

SECTION A

1. Find  $2a^3b^2c \times 3ab^2c^3$

2. Volume of a cube with edge x is -----

3.  $(\frac{-2}{5})^0 =$  -----

4. The area of a rhombus whose diagonals are of lengths 10 cm and 8.2 cm is -----

5. The common factor of the terms  $2x$ ,  $3x^2$  and 4 are-----

6. The co ordinates of the origin are-----

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SECTION B

7. 72% of 25 students are good in Mathematics .How many are not good in Mathematics?

8. Find the value of m for which  $2^m \div 2^{-3} = 2^6$ .

9. Simplify  $3x(4x - 5) + 3$  and find its value for  $x = 3$

10. Find the height of a cylinder whose radius is 7 cm and the total surface area is 968 square cm.

11. Find the value of

a)  $2^{-3}$

b)  $\frac{1}{3^{-2}}$

12. A machine in a soft drink factory fills 840 bottles in 6 hours. How many bottles will it fill in 5 hours?

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SECTION C

13. Subtract  $3pq(p - q)$  from  $2pq(p + q)$ .

14. The area of a trapezium shaped field is  $480m^2$ . The distance between two parallel sides is 15 m and one of the parallel sides is 20m. Find the other parallel side?

15. Express the following numbers in standard form

i) 0.000035

ii) 4050000

iii) 31470000000

16. If 15 workers can build a wall in 48 hours, how many workers will be required to do the same work in 30 hours?

17. Factorise

i)  $4p^2 - 9q^2$

ii)  $a^2 + 8a + 16$ .

18. Plot the following points on a graph paper

A(4,0) ,B(4,2), C(4,6) ,D(4,4)

19. Using identities evaluate

i)  $99^2$

ii)  $102^2$

20. In a building there are 24 cylindrical pillars .The radius of each pillars is 28 cm and height is 4 m. Find the total cost of painting the curved surface area of all pillars at the rate of Rs 8 per  $m^2$ .

21. Divide  $24(x^2yz + xy^2z + xyz^2)$  by  $8xyz$ .

22. Simplify  $\frac{x^5 \times y^3 \times xz^{-3}}{x^2 \times y^{-2} \times z}$

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#### SECTION D

23. Show that  $(3x + 2y)^2 - 24xy = (3x - 2y)^2$

24. Factorise the expression and divide as directed

i)  $(2y^2 - 14y + 24) \div (y-4)$

ii)  $(y^2 + 7y + 10) \div (y+5)$

25. A closed cylindrical tank of radius 7m and height 3m is made from a sheet of metal. How much sheet of metal is required?

26. Simplify  $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

27. A school has 8 periods a day each of 45 minutes duration. How long would each period be, if the school has 9 periods a day? Assuming the number of school hours to be the same?

28. Draw the graph for the following table, with the suitable scales on the axes.

Number of Chocolates	1	2	3	4	5
Cost in Rs.	5	10	15	20	25

Is it a linear graph?

29. Using suitable identities evaluate

i)  $(2x + 5y)(2x+3y)$

ii)  $153^2 - 147^2$

30. Subtract  $3a(a+b+c) - 2b(a - b + c)$  from  $4c(-a+b+c)$ .

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ANSWERS:

1.  $2 \times 3 \times a^3 \times a \times b^2 \times b^2 \times c \times c^3 = 6a^4b^4c^4$ .

2.  $x^3$

3. 1

4. Area of a Rhombus =  $\frac{1}{2}d_1d_2 = \frac{1}{2} \times 10 \times 8.2 = 41cm^2$ .

5. One

6. (0, 0)

7. 72% of 25 students are good in Mathematics. So 28% of 25 students are not good in Mathematics.

Number of students who are not good in Mathematics =  $\frac{28}{100} \times 25 = 7$  students.

8.  $2^m \div 2^{-3} = 2^6$

$2^{m-(-3)} = 2^6$

$2^{m+3} = 2^6$

Since it is an equation and the bases are equal, we can equate the exponents.

Therefore,  $m + 3 = 6$

$m = 6 - 3 = 3$

$$9. 3x(4x - 5) + 3 = 12x^2 - 15x + 3$$

$$\text{When } x = 3, 12(3)^2 - 15 \times 3 + 3 = 108 - 45 + 3 = 66$$

$$10. \text{ Total Surface Area of a Cylinder} = 2\pi r(r + h)$$

Given radius  $r = 7$  cm

$$\text{Area} = 968 \text{ cm}^2$$

$$968 = 2 \times \frac{22}{7} \times 7(7 + h)$$

$$968 = 44(7 + h)$$

$$968 = 308 + 44h$$

$$44h = 968 - 308 = 660$$

$$h = \frac{660}{44} = 15 \text{ cm}$$

$$11. \text{ a) } 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

$$\text{b) } \frac{1}{3^{-2}} = 3^2 = 9$$

12.

Number of bottles	840	X
Time taken	6	5

Since this is the case of direct proportion, we have  $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

$$\text{Therefore, } \frac{840}{6} = \frac{x}{5}$$

By Cross Multiplication,  $840 \times 5 = 6x$

$$X = \frac{840 \times 5}{6} = 700 \text{ bottles.}$$

$$13. 2pq(p+q) - (3pq(p-q)) = 2p^2q + 2pq^2 - (3p^2q - 3pq^2)$$

$$= 2p^2q + 2pq^2 - 3p^2q + 3pq^2$$

$$= -p^2q + 5pq^2$$

14. One of the parallel sides of a trapezium is  $a = 20$  m

Let another parallel side be  $b$  and height  $h = 15$  m

$$\text{Area of trapezium} = \frac{1}{2}h(a+b)$$

$$\text{Given Area} = 480m^2$$

$$480 = \frac{1}{2} \times 15(20+b)$$

$$960 = 300 + 15b$$

$$15b = 960 - 300 = 660$$

$$b = \frac{660}{15} = 44 \text{ m}$$

$$15. \text{ i) } 3.5 \times 10^{-5}$$

$$\text{ii) } 4.05 \times 10^6$$

$$\text{iii) } 3.147 \times 10^{10}$$

16.

Number of workers	15	X
Time taken	48	30

Since this is a case of inverse proportion, we have  $x_1y_1 = x_2y_2$

$$15 \times 48 = x \times 30$$

$$X = \frac{15 \times 48}{30} = 24 \text{ workers.}$$

$$17. \text{ i) } 4p^2 - 9q^2$$

Here we can use the identity  $a^2 - b^2 = (a+b)(a-b)$

$$4p^2 - 9q^2 = (2p)^2 - (3q)^2 = (2p+3q)(2p-3q)$$

$$\text{ii) } a^2 + 8a + 16$$

Here we can use the identity  $(a+b)^2 = a^2 + 2ab + b^2$

$$a^2 + 8a + 16 = a^2 + 2a \times 4 + 4^2 = (a+4)^2$$

18. Try to plot on a graph paper.

$$19. \text{ i) } 99^2 = (100 - 1)^2 = (100)^2 - 2 \times 100 \times 1 + 1^2 = 10000 - 200 + 1 = 9801$$

$$\text{ii) } 102^2 = (100 + 2)^2 = (100)^2 + 2 \times 100 \times 2 + 2^2 = 10000 + 400 + 4 = 10404$$

20. Radius of a cylindrical pillar  $r = 28\text{cm} = 0.28\text{m}$

Height  $h = 4\text{m}$

Curved surface area of a cylinder  $= 2\pi rh$

Curved surface area of a pillar  $= 2 \times \frac{22}{7} \times 0.28 \times 4 = 7.04\text{m}^2$

Curved surface area of 24 such pillars  $= 7.04 \times 24 = 168.96\text{m}^2$

Cost of painting an area of  $1\text{m}^2 = \text{Rs } 8$

Therefore, cost of painting  $168.96\text{m}^2 = 168.96 \times 8 = \text{Rs } 1351.68$

$$21. \frac{24(x^2yz + xy^2z + xyz^2)}{8xyz} = \frac{24xyz(x+y+z)}{8xyz} = 3(x+y+z)$$

$$22. \frac{x^5 \times y^3 \times z^{-3}}{x^2 \times y^{-2} \times z} = x^{5-2} \times y^{3-(-2)} \times z^{-3-1} = x^3 y^5 z^{-4}$$

23. To show that  $(3x + 2y)^2 - 24xy = (3x - 2y)^2$

$$\text{LHS} = (3x)^2 + 2 \times 3x \times 2y + (2y)^2 - 24xy = 9x^2 + 12xy + 4y^2 - 24xy$$

$$= 9x^2 - 12xy + 4y^2 = (3x - 2y)^2 = \text{RHS}$$

$$24. \text{ a) } \frac{(2y^2 - 14y + 24)}{y-4} = \frac{2(y^2 - 7y + 12)}{y-4} = \frac{2(y^2 - 4y - 3y + 12)}{y-4} = \frac{2(y(y-4) - 3(y-4))}{y-4}$$

$$= \frac{2(y-4)(y-3)}{y-4} = 2(y-3).$$

$$\text{ b) } \frac{y^2 + 7y + 10}{y+5} = \frac{y^2 + 2y + 5y + 10}{y+5} = \frac{y(y+2) + 5(y+2)}{y+5} = \frac{(y+2)(y+5)}{y+5} = y+2$$

25. Total Surface Area of Cylinder  $= 2\pi r(r + h) = 2 \times \frac{22}{7} \times 7(7 + 3) = 440\text{m}^2$ .

Thus  $440\text{m}^2$  sheet of metal is required.

$$26. \frac{3^{-5} \times (2 \times 5)^{-5} \times 5^3}{5^{-7} \times (2 \times 3)^{-5}} = \frac{3^{-5} \times 2^{-5} \times 5^{-5} \times 5^3}{5^{-7} \times 2^{-5} \times 3^{-5}} = 3^{-5+5} 2^{-5+5} 5^{-5+3+7} = 3^0 2^0 5^5 = 5^5$$

27.

Number of periods	8	9
Duration of time	45	y

Since this is a case of Inverse proportion, we have  $x_1 y_1 = x_2 y_2$

Therefore, we have  $8 \times 45 = 9y$

$$Y = \frac{8 \times 45}{9} = 40 \text{ minutes.}$$

28. Do yourself in a graph paper.

29. i)  $(2x + 5y)(2x + 3y)$

Here we can use the identity  $(x + a)(x + b) = x^2 + (a + b)x + ab$

$$\begin{aligned}(2x + 5y)(2x + 3y) &= (2x)^2 + (5y + 3y)2x + 5y \times 3y \\ &= 4x^2 + 16xy + 15y^2.\end{aligned}$$

ii)  $153^2 - 147^2 = (153 + 147)(153 - 147) = 300 \times 6 = 1800$

30.  $3a(a+b+c) - 2b(a-b+c) = 3a^2 + 3ab + 3ac - 2ab + 2b^2 - 2bc$   
 $= 3a^2 + ab + 3ac + 2b^2 - 2bc$

Now  $4c(-a + b + c) - [3a^2 + ab + 3ac + 2b^2 - 2bc] = -4ac + 4bc + 4c^2 - 3a^2 - ab - 3ac - 2b^2 + 2bc$   
 $= -7ac + 6bc - ab + 4c^2 - 3a^2 - 2b^2$

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