

circle at $(0,0)$ $x^2 + y^2 = r^2$ / circle at $c(h,k)$ $(x-h)^2 + (y-k)^2 = r^2$
 ↓ x-coord → y-coord

Identify the center and radius of each.

1) $(x - \frac{13}{2})^2 + (y - \sqrt{217})^2 = 13$

Center: $(\frac{13}{2}, \sqrt{217})$

Radius $\sqrt{13}$

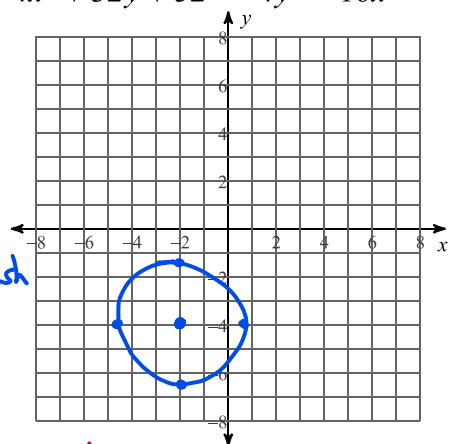
2) $(x + 6)^2 + (y - 12)^2 = 49$

C: $(-6, 12)$

r 7

Identify the center and the radius. Then graph the circle.

3) $4x^2 + 32y + 52 = -4y^2 - 16x$



$\sqrt{7} \approx 2.64$

$$4x^2 + 16x + 16 + 4y^2 + 32y + 64 = -52 + 16 + 64$$

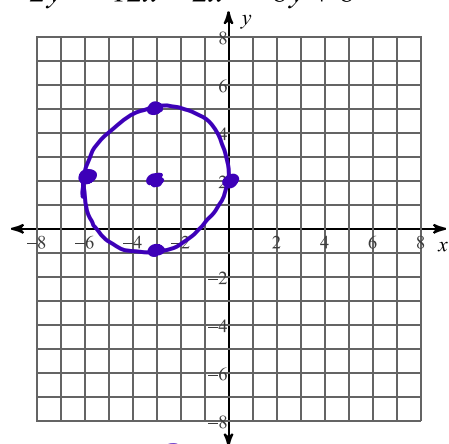
$$4(x^2 + 4x + 4) + 4(y^2 + 8y + 16) = 28$$

$$\frac{4}{4}(x+2)^2 + \frac{4}{4}(y+4)^2 = \frac{28}{4}$$

$$(x+2)^2 + (y+4)^2 = 7$$

C $(-2, -4)$ r $\sqrt{7}$

4) $-2y^2 - 12x = 2x^2 - 8y + 8$



$$-8 = 2x^2 + 12x + 18 + 2y^2 - 8y + 8$$

$$-18 = 2(x^2 + 6x + 9) + 2(y^2 - 4y + 4)$$

$$\frac{-18}{2} = \frac{2}{2}(x+3)^2 + \frac{2}{2}(y-2)^2$$

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

C $(-3, 2)$ r 3

Use the information provided to write the standard form equation of each circle.

5) Center: $\left(-9, -\frac{11}{2}\right)$

Circumference: 10π

$$(x+9)^2 + \left(y + \frac{11}{2}\right)^2 = r^2$$

$$10\pi = 2\pi r$$

$$\text{So } r = 5$$

$$(x+9)^2 + \left(y + \frac{11}{2}\right)^2 = 25$$

6) Center: $(8, 15)$

Point on Circle: $(7, 13)$

$$(x-8)^2 + (y-15)^2 = r^2$$

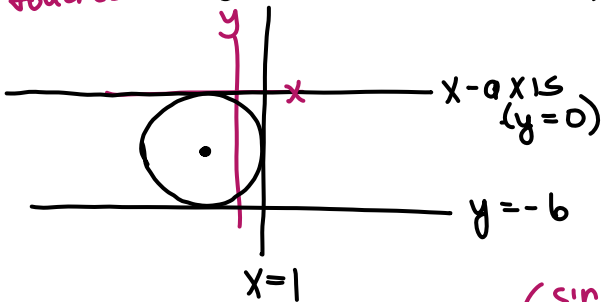
$$(7-8)^2 + (13-15)^2 = r^2$$

$$(-1)^2 + (-2)^2 = 1+4 = 5 = r^2$$

$$(x-8)^2 + (y-15)^2 = 5$$

7) Center lies in the third quadrant

touches \leftarrow Tangent to the x -axis, $x = 1$, and $y = -6$



radius has to be $= 3$ (since diameter $= 6$)

y -coordinate of center $= -3$ (halfway between 0 and -6)

x -coordinate of center $= -2$ (since 3 units left of $x=1$ is -2)

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

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

8) Three points on the circle:
 (16, 1), (8, -9), and (-2, -1)

$$(16-h)^2 + (1-k)^2 = r^2 \rightarrow 256 - 32h + h^2 + 1 - 2k + k^2 = r^2$$

$$(8-h)^2 + (-9-k)^2 = r^2 \rightarrow (64 - 16h + h^2 + 81 + 18k + k^2 = r^2)$$

$$(-2-h)^2 + (-1-k)^2 = r^2 \quad \underline{192 - 16h - 80 - 20k = 0}$$

$$\begin{array}{r} 4 + 4h + h^2 + 1 + 2k + k^2 = r^2 \\ - (64 - 16h + h^2 + 81 + 18k + k^2 = r^2) \end{array}$$

$$(192 - 16h - 80 - 20k = 0) \div 4$$

$$(-60 + 20h - 80 - 16k = 0) \div 4$$

$$-60 + 20h - 80 - 16k = 0$$

to simplify my life

$$(48 - 4h - 20 - 5k = 0) \cdot 5$$

$$(-15 + 5h - 20 - 4k = 0) \cdot 4$$

$$\rightarrow 140 - 20h - 25k = 0$$

$$\begin{array}{r} + \\ + \end{array} \rightarrow -140 + 20h - 16k = 0$$

$$\underline{0 + 0 - 41k = 0}$$

$$\boxed{k=0}$$

choose an eq to plug in $k=0$

$$48 - 4h - 20 - 5(0) = 0$$

$$28 - 4h = 0$$

$$28 = 4h$$

$$\boxed{h=7}$$

Now find r

$$(-2-7)^2 + (-1-0)^2 = r^2$$

$$(-9)^2 + (-1)^2 = r^2$$

$$81 + 1 = r^2$$

$$\boxed{82 = r^2}$$

$$\boxed{(x-7)^2 + y^2 = 82}$$