

1. The locus of the mid-point of the chords of the circle $x^2 + y^2 = 4$ which subtends a right angle at the origin is
 (a) $x + y = 2$ (b) $x^2 + y^2 = 1$ (c) $x^2 + y^2 = 2$ (d) $x + y = 1$
2. Two circles $x^2 + y^2 = 6$ and $x^2 + y^2 - 6x + 8 = 0$ are given. Then the equation of the circle through their point of intersection and the point (1, 1) is
 (a) $x^2 + y^2 - 6x + 4 = 0$ (b) $x^2 + y^2 - 3x + 1 = 0$
 (c) $x^2 + y^2 - 4y + 2 = 0$ (d) none of these
3. The equation of the circle described on the common chord of the circles $x^2 + y^2 + 2x = 0$ and $x^2 + y^2 + 2y = 0$ as diameter is
 (a) $x^2 + y^2 + x - y = 0$ (b) $x^2 + y^2 - x - y = 0$
 (c) $x^2 + y^2 - x + y = 0$ (d) $x^2 + y^2 + x + y = 0$
4. A circle passes through the origin and has its centre on $y = x$. If it cuts $x^2 + y^2 - 4x - 6y + 10 = 0$ orthogonally, then the equation of the circle is
 (a) $x^2 + y^2 - x - y = 0$ (b) $x^2 + y^2 - 6x - 4y = 0$
 (c) $x^2 + y^2 - 2x - 2y = 0$ (d) $x^2 + y^2 + 2x + 2y = 0$
5. The radical centre of three circles described on the three sides of a triangle as diameter is
 (a) the orthocentre (b) the circumcentre
 (c) the incentre (d) the centroid of the triangle
6. The number of common tangents to the circles $x^2 + y^2 - x = 0$, $x^2 + y^2 + x = 0$ is
 (a) 2 (b) 1 (c) 4 (d) 3
7. Consider the circles $x^2 + (y - 1)^2 = 9$, $(x - 1)^2 + y^2 = 25$. They are such that
 (a) these circles touch each other
 (b) one of these circles lies entirely inside the other
 (c) each of these circles lies outside the other
 (d) they intersect in two points
8. The length of the tangent from (0, 0) to the circle $2(x^2 + y^2) + x - y + 5 = 0$ is
 (a) $\sqrt{5}$ (b) $\frac{\sqrt{5}}{2}$ (c) $\sqrt{2}$ (d) $\sqrt{\frac{5}{2}}$
9. A circle touches the x-axis and also touches the circle with centre (0, 3) and radius 2. The locus of the centre of the circle is
 (a) a circle (b) a parabola
 (c) an ellipse (d) a hyperbola
10. The circles $x^2 + y^2 - 4x - 6y - 12 = 0$ and $x^2 + y^2 + 4x + 6y + 4 = 0$
 (a) touch externally (b) touch internally
 (c) intersect at two points (d) do not intersect

11. The equation of the unit circle concentric with $x^2 + y^2 + 8x + 4y - 8 = 0$ is
 (a) $x^2 + y^2 - 8x + 4y - 8 = 0$ (b) $x^2 + y^2 - 8x + 4y + 8 = 0$
 (c) $x^2 + y^2 - 8x + 4y - 28 = 0$ (d) $x^2 + y^2 - 8x + 4y + 19 = 0$
12. The locus of the centre of the circle which cuts the circles $x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$ and $x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$ orthogonally is
 (a) an ellipse (b) the radical axis of the given circles
 (c) a conic (d) another circle
13. The length of the tangent to the circle $x^2 + y^2 - 2x - y - 7 = 0$ from $(-1, -3)$ is
 (a) $\sqrt{8}$ (b) $2\sqrt{2}$ (c) 4 (d) 8
14. Given that the circles $x^2 + y^2 - 2x + 6y + 6 = 0$ and $x^2 + y^2 - 5x + 6y + 15 = 0$ touch, the equation to their common tangent is
 (a) $x = 3$ (b) $y = 6$
 (c) $7x - 12y - 21 = 0$ (d) $7x + 12y + 21 = 0$
15. The two circles $x^2 + y^2 - 2x - 2y = 7$ and $3(x^2 + y^2) - 8x + 29y = 0$
 (a) touch externally (b) touch internally
 (c) cut each other orthogonally (d) do not cut each other
16. The centre of the circle passing through $(0, 0)$ and $(1, 0)$ and touching the circle $x^2 + y^2 = 9$ is
 (a) $(3/2, 1/2)$ (b) $(1/2, 3/2)$ (c) $(1/2, 1/2)$ (d) $(1/2, \pm\sqrt{2})$
17. The equation of a parabola having focus $(-3, 0)$ and directrix $x = 3$ is
 (a) $y^2 = 12x$ (b) $y^2 = -12x$ (c) $x^2 = 12y$ (d) $x^2 = -12y$
18. The equation of the directrix of the parabola $x^2 - 4x - 3y + 10 = 0$ is
 (a) $y = -\frac{5}{4}$ (b) $y = \frac{5}{4}$ (c) $y = -\frac{3}{4}$ (d) $x = \frac{5}{4}$
19. The equation of the parabola whose vertex and focus lie on the axis of x at distances a and a_1 from the origin respectively, is
 (a) $y^2 = 4(a_1 - a)x$ (b) $y^2 = 4(a_1 - a)(x - a)$
 (c) $y^2 = 4(a_1 - a)(x - a_1)$ (d) none of these
20. The coordinates of a point on the parabola $y^2 = 8x$ whose focal distance is 4, are
 (a) $(1/2, \pm 2)$ (b) $(1, \pm 2\sqrt{2})$ (c) $(2, \pm 4)$ (d) none of these
21. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the vertex of the parabola. The length of its side is
 (a) $4a\sqrt{3}$ (b) $2a\sqrt{3}$ (c) $16a\sqrt{3}$ (d) $8a\sqrt{3}$
22. The coordinates of the focus of the parabola $x^2 - 4x - 8y - 4 = 0$ are
 (a) $(0, 2)$ (b) $(2, 1)$ (c) $(1, 2)$ (d) $(-2, -1)$
23. The area of the triangle inscribed in the parabola $y^2 = 4x$ the ordinates of whose vertices are 1, 2 and 4 is
 (a) $7/2$ sq. units (b) $5/2$ sq. units
 (c) $3/2$ sq. units (d) $3/4$ sq. units

24. If $y = mx + c$ touches the parabola $y^2 = 4a(x + a)$, then
 (a) $c = \frac{a}{m}$ (b) $c = am + \frac{a}{m}$
 (c) $c = a + \frac{a}{m}$ (d) none of these
25. If the segment intercepted by the parabola $y^2 = 4ax$ with the line $lx + my + n = 0$ subtends a right angle at the vertex, then
 (a) $4al + n = 0$ (b) $4al + 4am + n = 0$
 (c) $4am + n = 0$ (d) $al + n = 0$
26. The parametric representation $(2 + t^2, 2t + 1)$ represents
 (a) a parabola with focus at $(2, 1)$ (b) a parabola with vertex at $(2, 1)$
 (c) an ellipse with centre at $(2, 1)$ (d) none of these
27. If the line $x + y = 1$ touches the parabola $y^2 - y + x = 0$, then the coordinates of the point of contact are
 (a) $(1, 1)$ (b) $(1/2, 1/2)$ (c) $(0, 1)$ (d) $(1, 0)$
28. The slope of the normal at the point $(at^2, 2at)$ of the parabola, $y^2 = 4ax$ is
 (a) $\frac{1}{t}$ (b) t (c) $-t$ (d) $-\frac{1}{t}$
29. The angle between the tangents drawn from the origin to the parabola $y^2 = 4a(x - a)$ is
 (a) 90° (b) 30° (c) $\tan^{-1}\left(\frac{1}{2}\right)$ (d) 45°
30. If $x = my + c$ is a normal to the parabola $x^2 = 4ay$, then the value of c is
 (a) $-2am - am^3$ (b) $2am + am^3$ (c) $-\frac{2a}{m} - \frac{a}{m^3}$ (d) $\frac{2a}{m} + \frac{a}{m^3}$
31. The equation of the tangent at the vertex of the parabola $x^2 + 4x + 2y = 0$ is
 (a) $x = -2$ (b) $x = 2$ (c) $y = 2$ (d) $y = -2$
32. Two tangents are drawn from the point $(-2, -1)$ to the parabola $y^2 = 4x$. If α is the angle between these tangents, then $\tan \alpha =$
 (a) 3 (b) $1/3$ (c) 2 (d) $1/2$
33. The graph represented by the equations $x = \sin^2 t$ $y = 2 \cos t$ is
 (a) a portion of a parabola (b) a parabola
 (c) a part of a sine graph (d) a part of a hyperbola
34. The two ends of latus rectum of a parabola are the points $(3, 6)$ and $(-5, 6)$. The focus is
 (a) $(1, 6)$ (b) $(-1, 6)$ (c) $(1, -6)$ (d) $(-1, -6)$
35. The vertex of the parabola $x^2 + 8x + 12y + 4 = 0$ is
 (a) $(-4, 1)$ (b) $(4, -1)$ (c) $(-4, -1)$ (d) $(4, 1)$
36. The focus of the parabola $y^2 - 4y - 8x + 4 = 0$ is
 (a) $(1, 1)$ (b) $(1, 2)$ (c) $(2, 1)$ (d) $(2, 2)$