

WINTER BREAK HOLIDAY HOMEWORK'2018

1. Write the equation of line whose perpendicular distance from the origin is 5 units and angle made by the perpendicular with the positive x-axis is 30° .
2. Write the equation of the line passing through the point $(-4,3)$ with slope $\frac{1}{2}$.
3. Find the equation of the circle passing through the points $(2,3)$ and $(-1,1)$ and whose centre is on the line $x-3y-11=0$
4. If p and q are the lengths of perpendiculars from the origin to the lines $x\cos\theta - y\sin\theta = k$ and $x\sec\theta + y\csc\theta = k$ respectively, prove that $p^2 + 4q^2 = k^2$.
5. Find the equation of the line passing through the intersection of $5x + 3y - 23 = 0$ and perpendicular to the line $5x - 3y - 1 = 0$
6. Find the equation of the line passing through the intersection of the lines $3x - 4y + 1 = 0$ and $5x + y - 1 = 0$ and cutting equal intercept on the coordinate axes .
7. A ray of light passing through the point $(1,2)$, reflects on the x-axis at point A and reflected ray passes through the point $(5,3)$. Find the co ordinates of A .
8. Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1,2)$ measured parallel to the line $2x - y + 5 = 0$.
9. If p is the length of perpendicular from origin to the line $\frac{x}{a} + \frac{y}{b} = 1$, then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$
10. Find the coordinates of the foot of the perpendicular from the point $(-1,3)$ to the line $3x - 4y - 16 = 0$.
11. Find the value of p so that the three lines $3x + y - 2 = 0$, $px + 2y - 3 = 0$ and $2x - y - 3 = 0$ may intersect at one point.
12. Find the equation of the circle passing through the points $(2,3)$ and $(-1,1)$ and whose centre is on the line $x-3y-11=0$.
13. Find the co-ordinates of the foci and the vertices ,the eccentricity and the length of latus rectum of the conic section $9y^2 - 4x^2 = 36$.
14. Find the equation of a circle with radius 5 whose centre lies on X-axis and passes through point $(2,3)$.

15. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum
16. Write the equation of the ellipse whose semi major and semi minor axes are 3 and 2 respectively .
17. Find the coordinate of the foci ,the vertices , the length of major axis , the minor axis , the eccentricity and the length of latus rectum of the ellipse : $36x^2 + 4y^2 = 144$
18. The cable of a uniformly loaded suspension bridge in the form of a parabola .The roadway which is horizontal and 100 m long is supported by vertical wires attached to the cable , the longest wire being 30 m and the shortest being 6 m .Find the length of a supporting wire attached to the roadway 18 m from the middle .
19. Find the equation of the circle passing through the points (4,1) and (6,5) and whose centre is on the line $4x + y = 16$
20. Find the coordinates of the points which trisect the line segment joining the points P (4, 2, -6) and Q (10, -16,6) .
21. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$, where one vertex is at the vertex of the parabola. Find the length of the side of the triangle .
22. Find the ratio in which the YZ-plane divides the line segment formed by joining the points (-2,4,7) and (3,-5,8) .
23. Determine the values of a and b so that the points A(a,b,3) ,B(2,0,-1) and C(1,-1,-3) are collinear .

24. Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$

25. Evaluate $\lim_{x \rightarrow 0} \frac{\sin 5x}{\sin 2x}$

26. Evaluate $\lim_{x \rightarrow 0} \frac{\operatorname{cosec} x - \cot x}{x}$

27. Evaluate $\lim_{x \rightarrow 0} \frac{1 + \cos 2x}{(\pi - 2x)^2}$

28. Evaluate $\lim_{x \rightarrow 0} \frac{1 + \cos 2x}{(\pi - 2x)^2}$

29. Evaluate $\lim_{x \rightarrow 0} \frac{x \tan x}{1 - \cos x}$

30'. Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+3x} - \sqrt{1-3x}}{x}$