

## Graphs of Equations and Circles

1) If the circle  $(x - a)^2 + (y - b)^2 = 4$ ,  $a < 0$ ,  $b > 0$ , is tangent to both axes, then  $2a + 3b =$

- A) 2
- B) 4
- C) -2
- D) -4
- E) 6

2) The graph of the equation  $xy^2 = |x^4 - y^2|$ , is

- A) symmetric with respect to the  $x$ -axis only
- B) not symmetric with respect to the  $x$ -axis,  $y$ -axis, nor to the origin
- C) symmetric with respect to the  $x$ -axis and  $y$ -axis
- D) symmetric with respect to the  $y$ -axis only
- E) symmetric with respect to the origin only

3) An equation of the circle centred at  $(-1, b)$  in the graph below, is

- A)  $x^2 + y^2 + 2x - 4y - 20 = 0$
- B)  $x^2 + y^2 + 2x + 4y + 20 = 0$
- C)  $x^2 + y^2 + 2x + 4y - 20 = 0$
- D)  $x^2 + y^2 + 2x - 4y + 20 = 0$
- E)  $x^2 + y^2 - 2x - 4y - 20 = 0$

4) If the graph of the circle  $2x^2 + 2y^2 - 8x + 4y = 0$  has center  $(h, k)$  and radius  $r$ , then  $h + k + r^2 =$

A) 6

B) 4

C)  $\sqrt{5} + 1$

D)  $\sqrt{5} - 1$

E) 2

5) If the graph of the circle  $(x + 2)^2 + (y - 3)^2 = k - 1$  is tangent to the  $y$ -axis, then  $k =$

A) 5

B) 3

C) 8

D) 10

E) 7

6) The equation  $|x - y| = y^2 + 1$  is

A) symmetric with respect to the origin only

B) symmetric with respect to the  $x$ -axis only

C) symmetric with respect to the  $y$ -axis only

D) symmetric with respect to the  $x$ -axis,  $y$ -axis and origin

E) not symmetric with respect to the  $x$ -axis,  $y$ -axis and origin

7) The equation of the circle having a diameter with endpoints  $(-5, 3)$  and  $(1, 5)$ , is

(A)  $x^2 + y^2 + 4x - 8y + 10 = 0$

(B)  $x^2 + y^2 - 4x + 8y - 10 = 0$

(C)  $x^2 + y^2 - 4x + 8y + 10 = 0$

(D)  $x^2 + y^2 + 4x - 8y - 10 = 0$

(E)  $x^2 + y^2 - 4x - 8y - 10 = 0$

8) The center  $C(h, k)$  and the radius  $r$  of the circle  $1/2x^2 + 1/2y^2 - 3x + 2y - 3/2 = 0$  are

(a)  $C(3, -2), r = 4$

(b)  $C(2, -3), r = 4$

(c)  $C(3, -2), r = \sqrt{15}$

(d)  $C(3, -2), r = \sqrt{17}$

(e)  $C(3/2, -1), r = \sqrt{2}/2$

9) The equation of the circle with center  $(3, -1)$  and tangent to  $x$ -axis is

(a)  $x^2 + y^2 - 6x + 2y + 9 = 0$

(b)  $x^2 + y^2 - 6x + 2y = 0$

(c)  $x^2 + y^2 + 6x - 2y - 9 = 0$

(d)  $x^2 + y^2 - 6x + 2y + 1 = 0$

(e)  $x^2 + y^2 + 6x - 2y - 3 = 0$

10) If the center of the circle  $x^2 + y^2 + 4x - 6y = 9$  is  $(2a+1, 2b-1)$ , then value of  $ab$  is equal to

- (a)  $-3$
- (b)  $-3/4$
- (c)  $-2/3$
- (d)  $-1/3$
- (e)  $4/3$

11) The distance between the point  $(-4, -4)$  and the center of the circle  $x^2 + y^2 - 6x + 10y + 25 = 0$  is equal to

- (a)  $5\sqrt{2}$
- (b)  $4\sqrt{2}$
- (c)  $3\sqrt{2}$
- (d)  $2\sqrt{5}$
- (e)  $10\sqrt{5}$

12) The graph of the equation  $y^3 = -x^3y^2 + \frac{x}{|x|}$  is symmetry with respect to

- (a) the origin only
- (b) the  $y$ -axis and the origin
- (c) the  $x$ -axis and the origin
- (d) the  $x$ -axis only
- (e) the  $y$ -axis only

13) The center  $C(h, k)$  and the radius  $r$  of the circle

$$1/2x^2 + 1/2y^2 - 3x + 2y - 3/2 = 0 \text{ are}$$

- (f)  $C(3, -2), r = 4$
- (g)  $C(2, -3), r = 4$
- (h)  $C(3, -2), r = \sqrt{15}$
- (i)  $C(3, -2), r = \sqrt{17}$
- (j)  $C(3/2, -1), r = \sqrt{2}/2$

14) The equation of the circle with center  $(3, -1)$  and tangent to  $x$ -axis is

- (f)  $x^2 + y^2 - 6x + 2y + 9 = 0$
- (g)  $x^2 + y^2 - 6x + 2y = 0$
- (h)  $x^2 + y^2 + 6x - 2y - 9 = 0$
- (i)  $x^2 + y^2 - 6x + 2y + 1 = 0$
- (j)  $x^2 + y^2 + 6x - 2y - 3 = 0$

15) If the center of the circle  $x^2 + y^2 + 4x - 6y = 9$  is  $(2a+1, 2b-1)$ , then value of  $ab$  is equal to

- (f)  $-3$
- (g)  $-3/4$
- (h)  $-2/3$
- (i)  $-1/3$
- (j)  $4/3$

16) The distance between the point  $(-4, -4)$  and the center of the circle  $x^2 + y^2 - 6x + 10y + 25 = 0$  is equal to

- (f)  $5\sqrt{2}$
- (g)  $4\sqrt{2}$
- (h)  $3\sqrt{2}$
- (i)  $2\sqrt{5}$
- (j)  $10\sqrt{5}$

17) The graph of the equation  $y^3 = -x^3y^2 + \frac{x}{|x|}$  is symmetry with respect to

- (f) the origin only
- (g) the  $y$ -axis and the origin
- (h) the  $x$ -axis and the origin
- (i) the  $x$ -axis only
- (j) the  $y$ -axis only

18) If the circle  $2x^2 + 2y^2 - 6x + 10y = 1$  has center  $C(h, k)$  and radius  $r$ , then  $2h + 2k + r =$

- (A) 1

19) The general equation of the circle with center at  $C(3, 2)$  and tangent to the  $x$ -axis is given by

- (A)  $x^2 - 6x + y^2 - 4y + 9 = 0$

20) If  $(h, k)$  is the center and  $r$  is the radius of the circle  $2x^2 + 2y^2 - 6x + 10y = 1$ , then  $h + k + r =$

- (A) 2

21) The distance between the center of the circle  $(x - 3)^2 + (y + 2)^2 = 36$  and the point  $(-5, 3)$  is:

- (A)  $\sqrt{89}$

- 22) A circle in the second quadrant, tangent to both axes, and of diameter 1 has an equation

A)  $4\left(x + \frac{1}{2}\right)^2 + 4\left(y - \frac{1}{2}\right)^2 = 1$

- 23) The lines  $x = 1$  and  $y = 1$  intersect the circle  $x^2 + (y - 1)^2 = 1$  at  $m$  and  $n$  points respectively, then [Hint: Sketch]

A)  $m = 1$  ;  $n = 2$

- 24) If  $(4, 6)$  is one end point of a diameter of a circle with center  $(-3, 3/2)$ , then the other end point of the diameter is

A)  $(-10, -3)$

- 25) Which of the following statements is FALSE about the graph of the equation  $(x - 3)^2 + (y - 2)^2 = m$  ?

A) If  $m = -9$  then the graph of the equation is nonexistent

B) If  $m = 9$  then the graph of the equation is a circle that is tangent to y-axis

C) If  $m = 9$  then the graph of the equation is a circle that is tangent to x-axis

D) If  $m = 0$  then the graph of the equation is a point that is above x-axis

E) If  $m = 4$  then the graph of the equation is a circle with radius 2

26) The graph of the equation  $|xy| + |x|y = 1$  is symmetric with respect to

- (a) both the x- and y-axes
- (b) the x-axis only
- (c) the y-axis only
- (d) the origin only
- (e) both the x-axis and the origin

27) If the circle  $2x^2 + 2y^2 - 6x + 10y = 1$  has center  $C(h, k)$  and radius  $r$ , then  $2h + 2k + r =$

- (A) 1

28)