

1. What is the center and the radius of the equation $(x-3)^2 + (y+2)^2 = 4$?
- A) C(3, 2) and $r=4$ B) C(-3, 2) and $r=2$
 C) C(3, -2) and $r=2$ D) C(-3, 2) and $r=2$
 E) C(3, -2) and $r=4$
2. Which one of the followings is the center C and the radius r of the circle $4x^2 + 4y^2 - 8x + 24y = 81$?
- A) C(4, -12) ; $r = 9$ B) C(1, -3) ; $r = 9$
 C) C(1, -3) ; $r = \frac{11}{2}$ D) C(1, -3) ; $r = 11$
 E) C(1, -3) ; $r = \frac{9}{2}$
3. The points A(-2,1) and B(2,5) are given. Which one of the followings is the equation of the circle, with diameter [AB] ?
- A) $x^2 + (y+3)^2 = 2\sqrt{2}$
 B) $(x-3)^2 + y^2 = 8$
 C) $x^2 + (y-3)^2 = 8$
 D) $(x+3)^2 + y^2 = 2\sqrt{2}$
 E) $x^2 + y^2 = 8$
4. What is the radius of the equation $x^2 + y^2 - 2x - 4y - 4 = 0$?
- A) 1 B) 2 C) 3 D) 4 E) 5
5. Where does the circle $(x-3)^2 + (y+2)^2 = 4$ cut the x-axis ?
- A) 1 B) 2 C) 3 D) 4 E) 5
6. If the circle $x^2 + y^2 - 2x + y - a + 3 = 0$ is tangent to $y = 1$, then what is a ?
- A) -1 B) 4 C) 5 D) 6 E) 8
7. If the circle given by the equation $x^2 + y^2 - 6x + 8y + k = 0$ is tangent to x-axis, then what is the value of k ?
- A) 6 B) 8 C) 9 D) 12 E) 16
8. Find the equation of the circle, whose center is on the point C(-2,-3) and is tangent to the y-axis.
- A) $x^2 + y^2 + 6x + 4y + 9 = 0$
 B) $x^2 + y^2 + 6x - 4y - 9 = 0$
 C) $x^2 + y^2 + 4x + 6y + 9 = 0$
 D) $x^2 + y^2 - 4x - 6y + 9 = 0$
 E) $x^2 + y^2 + 4x + 6y - 9 = 0$
9. If the circle $x^2 + y^2 - 2x + 4y + m = 0$ is tangent to the line $x = -3$, find m.
- A) 4 B) 11 C) -4 D) -8 E) -11
10. The center of a circle is on the point C(2,3) and its radius is 5. Find the abscissa values of the intersection points of the circle by the x-axis.
- A) -4,4 B) -1,7 C) -2,6 D) -3,5 E) -5,3
11. What is the equation of the tangent line that is tangent to the circle $(x-1)^2 + (y+1)^2 = 8$ at the point A(-1,1) ?
- A) $y = x$ B) $y = 2x - 3$ C) $y = 2x + 2$
 D) $y = 3x$ E) $y = x + 2$
12. Find y-value of the point that lies on the circle $(x-2)^2 + (y+1)^2 = 25$ and is nearest to the point P(10,5).
- A) 2 B) 3 C) 4 D) 5 E) 10

13. Find the equation of the line that is tangent to the circle $(x-2)^2 + (y-3)^2 = r^2$ at the point $A(1,2)$.

A) $x + y + 3 = 0$ B) $-x + y + 3 = 0$
 C) $2x - y + 3 = 0$ D) $2x + y - 4 = 0$
 E) $x + y - 3 = 0$

14. Which one of the followings is the equation of the line that is tangent to the circle $x^2 + y^2 - 8x + 2y - 8 = 0$ at the point $A(1,3)$?

A) $3x + 4y - 15 = 0$ B) $4x + 3y - 13 = 0$
 C) $3x - 4y + 9 = 0$ D) $3x - 5y + 12 = 0$
 E) $4x + 5y - 10 = 0$

15. Which one of the followings is the radius of the circle that passes through the points $A(0,1)$ and $B(1,-3)$ and whose center is on the line $y = x - 3$?

A) $\sqrt{17}$ B) $\frac{\sqrt{34}}{2}$ C) 2 D) 3 E) $\frac{7}{2}$

16. Let B be the nearest point of the circle $x^2 + y^2 - 4x + 6y - 3 = 0$ to the point $A(-4,5)$.
What is $|AB|$?

A) 6 B) 5 C) 4 D) 3 E) 2

17. If the circles $x^2 + (y-6)^2 = r^2$ and $(x-8)^2 + y^2 = 25$ are internally tangent, then find r .

A) 5 B) 10 C) 15 D) 20 E) 25

18. What is the shortest chord passing through $A(1,1)$ for the circle $x^2 + y^2 + x - y - 11 = 0$?

A) 6 B) 5 C) 4 D) 3 E) 2

19. The line $2x - y + 2 = 0$ intersect the circle $x^2 + y^2 = 16$ at the points A and B . The perpendicular line segment drawn from the center of the circle to the line AB intersect it at the point H . Find the y -value of H .

A) $\frac{4}{5}$ B) $\frac{7}{10}$ C) $\frac{3}{5}$ D) $\frac{1}{2}$ E) $\frac{2}{5}$

20. Inside the circle $x^2 + y^2 = 625$, the chords with length 48-cm are drawn. Which one of the followings is the geometric place of the midpoints of the chords?

A) $x^2 + y^2 = 25$ B) $x^2 + y^2 = 169$
 C) $x^2 + y^2 = 576$ D) $x^2 + y^2 = 49$
 E) $x^2 + y^2 = 144$