UNIT 6

Circles - Standard Form

$$y = (x-h)^2 + (y-k)^2 = r^2$$

$(x-h)^2 + (y-k)^2$: change signs to get the center. (h,k)

r^2: $\sqrt{\ }$ to get the radius

EX. $(x-4)^2 + (y+3)^2 = 25$

Center = $(4,-3)$

Radius = 5

Circles - General Form

$$x^2 + y^2 + 4x - 6y \cancel{-} 22 = 0$$

$+22 \quad +22$

step 1 → group x's & y's with a blank and move constant to other side with 2 blanks.

step 2 → Take $\frac{1}{2}$ of x term and square it and $\frac{1}{2}$ of y term and square it. Fill in blanks.

step 3 → set up $(x\ \ )^2 + (y\ \ )^2 = \_\_\_$

step 4 → Fill in ( ) with $\frac{x}{2}$ and $\frac{y}{2}$ (watch your signs)

$$x^2 + 4x + \underline{4} + y^2 - 6y + \underline{9} = 22 + \underline{4} + \underline{9}$$

$\left(\frac{4}{2}\right)^2 = (2)^2 = 4$ $\quad$ $\left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

$$(x+2)^2 + (y-3)^2 = 35$$

center $= (-2, 3)$

$r = \sqrt{35} = 5.92$

UNIT 6 – EOCT Review Name: _____

1. **Which is an equation for the circle with a center at (–2, 3) and a radius of 3?**

A. $x^2 + y^2 + 4x - 6y + 22 = 0$

X B. $2x^2 + 2y^2 + 3x - 3y + 4 = 0$

C. $x^2 + y^2 + 4x - 6y + 4 = 0$

X D. $3x^2 + 3y^2 + 4x - 6y + 4 = 0$

$x^2 + 4x + \underline{4} + y^2 - 6y + \underline{9} = -4 + \underline{4} + \underline{9}$

$\left(\frac{4}{2}\right)^2 = (2)^2 = 4 \quad \left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

$(x+2)^2 + (y-3)^2 = 9$

$C = (-2, 3) \quad r = 3$

2. **What is the center of the circle given by the equation $x^2 + y^2 - 10x - 11 = 0$?**

A. (5, 0)

B. (0, 5)

C. (–5, 0)

D. (0, –5)

$x^2 - 10x + \underline{25} + y^2 + 0y + \underline{0} = 11 + \underline{25} + \underline{0}$ (+11)

$\left(\frac{-10}{2}\right)^2 = (-5)^2 \quad \left(\frac{0}{2}\right)^2 = 0^2$

$(x-5)^2 + (y+0)^2 = 36$

center $(5, 0) \quad r = 6$

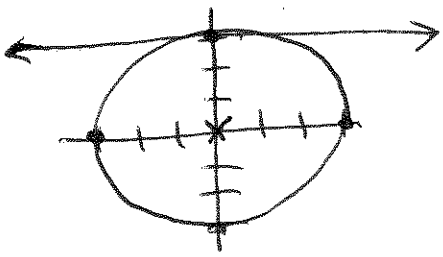
3. **A circle is centered at the origin and has a radius of 3 units. A horizontal line passes through the point (0, 3). In how many places does the line intersect the circle?**

A. 0

B. 1

C. 2

D. infinitely many



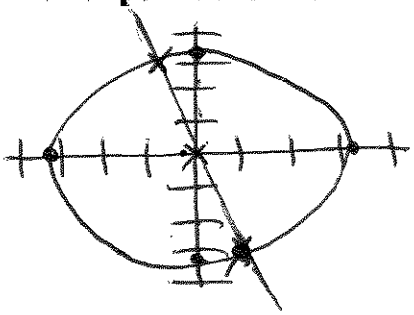
4. **A circle is centered at the origin and has a radius of $\sqrt{10}$ units. A line has a slope of –3 and passes through the origin. At which points does the line intersect the circle?**

A. (–3, 1) and (3, –1)

B. (–1, 3) and (1, –3)

C. (1, 3) and (–1, –3)

D. (3, 1) and (–3, –1)



$r = \sqrt{10} = 3.2$

slope $= \frac{-3}{1}$

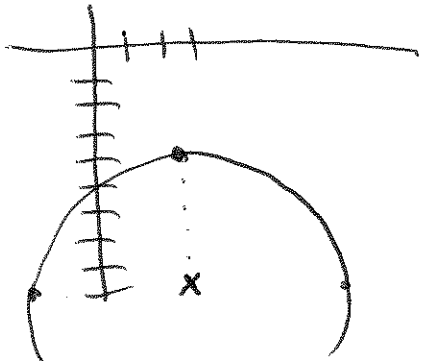
5. **Which point is on a circle with a center of (3, –9) and a radius of 5?**

A. (–6, 5)

B. (–1, 6)

C. (1, 6)

D. (6, –5)



ck all points to see if they would be on the circle.

6. What value should be added in the blanks to complete the square?

$x^2 + 8x + \_\_\_ + y^2 + 10y + 25 = -15 + \_\_\_$

$(8/2)^2 = (4)^2 = 16$

(A) 4 (B) 8 (C) 16 (D) 64

7-11. Match each equation with the description of the circle it represents.

F 7. $(x-4)^2 + (y-5)^2 = 4$

A 8. $(x+7)^2 + (y-2)^2 = 9$

H 9. $x^2 - 10x + y^2 - 8y = -39$

E 10. $x^2 + 8x + y^2 + 10y = -25$

D 11. $x^2 - 4x + y^2 + 14y = -50$

A center: (–7, 2); radius 3

B center: (–7, –2); radius $\sqrt{3}$

C center: (–2, 7); radius 3

D center: (2, –7); radius $\sqrt{3}$

E center: (–4, –5); radius 4

F center: (4, 5); radius 2

G center: (5, –4); radius $\sqrt{2}$

H center: (5, 4); radius $\sqrt{2}$

12. The graph of the equation $x^2 + 6x + y^2 - 8y = -9$ is a circle.

a. Complete the square and then write the equation in the form $(x-h)^2 + (y-k)^2 = r^2$. Show your work.

$x^2 + 6x + \underline{9} + y^2 - 8y + \underline{16} = -9 + \underline{9} + \underline{16}$

$(6/2)^2 = (3)^2 \qquad \left(\frac{-8}{2}\right)^2 = (-4)^2$

$(x+3)^2 + (y-4)^2 = 16$

b. Describe the center and radius of the circle.

center $(-3, 4)$

radius $= 4$