplifies an expression involving powers of 5 and finds that
$5^{2n} \times 5^3 = 5^{11}$
(b) In another situation a student multiplies power of 3 and gets
$9 \times 3^n = 3^7$
(c) The third situation a student observes that multiplying powers of 2 gives
$8 \times 2^{n+2} = 32$
(d) In final situation a student divides powers of 7 and finds
$\frac{7^{2n+1}}{49} = 7^3$

Questions:
(a) Find the value of n in the first situation.
(b) Find the value of n in the second situation.
(c) Find the value of n in the third situation.
(d) Find the value of n in the fourth situation.

Solution:
(a) Given $5^{2n} \times 5^3 = 5^{11}$

$= 5^{2n+3} = 5^{11}$

On equating the coefficients, we get

$2n + 3 = 11$

$\Rightarrow 2n = 11 - 3$

$\Rightarrow 2n = 8$

$\Rightarrow n = (8/2)$

$\Rightarrow n = 4$

(b) Given $9 \times 3^n = 3^7$

$= (3)^2 \times 3^n = 3^7$

$= (3)^{2+n} = 3^7$

On equating the coefficients, we get

$2 + n = 7$

$\Rightarrow n = 7 - 2 = 5$

(c) Given $8 \times 2^{n+2} = 32$

$= (2)^3 \times 2^{n+2} = (2)^5$ [since $2^3 = 8$ and $2^5 = 32$]

$= (2)^{3+n+2} = (2)^5$

On equating the coefficients, we get

$3 + n + 2 = 5$

$\Rightarrow n + 5 = 5$

$\Rightarrow n = 5 - 5$

$\Rightarrow n = 0$

(d) Given $7^{2n+1} \div 49 = 7^3$

$= 7^{2n+1} \div 7^2 = 7^3$ [since $49 = 7^2$]

$= 7^{2n+1-2} = 7^3$

$= 7^{2n-1} = 7^3$

On equating the coefficients, we get

$2n - 1 = 3$

$\Rightarrow 2n = 3 + 1$

$\Rightarrow 2n = 4$

$\Rightarrow n = 4/2 = 2$

38. A teacher tells her class that the highest marks obtained by a student in the class is twice the lowest marks obtained plus 7. The highest score is 87.

(a) Write the expression

(b) Find the lowest marks

Solution:

From the question, it is given that,

Highest score in the class = 87

Let the lowest score be equal to the a

$= 2 \times$ Lowest score $+ 7 =$ Highest score in class

$= (2 \times a) + 7 = 87$

$= 2a + 7 = 87$

$= 2a = 87 - 7$

$= 2a = 80$

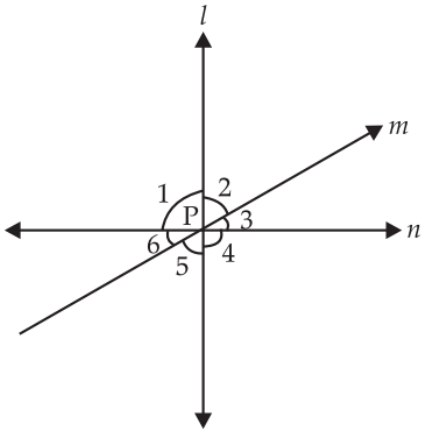
Divide by 2 to solve for

$a = 80 \div 2$

$a = 80 \div 2$

$a = 40$

39. Three roads shown in the figures intersect each other at point P.
Road l is perpendicular to Road n.
The measure of ∠2 is 65°.



(a) What is the measure of ∠6?

Solution:

Clearly, ∠2 + ∠3 = 90° (as *l* is perpendicular to *n*)

⇒ 65° + ∠3 = 90°

⇒ ∠3 = 90° – 65°

⇒ ∠3 = 25°

Now, ∠6 = ∠3 (Vertically opposite angles)

⇒ ∠6 = 25°

(b) What is the sum of the measure of ∠3 and ∠4?

Solution:

∠2+ ∠3 + ∠4 = 180°. (Linear pair)

65° + ∠3 + ∠4 = 180°

∠3 + ∠4 = 180° – 65°

∠3 + ∠4 = 115°

(c) Why ∠1= ∠4

Solution:

∠1 = ∠4 by vertically opposite angles

(d) Write all the vertically opposite angles given in the above figure

Solution:

∠1 = ∠4 ∠2 = ∠5 ∠3 = ∠6