NAAHAR PUBLIC SCHOOL (CBSE) SENIOR SECONDARY

TERM II EXAM

SUB:MATHS MARKS:80

GRADE:VIII

I. CHOOSE THE BEST ANSWER: 10 X 1 =10

1.Which of these is not a perfect cube?

a) 343 b) 1331 c) 512 d) 81

2. Which of the following is equal to its own cube?

Ia) -1 b). -2 c). -3 d). -9

3.. On what a discount is calculated?

a. SP b. MP c. Marked price d. None of these

4.Convert the 3:4 ratios to percentages.

a. 45% b. 50% c. 75% d. 25%

5. The coefficient of x in the expression -7x +5 is

(a) 5 (b) -7 (c)7 (d)x

6. How many number of vertices does a cone has?

a) 1 b). 2 c) 3 d) None of these

7. One of the example of binomial is

(a) 3xyz (b) 3xy+z (c)3x+y+z (d)3+x+y+z

8. If F, E and V represent the faces, edges and vertices respectively of a polyhedral then which of

the following is the Euler's formula?

I. F - V + E = 2 II. F + V + E = 2 III. F + V - E = 2 IV. F + V =2 - E

9. A _____ is a bar graph that shows data in intervals.
(a). Bar-graph (b). Pie-chart (c). Histogram (d). Line Graph

10. In a pie chart, the total angle at the centre of the circle is

(a) 180° (b) 360° (c) 270° (d) 90°

II. FILL IN THE BLANKS : 7 X 1 = 7

11. Cube of an odd number is odd.
12. Amount = Principal (1 + Rate/100)^n
13. A Pie graph is used to compare parts of a whole
14. The number of vertices of sphere is zero
15. Expand ($a^2 - b^2$) = (a+b) (a-b)
16. Expressions that contains only one term is called monomial.
17. How many number of faces does a solid sphere has? one

III TWO MARKS: 10 X 2 = 20

18. Check whether 128 is a perfect cube or not.
Sol:

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

Prime factors of 128 = 2 × 2 × 2 × 2 × 2 × 2 × 2
Here one factor 2 does not appear in a 3's group.
Therefore, 128 is not a perfect cube.

19. The price of a TV is Rs. 13,000. The sales tax charged on it is at the rate of 12%. Find the amount that Vinod will have to pay if he buys it.

ST = 12%

$$SP = MP \times \left(1 + \frac{ST}{100}\right)$$

$$= 13{,}000 \times \left(1 + \frac{12}{100}\right)$$

$$= 13{,}000 \times \frac{112}{100} = ₹\ 14{,}560$$

20. Convert the following ratios to percentages. (a) 3:4 (b) 2:3

Answer :

Sol:

(a) $3:4=\frac{3}{4}=\frac{3}{4}\times\frac{100}{100}=\frac{3}{4}\times100\%=75\%$

(b) $2:3=\frac{2}{3}=\frac{2}{3}\times\frac{100}{100}=\frac{2}{3}\times100\%=\frac{200}{3}\%$

21. **Add the following.**

(i) ab – be, be – ca, ca – ab

(ii) a -b + ab, b – c + be, c – a + ac

Sol:

(i) ab – be, be – ca, ca – ab

$$\begin{array}{rr} & ab - bc \\ (+) & + bc - ca \\ (+) & -ab \quad\quad ca \\ \hline & 0 \\ \hline \end{array}$$

(ii) a -b + ab, b – c + be, c – a + ac

$$\begin{array}{rr} & a - b + ab \\ (+) & + b \quad - c + bc \\ (+) & -a \quad\quad + c \quad\quad + ac \\ \hline & ab + bc \quad + ac \\ \hline \end{array}$$

22. **Find the volume of rectangular boxes with the following length, breadth and height respectively** 2p, 4q, 8r

Sol:

Length = $2p$

Breadth = $4q$

Height = $8r$

$\therefore$ Volume of the rectangular box

= Length × Breadth × Height

$= (2p) \times (4q) \times (8r)$

$= (2 \times 4 \times 8) \times (p \times q \times r)$

$= 64\ pqr$

23. **Use a suitable identity to find the product of (2y+5)(2y+5)**

(2y + 5) (2y + 5)

$(2y + 5)(2y + 5) = (2y + 5)^2$

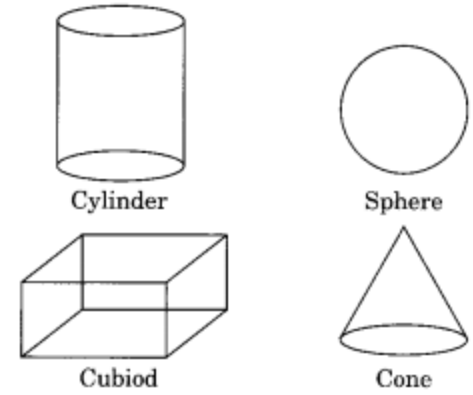
$= (2y)^2 + 2(2y)(5) + (5)^2$

| Using Identity I

$= 4y^2 + 20y + 25$

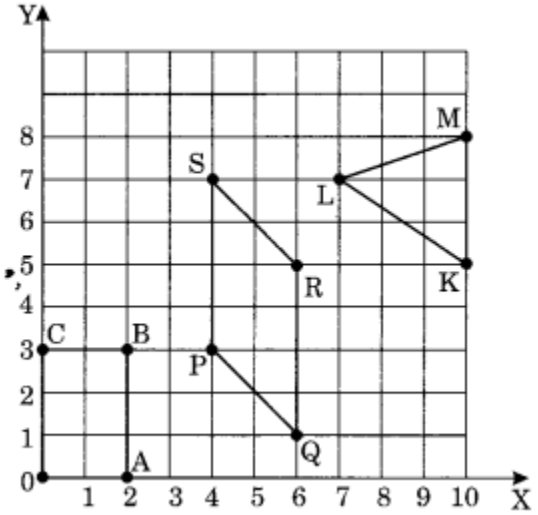
24. Draw any four 3-dimensional figures.

Solution:



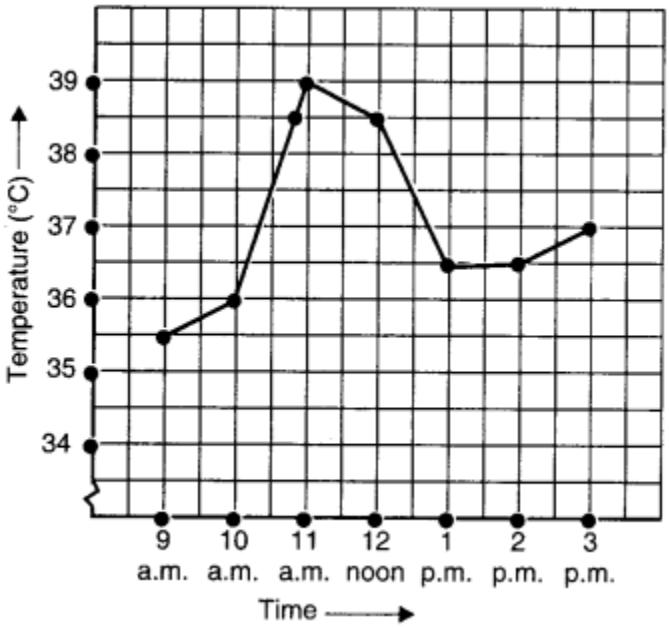
25. Verify using Eulers formula whether a polyhedron can have 10 faces, 20 edges and 15 vertices.
Solution:
We have
Number of faces F = 10
Number of edges E = 20
and number of vertices V = 15
Euler's formula:
V + F – E = 2
⇒ 15 + 10 – 20 = 2
⇒ 5 ≠ 2
Hence, it is not possible to have a polyhedron satisfying the above data.

26. Write the coordinates of the vertices of each of these adjoining figures.



Solution:
Required coordinates are as follows:
Coordinates of rectangle OABC are:
O(0, 0), A(2, 0), B(2, 3), C(0, 3)
Coordinates of parallelogram PQRS are:
P(4, 3), Q(6, 1), R(6, 5), S(4, 7)
Coordinates of triangle KLM are:
K(10, 5), L(7, 7), M (10, 8).

27. The following graph shows the temperature of a patient in a hospital, recorded every hour.



(a) What was the patient's temperature at 1 p.m.?
(b) When was the patient's temperature 38.5°C?
(c) The patient's temperature was the same two times during the period given. What were these two times?

Solution.
(a) The patient's temperature at 1 p.m. was 36.5°C.
(b) The patient's temperature was 38.5°C at 10.50 a.m. and 12 noon.
(c) The two times when the patient's temperature was the same were 1 p.m. and 2 p.m.

V. THREE MARKS : $6 \times 3 = 18$

28. Find the smallest number by which 243 must be multiplied to get a perfect cube.

SOL; We have $243 = 3 \times 3 \times 3 \times 3 \times 3$

3	243
3	81
3	27
3	9
3	3
	1

The prime factor 3 is not a group of three.
∴ 243 is not a perfect cube.
Now, $[243] \times 3 = [3 \times 3 \times 3 \times 3 \times 3] \times 3$
or $729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$
Now, 729 becomes a perfect cube.
Thus, the smallest required number to multiply 243 to make it a perfect cube is 3.

29. If 60% of people in a city like a cricket, 30% like football and the remaining like other games then what percent of the people like other games? If the total number of people are 50 lakh, find the exact number who like each type of game.
Solution.
People who like other games = [100 – (60 + 30)]%
= (100 – 90)% = 10%.
Total number of people = 50 lakh
= 5000000

∴ Number of people who like cricket = 60% of 5000000
= 5000000 x 60/100
= 3000000 = 30 lakh

Number of people who like football = 30% of 5000000
= 5000000 x 30/100
= 1500000 = 15 lakh

Number of people who like the other games
= 10% of 5000000
= 5000000 x 10/ 100
= 5,00,000 = 5 lakh

30. A shopkeeper buys 80 articles for Rs. 2,400 and sells them for a profit of 16%. Find the selling price of one article.
Solution.
CP of 80 articles = ₹ 2400

Profit = 16% of Rs. 2400
= Rs. 16/ 100×2400 = Rs. 384
∴SP of 80 articles
= CP + Profit
= Rs. 2400 + Rs. 384
= Rs. 2784
∴ SP of 1 article = Rs. 2784 / 80 = Rs.34.80
Hence, the selling price of one article is Rs. 34.80.

31. Using identities, evaluate: i) 99^2 ii) 102^2

Sol:

99^2

$99^2 = (100 - 1)^2$

$= (100)^2 - 2(100)(1) + (1)^2$ | Using Identity II

$= 10000 - 200 + 1 = 9801$

102^2

$102^2 = (100 + 2)^2$

$= (100)^2 + 2(100)(2) + (2)^2$ | Using Identity I

$= 10000 + 400 + 4 = 10404$

32.Find the product:
(i) (5 – 2x) (3 + x)
(ii) (x + 7y) (7x —y)

Sol:

(i) (5 – 2x) (3 + x)

$= (5 - 2x)(3 + x)$

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

| by distributive law

$= (5) \times (3) + (5) \times (x)$

$- (2x) \times (3) - (2x) \times (x)$

$= 15 + 5x - 6x - 2x^2$

$= 15 - x - 2x^2$

| Combining like terms

(x + 7y) (7x – y)

$= (x + 7y) \times (7x - y)$

$= (x) \times (7x - y) + (7y) \times (7x - y)$

| by distributive law

$= (x) \times (7x) - (x) \times (y)$

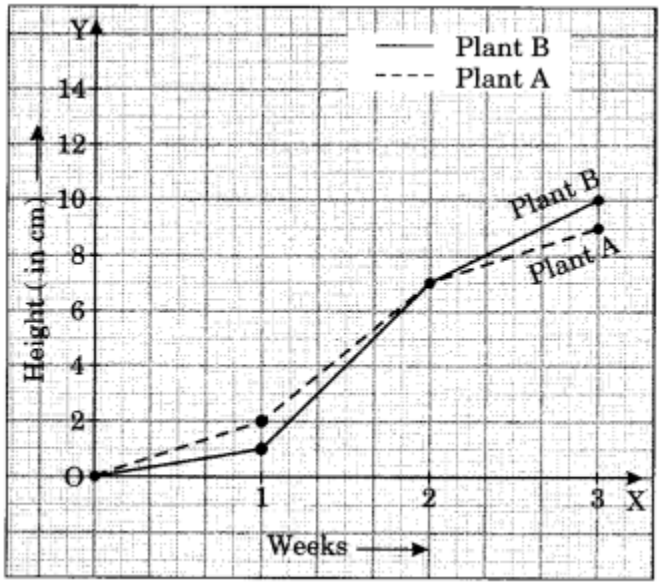
$+ (7y) \times (7x) - (7y) \times (y)$

$= 7x^2 - xy + 49yx - 7y^2$

$= 7x^2 + 48xy - 7y^2$

| Combining like terms

33.For an experiment in Botany, two different plants, plant A and plant B, were grown under similar laboratory conditions. Their heights were measured at the end of each week for 3 weeks. The results are shown by the following graph.



(a) How high was plant A after (i) 2 weeks (ii) 3 weeks

Solution:
(a) The height of plant A (i) after 2 weeks was 7 cm (ii) after 3 weeks was 9 cm.

(b) How high was plant B after (i) 2 weeks (ii) 3 weeks
Sol; (b) The height of plant B (i) after 2 weeks was 7 cm (ii) after 3 weeks was 10 cm.

(c) How much did plant A grow during the 3rd week?
Sol; (c) Plant A grew 7 cm to 9 cm i.e, 2 cm.

VI. FIVE MARKS : $5 \times 5 = 25$

34. Find the cube roots by prime factorization method: i)512 ii)27000

Sol:

27000

$\sqrt[3]{27000} = \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5}$

$= 2 \times 3 \times 5$

$= 30$

2	27000
2	13500
2	6750
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

512

$\sqrt[3]{512} = \sqrt[3]{2 \times 2 \times |2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}$

$= 2 \times 2 \times 2$

$= 8$

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2

35. Fabina borrows Rs. 12,500 at 12% per annum for 3 years at simple interest and Radha borrows the same amount for the same time period at 10% per annum, compounded annually. Who pays more interest and by how much ?

Sol:

For Fabina

$P = ₹\ 12500$

$R = 12\%$ per annum

$T = 3$ years

$\therefore$ SI on ₹ 12,500 at 12% p.a. for 3 years

$$= \frac{12{,}500 \times 12 \times 3}{100} = ₹\ 4{,}500$$

For Radha

$P = ₹\ 12{,}500$

$R = 10\%$ per annum

$n = 3$ years

$$\therefore \quad A = P\left(1 + \frac{R}{100}\right)^n$$

$$= 12{,}500\left(1 + \frac{10}{100}\right)^3$$

$$= 12{,}500\left(1 + \frac{1}{10}\right)^3$$

$$= 12{,}500\left(\frac{11}{10}\right)^3$$

$$= 12{,}500 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10}$$

$= ₹\ 16{,}637.50$

$$\therefore \quad CI = A - P$$

$= ₹\ 16{,}637.50 - ₹\ 12{,}500$

$= ₹\ 4{,}137.50$

Difference between CI and SI

$= ₹\ 4{,}500 - ₹\ 4{,}137.50$

$= ₹\ 362.50$

Hence, Fabina pays more by ₹ 362.50.

36. **Show that: i) $(9p-5q)^2+180pq=(9p+5q)^2$**

ii) $\left(\frac{4}{3}m - \frac{3}{4}n\right)^2 + 2mn = \frac{16}{9}m^2 + \frac{9}{16}n^2$

sol:

(ii) $(9p - 5q)^2 + 180pq = (9p + 5q)^2$

L.H.S. $= (9p - 5q)^2 + 180pq$

$= \{(9p)^2 - 2(9p)(5q) + (5q)^2\} + 180pq$

| Using Identity II

$= (81p^2 - 90pq + 25q^2) + 180pq$

$= 81p^2 + (180pq - 90pq) + 25q^2$

| Combining the like terms

$= 81p^2 + 90pq + 25q^2$ ...(1)

R.H.S. $= (9p + 5q)^2$

$= (9p)^2 + 2(9p)(5q) + (5q)^2$

| Using Identity I

$= 81p^2 + 90pq + 25q^2$ ...(2)

From equations (1) and (2),

L.H.S. = R.H.S.

$\therefore \quad (9p - 5q)^2 + 180pq = (9p + 5q)^2$

(iii) $\left(\frac{4}{3}m - \frac{3}{4}n\right)^2 + 2mn = \frac{16}{9}m^2 + \frac{9}{16}n^2$

$$\text{L.H.S.} = \left(\frac{4}{3}m - \frac{3}{4}n\right)^2 + 2mn$$

$$= \left(\frac{4}{3}m\right)^2 - 2\left(\frac{4}{3}m\right)\left(\frac{3}{4}m\right) + \left(\frac{3}{4}m\right)^2 + 2mn$$

| Using Identity II

$$= \frac{16}{9}m^2 - 2mn + \frac{9}{16}n^2 + 2mn$$

$$= \frac{16}{9}m^2 + (2mn - 2mn) + \frac{9}{16}n^2$$

| Combining the like terms

$$= \frac{16}{9}m^2 + (2 - 2)mn + \frac{9}{16}n^2$$

$$= \frac{16}{9}m^2 + (0)mn + \frac{9}{16}n^2$$

$$= \frac{16}{9}m^2 + \frac{9}{16}n^2 = \text{R.H.S.}$$

37.Using Euler's formula find the unknown

Faces	?	5	20
Vertices	6	?	12
Edges	12	9	?

Solution.

(i)

$F + V = E + 2$

$\Rightarrow F + 6 = 12 + 2$

$\Rightarrow F + 6 = 14$

$\Rightarrow F = 14 - 6 = 8$

(ii)

$F + V = E + 2$

$\Rightarrow 5 + V = 9 + 2$

$\Rightarrow 5 + V = 11$

$\Rightarrow V = 11-5 = 6$

(iii)

$F + V = E + 2$

$\Rightarrow 20 + 12 = E + 2$

$\Rightarrow 32 = E + 2$

$\Rightarrow E = 32 - 2$

$\Rightarrow E = 30$

38. raw the graphs for the following tables of values, with suitable scales on the axes.

(a) Cost of apples

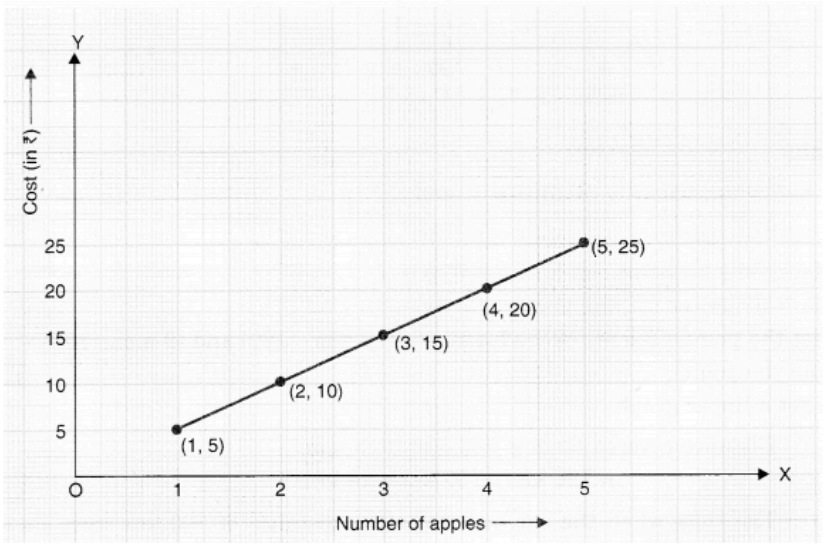
No. of apples	1	2	3	4	5
Cost (in Rs.)	5	10	15	20	25

(b) Distance travelled by a car

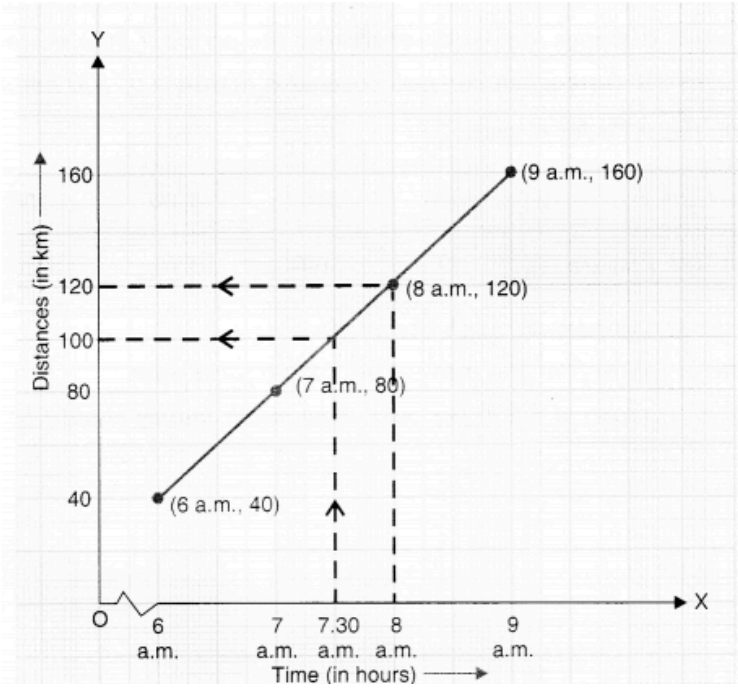
Time (in hours)	6 a.m	7 a.m	8 a.m	9 a.m
Dist (in Km)	40	80	120	160

Solution.

(a)


Y
Cost (in ₹)
25
20
15
10
5
(1, 5)
(2, 10)
(3, 15)
(4, 20)
(5, 25)
O
1
2
3
4
5
X
Number of apples

(b)


Y
Distances (in km)
160
120
100
80
40
(9 a.m., 160)
(8 a.m., 120)
(7 a.m., 80)
(6 a.m., 40)
O
6 a.m.
7 a.m.
7.30 a.m.
8 a.m.
9 a.m.
X
Time (in hours)