

**JASWANT MODERN SR. SEC. SCHOOL CLASS - IX (SET-A) SUBJECT- MATHEMATICS WORKSHEET  
(SUMMER BREAK) 2023**

**NUMBER SYSTEMS**

- Express each of the following in the form of  $p/q$ , where  $p$  and  $q$  are integers and  $q \neq 0$ : i.  $0.00\overline{32}$  ii.  $0.3\overline{178}$
- Rationalise the denominator in each of the following: i.  $\frac{5}{\sqrt{3}}$  ii.  $\frac{\sqrt{2}}{\sqrt{7}}$  iii.  $\frac{7}{\sqrt{5}+\sqrt{2}}$  iii.  $\frac{\sqrt{13}-\sqrt{7}}{\sqrt{13}-\sqrt{17}}$
- Simplify:  
i.  $7^{\frac{2}{3}} \times 7^{\frac{1}{5}}$  ii.  $\frac{15^{1/3}}{15^{1/4}}$  iii.  $5^{\frac{5}{8}} \times 11^{\frac{5}{8}}$  iv.  $(999^{17})^{1/17}$  v.  $\left(\frac{81}{64}\right)^{-3/2}$  vi.  $343^{-1/3}$  vii.  $125^{-\frac{1}{3}}$  viii.  $\frac{7^{1/2}}{7^{3/2}}$
- Fill in the blanks:  
(i)  $a^2 - b^2 = \underline{\hspace{2cm}}$  (ii)  $(x - a)(x - b) = \underline{\hspace{2cm}}$  (iii)  $5a^0 = \underline{\hspace{2cm}}$  (iv)  $(a - b)(a + b) = \underline{\hspace{2cm}}$

**POLYNOMIALS**

- Find the zero of the following polynomials:  
i.  $p(x) = ax$  ii.  $P(x) = bx - d$  iii.  $P(x) = \frac{3}{2}x - \frac{2}{3}$  iv.  $p(x) = ax$  v.  $P(x) = bx - d$  vi.  $P(x) = \frac{3}{2}x - \frac{2}{3}$
- Factorise the following:  
i.  $5ab - 15a^3b^3$  ii.  $9x^2 + 15xy$  iii.  $(a - b)^4 + (b - a)^3$  iv.  $1 + a + b + c + ab + bc + ca + abc$   
v.  $a^2 + 6b + 3a + 2ab$  vi.  $9x^2 + 24xy + 16y^2$  vii.  $25x^2 - 2x + 1/25$  viii.  $a^2 - b^2 + 2bc - c^2$   
ix.  $5 - 20x^2$  x.  $27a^2 - 48b^2$  xi.  $(3a + 5b)^2 - 4c^2$  xii.  $x^2 - 2\sqrt{2}x - 6$  xiii.  $x^2 - 8x - 105$   
xiv.  $x^2 + 15x - 154$  xv.  $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24zx$  xvi.  $1 + \frac{27}{125}a^3 + \frac{9a}{5} + \frac{27a^2}{25}$   
xvii.  $125x^3 - 27y^3 - 225x^2y + 135xy^2$  xviii.  $125a^3 + \frac{1}{8}$  xix.  $a^3 - 0.064$  xx.  $x^2 + 11x + 30$   
xxi.  $5x^2 - 16x - 21$  xxii.  $10x^2 - 9x - 7$  xxiii.  $\sqrt{2}x^2 + 3x + \sqrt{2}$  xxiv.  $x^2 - \sqrt{3}x - 6$   
xxv.  $9(2a - b)^2 - 4(2a - b) - 13$

**COORDINATE GEOMETRY**

- The  $x$  and  $y$ -coordinate are also known as \_\_\_\_\_ and \_\_\_\_\_ respectively.
- What are the equations of  $x$  and  $y$ -axis?
- Write the quadrant or axis in which the following points lie:  
i.  $(-6, 3)$  ii.  $(-5, -6)$  iii.  $(9, -7)$  iv.  $(0, 1)$  v.  $(5, 2)$  vi.  $(-2, 0)$  vii.  $(19, 0)$  viii.  $(0, -101)$  ix.  $(0, 0)$  x.  $(9, -5)$
- Plot the following points on a graph and find the area of the triangle formed by these points:  
i.  $(2, 5); (-2, 2); (4, 2)$  ii.  $(-3, 2); (2, 2); (0, 5)$  iii.  $(5, 3); (-6, 0); (4, 0)$  iv.  $(8, 8); (-8, 2); (7, 2)$

**LINEAR EQUATION IN TWO VARIABLES**

- Write in the form of  $ax + by + c = 0$ : i.  $3y - 7 = 0$  ii.  $x = 2$  iii.  $-2x = 5y - 18$
- Find the zeroes i.  $P(y) = -2y + 4$  ii.  $P(x) = 7x - 4$  iii.  $P(x) = ax - b$  iv.  $P(t) = 4t - 48$
- Form a linear equation in two variables with the information given in the following:  
i. 8 chairs and 5 tables of a classroom cost Rs. 10,500.  
ii. The coach of a cricket team buys 7 bats and 6 balls for Rs. 13,200.  
iii. 53 pens and 37 pencils together cost Rs. 1114.  
iv. The taxi charges in a city consist of fixed charges and the remaining depends upon the distance travelled in kilometres. If a person travels 60 km, he pays Rs. 960.  
v. Each one of A and B has some amount of money. If A gives Rs. 30 to B then B will have twice the money left with A.  
vi. X and Y are two friends X gave Rs. From his pocket money to Y. Y now has thrice as much money as left with X.  
vii. A taxi charges Rs. 20 for the first km and Rs. 12 per km for the subsequent distance covered. Take the total distance covered as  $x$  km and total fare as Rs.  $Y$ . Find the taxi charges for covering a) 12 km and b) 20 km
- Draw the graph of the following linear equations in two variables and find the area of the triangle formed by the lines and the axis.  
i.  $4x - 5y + 16 = 0$ ;  $2x + y - 6 = 0$  ii.  $4x - 5y - 20 = 0$ ;  $3x + 5y - 15 = 0$  iii.  $3x + y - 11 = 0$ ;  $x - y - 1 = 0$   
iv.  $x - y + 3 = 0$ ;  $2x + 3y - 4 = 0$  v.  $2x - 3y + 4 = 0$ ;  $x + 2y - 5 = 0$  vi.  $x - 2y + 2 = 0$ ;  $2x + y - 6 = 0$   
vii.  $x - y + 1 = 0$ ;  $3x + 2y - 12 = 0$  viii.  $4x - 3y + 4 = 0$ ;  $4x + 3y - 20 = 0$

**SURFACE AREAS AND VOLUMES**

- The height of a conical tent at the centre is 5m. The distance of any point its circular base from the top of the tent is 13m. Find the area of the slant surface?
- An iron pillar has some portion in the form of right circular triangle and remaining in the form of a right circular cone. The radius of the base of the each of the cone and the cylinder is 8 cm. The cylindrical portion is 240 cm high and the conical part is 36 cm high. Find the weight of the pillar if one cubic cm of iron weighs 7.8g.

3. A solid metallic sphere of diameter 28 is melted and recasted into a no. of smaller cones each of diameter 4 cm and height 3 cm. Find the no. of cones so formed.
4. Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area.
5. Curved surface area of a cone is  $308 \text{ cm}^2$  and its slant height is 14 cm. Find (i) radius of the base and (ii) total surface area of the cone.
6. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (Use  $\pi = 3.14$ ).
7. A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.
8. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.
9. The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas.
10. Find the volume, curved surface area and total surface area of a cone having base radius 35cm and height 12cm.
11. A man uses a piece of canvas having area of  $551 \text{ m}^2$ , to make a conical tent of base radius 7m. Assuming that all the stitching margins and wastage incurred while cutting amount to approximately  $1 \text{ m}^2$ , find the volume of the tent that can be made with it.
12. A spherical cannonball 28cm in diameter is melted and cast into a right circular cone mould, whose base is 35 cm in diameter. Find the height of the cone.
13. A hemisphere of lead of radius 9cm is cast into a right circular cone of height 72cm. Find the radius of base of the cone.
14. A hemispherical bowl made of brass has inner diameter 10.5cm. Find the cost of tin-plating it on the inside at the rate of Rs 32 per  $100 \text{ cm}^2$ .
15. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of the hemisphere?
16. A shot-put is a metallic sphere of radius 4.9cm. If the density of metal is  $7.8 \text{ g per cm}^3$ , find the mass of the shot-put.
17. The surface area of a sphere of radius 5cm is five times the area of the curved surface of a cone of radius 4cm. Find the height and the volume of the cone.
18. The height of a cone is 30cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be  $\frac{1}{27}$  of the volume of the given cone, at what height above the base, the section has been made?
19. How many metres cloth, 5m wide, will be required to make a conical tent, the radius of whose base is 7m and height is 24m?
20. The height and slant height of a cone are 21cm and 28cm respectively. Find the volume of the cone.
21. A right triangle with sides 5cm, 12cm and 13cm is revolved about the side 12 cm. Find the volume of the solid so formed. If triangle ABC is revolved about the side 5 cm then find the volume of the solid so formed. Find also the ratio of the volumes of the two solids obtained.
22. A heap of wheat is in the form of a cone of diameter 9 m and height 3.5 m. Find its volume. How much canvas is required to just cover the heap?
23. A hollow sphere of external and internal diameters 8 cm and 4 cm respectively is melted into a cone of base diameter 8 cm. Find the height of the cone.
24. On increasing the radius of a sphere by 10%, find the percentage increase in its volume.
25. The water of a factory is stored in a hemispherical tank whose internal diameter is 14m. The tank contains 50 kilolitres of water. Water is pumped into the tank to fill it to its capacity. Calculate the volume of water pumped into the tank.
26. The volumes of two spheres are in the ratio 64:27. Find the ratio of their surface areas.
27. Two solid spheres made of the same metal have weights 5920 g and 740 g respectively. Determine the radius of the larger sphere, if the diameter of the smaller one is 5 cm.
28. Find the volume of a sphere whose radius is 4.2 cm.