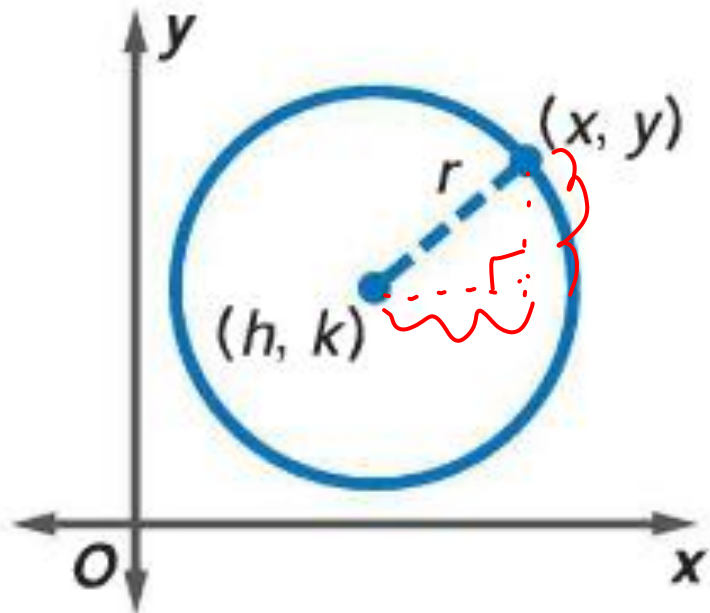


Equations of Circles

Equation of a Circle in Standard Form

The standard form of the equation of a circle with center at (h, k) and radius r is

$$\underline{(x - h)^2 + (y - k)^2 = r^2.}$$



Examples

Write the equation of the circle.

center at $(1, -8)$, radius 7

$$(x-h)^2 + (y-k)^2 = r^2$$
$$(x-1)^2 + (y+8)^2 = 49$$

Examples

Write the equation of the circle.

center at (1,-8), radius 7

$$h = 1, k = -8, r = 7$$

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

$$(x - 1)^2 + (y + 8)^2 = 49$$

Examples

Write the equation of the circle.

center at $(4, -1)$, diameter 8

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

$$(x-4)^2 + (y+1)^2 = 16$$

Examples

Write the equation of the circle.

center at $(4, -1)$, diameter 8

$$h = 4, k = -1, r = 4$$

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

$$(x - 4)^2 + (y + 1)^2 = 16$$

Examples

Write the equation of the circle.

center at (-2,4), passes through point (-6,7)

$$4^2 + 3^2 = 5^2$$

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

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

Examples

Write the equation of the circle.

center at $(-2,4)$, passes through point $(-6,7)$

$$h = -2, k = 4, r = 5$$

radius: 4 units in x-direction, 3 units in y-direction

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

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

Examples

Three tornado sirens are placed strategically around a town so they can be heard by all. Write the equation of the circle if the coordinates of the sirens are $A(-8,3)$, $B(-4,7)$, and $C(-4,-1)$.

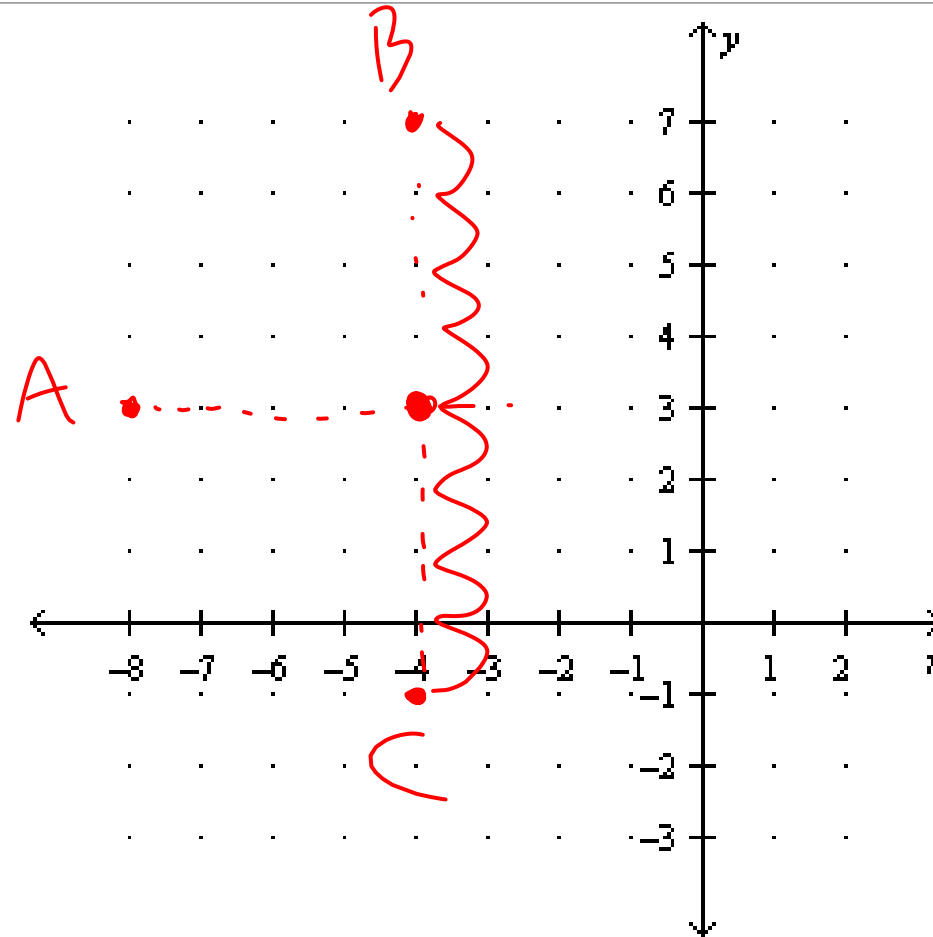
$$(x-h)^2 + (y-k)^2 = r^2$$

center $(-4, 3)$ $r^2 = (-4 + 8)^2 = 4^2 = 16$

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



Examples



h	k	r
$(-4, 3)$		4

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

Examples

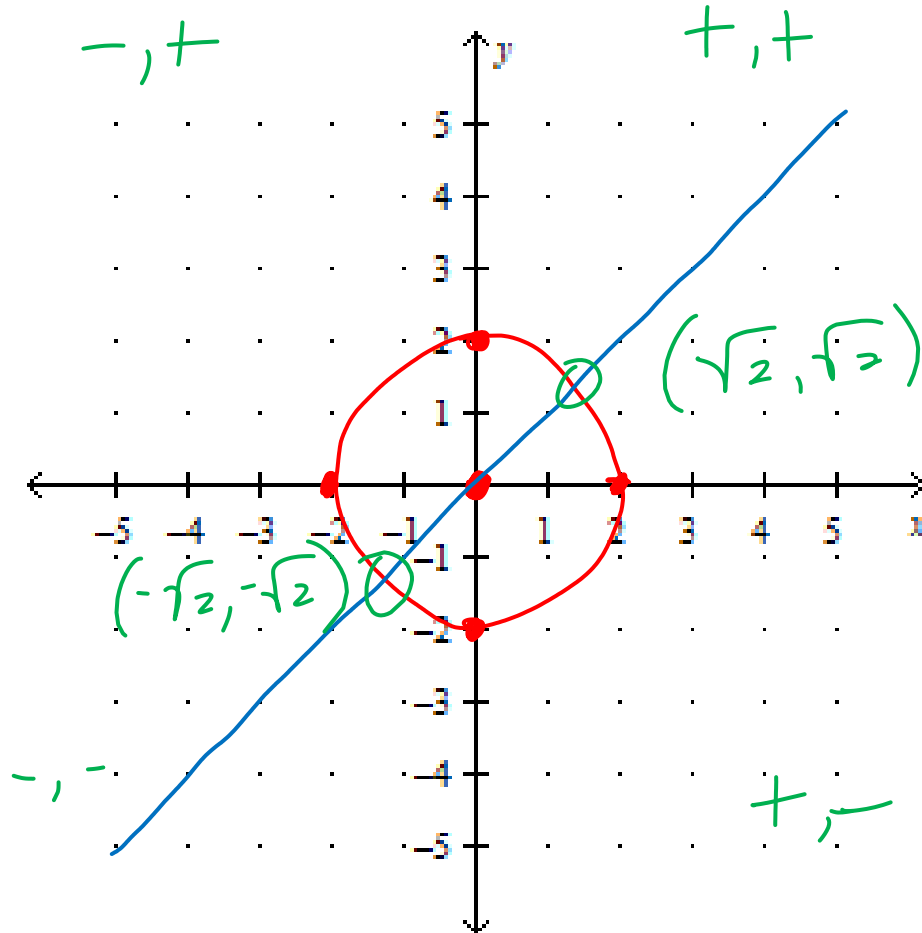
Find the point(s) of intersection between

$x^2 + y^2 = 4$ and $y = x$

$(0, 0)$

$x^2 + x^2 = 4$
 $2x^2 = 4$
 $x^2 = 2$
 $x = \pm\sqrt{2}$

$y^2 + y^2 = 4$
 $2y^2 = 4$
 $y^2 = 2$
 $y = \pm\sqrt{2}$



Examples

Find the point(s) of intersection between

$$x^2 + y^2 = 4 \text{ and } y = x$$

$$x^2 + x^2 = 4$$

$$2x^2 = 4$$

$$x^2 = 2$$

$$\sqrt{x^2} = \pm\sqrt{2}$$

$$x = \pm\sqrt{2}$$

substitute $y = x$

add

divide both sides by 2

take square roots

simplify

