

**King Fahd University of Petroleum and Minerals**  
**Mathematical Sciences Department**

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**Show All Necessary Steps**

(1) The radius  $R$  and the center  $C$  of the circle  $2x^2 + 2y^2 + 12x + 16y - 22 = 0$  are:

a)  $R = 6$  and  $C = (-3, -4)$

b)  $R = 36$  and  $C = (3, 4)$

c)  $R = \sqrt{6}$  and  $C = (-3, -4)$

d)  $R = 36$  and  $C = (-3, -4)$

e)  $R = 6$  and  $C = (-4, -3)$

(2) The equation of a circle that has a diameter with endpoints  $(2,3)$  and  $(-4,11)$  is:

a)  $(x+2)^2 + (y-3)^2 = 4$

b)  $(x-1)^2 + (y+7)^2 = 25$

c)  $(x+3)^2 + (y-3)^2 = 4$

d)  $(x+1)^2 + (y-7)^2 = 25$

e)  $(x+7)^2 + (y-3)^2 = 4$

(3) If  $(a,b)$  is the vertex and  $Max$  is the maximum value of the function  $y = -2x^2 + 4x - 4$ , then:

a)  $a + b = 0$ ,  $Max = -1$

b)  $a + b = -1$ ,  $Max = -2$

c)  $a + b = -3$ ,  $Max = -1$

d)  $a + b = -1$ ,  $Max = -3$

e)  $a + b = -1$ ,  $Max$  does not exist.

- (4) If the graph of  $y = \frac{x-1}{x+3}$  is shifted horizontally two units to the left and vertically three units up, then the equation of the new graph is:

a)  $y = \frac{4x+16}{x+5}$

b)  $y = \frac{-2x-13}{x+5}$

c)  $y = \frac{2x+12}{x+5}$

d)  $y = \frac{-2x-17}{x+5}$

e)  $y = \frac{4x+18}{x+5}$

- (5) The graph of the equation  $3x^2 = |2x - 5y|$  is symmetric with respect to:

a) the y-axis and origin

b) the x-axis only

c) the y-axis only

d) the origin only

e) the x-axis, the y-axis, and the origin

- (6) The x-intercept of the line that is through the point  $(2, -1)$  and parallel to the line  $3x + 4y = 5$  is :

a)  $\left(\frac{-1}{3}, 0\right)$

b)  $\left(\frac{2}{3}, 0\right)$

c)  $(4, 0)$

d)  $(-3, 0)$

e)  $\left(0, \frac{2}{3}\right)$

(7) Which one of the following relations defines  $y$  as a function of  $x$  ?

a)  $y^2 + 3x = 3$

b)  $\{(2,3), (3,5), (4,6), (5,3), (4,10)\}$

c)  $x^2 + y^2 = 9$

d)  $|y| = |x| + 5$  if  $y < 0$

e)  $y = 4 \pm \sqrt{x}$

(8) If  $f(x) = \begin{cases} \lfloor 1 - 2x \rfloor & \text{if } 0 \leq x \leq 5 \\ 5 & \text{if } 5 < x \leq 8 \\ \sqrt{x - 7} & \text{if } 8 < x \leq 11 \end{cases}$ , then for  $1 < n \leq 2$ ,  $f(1.2) + f(8) + f(n^2 + 7) =$

a) 0

b) 3

c)  $-n + 3$

d)  $n + 3$

e)  $n + 4$