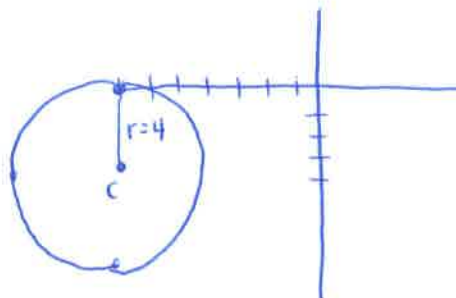


1. Write the equation of a circle with center at $(-7, -4)$ and is tangent to the x -axis.

radius = 4

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

$$(x+7)^2 + (y+4)^2 = 16$$

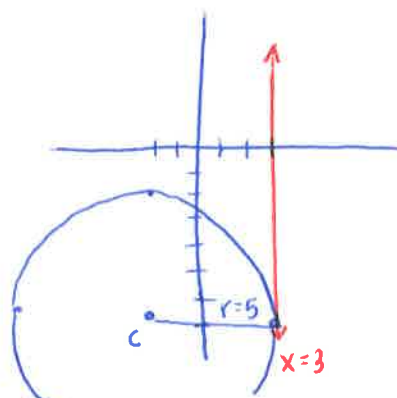


2. Write the standard form of the equation of the circle that is tangent to the line $x=3$ and has center at $(-2, -7)$.

radius = 5

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

$$(x+2)^2 + (y+7)^2 = 25$$



3. A circle is tangent to the y -axis at $y=3$ and has an x -intercept at $x=1$. Determine the equation of the circle.

$(0, 3)$

Center: tangent: (h, k) and (x, y)

$$(0 - x)^2 + (3 - 3)^2 = r^2$$

$$x^2 + 0^2 = r^2$$

$$x^2 = r^2$$

Center: intercept: (h, k) and (x, y)

$$(1 - x)^2 + (0 - 3)^2 = r^2$$

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

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

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

$$1 - 2x + x^2 + 9 = x^2$$

$$1 - 2x + 9 = 0$$

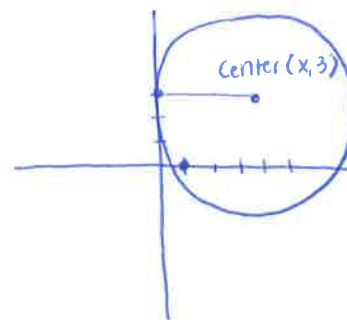
$$-2x + 10 = 0$$

$$-2x = -10$$

$$x = 5$$

center $(5, 3)$ so $r = 5$

$$(x - 5)^2 + (y - 3)^2 = 25$$



4. Please write the equation of a circle that passes through the origin, has an x -intercept at 1 and a y -intercept at 2.

$(0, 2)$

$(0, 0)$

$(1, 0)$

$$(0, 0): (0 - h)^2 + (0 - k)^2 = r^2$$

$$h^2 + k^2 = r^2$$

$$(1, 0): (1 - h)^2 + (0 - k)^2 = r^2$$

$$(1 - h)^2 + k^2 = r^2$$

$$(0, 2): (0 - h)^2 + (2 - k)^2 = r^2$$

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

$$\frac{h^2 + k^2}{-k^2} = \frac{(1-h)^2 + k^2}{-k^2}$$

$$h^2 = (1-h)(1-h)$$

$$\frac{h^2}{-h^2} = \frac{1-2h+h^2}{-h^2}$$

$$0 = 1 - 2h$$

$$2h = 1$$

$$h = \frac{1}{2}$$

Eqs 1 & 3:

$$h^2 + k^2 = h^2 + (2 - k)^2$$

$$\left(\frac{1}{2}\right)^2 + k^2 = \left(\frac{1}{2}\right)^2 + (2 - k)^2$$

$$\frac{1}{4} + k^2 = \frac{1}{4} + (2 - k)(2 - k)$$

$$\frac{1}{4} + k^2 = \frac{1}{4} + (2 - k)(2 - k)$$

$$\frac{1}{4} + k^2 = \frac{1}{4} + 4 - 4k + k^2$$

$$0 = 4 - 4k$$

$$4k = 4$$

$$k = 1$$

To find r :

$$h^2 + k^2 = r^2$$

$$\left(\frac{1}{2}\right)^2 + 1^2 = r^2$$

$$\frac{1}{4} + \frac{4}{4} = r^2$$

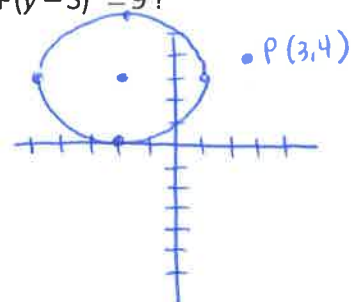
$$\frac{5}{4} = r^2$$

$$\left(x - \frac{1}{2}\right)^2 + (y - 1)^2 = \frac{5}{4}$$

4. Is the point $P(3,4)$ inside, outside, or on the circle with equation $(x+2)^2 + (y-3)^2 = 9$?

The point is outside the circle

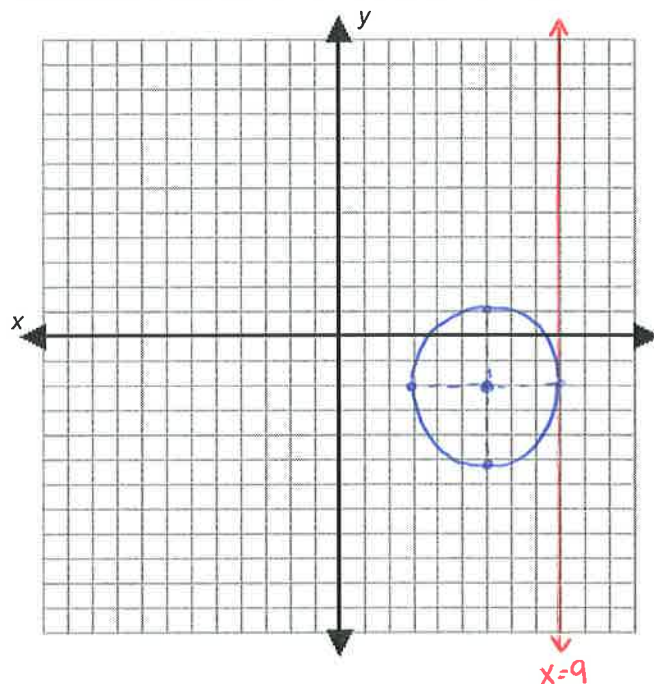
center $(-2, 3)$ radius $= \sqrt{9} = 3$



5. Given the equation of the circle $(x-6)^2 + (y+2)^2 = 9$, determine if the line $x=9$ is a tangent to the circle, a secant to the circle, or neither.

center $(6, -2)$
radius $= \sqrt{9} = 3$

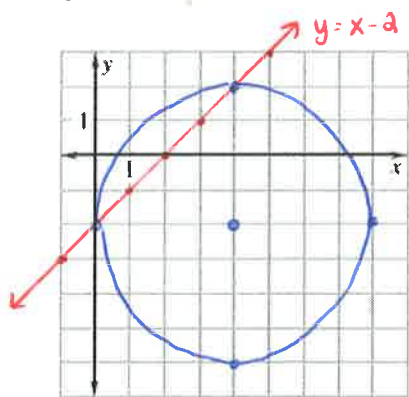
Since the line hits the circle at exactly one point, the line $x=9$ is tangent to the circle



- Graph the circle $(x-4)^2 + (y+2)^2 = 16$ and the line with the given equation. Determine whether the line is a tangent or a secant.

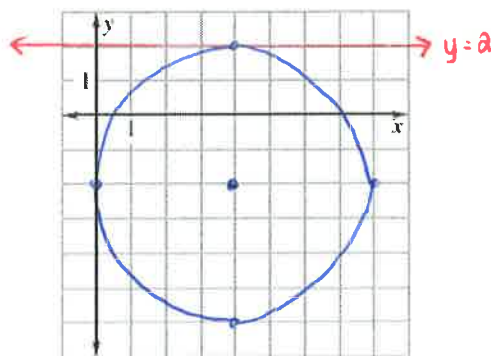
center $(4, -2)$
radius $= \sqrt{16} = 4$

6. $y = x - 2$



The line $y = x - 2$ is secant

7. $y = 2$



The line $y = 2$ is tangent