

Graphing Circles

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**Mathematics Enrichment
through Technology**



Standard form of an equation of a circle

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

where (h,k) is the center of the circle and r is the radius

General form of the equation of a circle

$$x^2 + y^2 + ax + by + c = 0$$

where a , b , and c are variables

Graphing a circle whose equation is in general form

$$x^2 + y^2 - 6x + 2y + 9 = 0$$

Since the equation given is in the general form, completing the square will be used. By completing the square, the equation can then be set-up in the standard form of an equation of a circle therefore, identifying its center and radius.

$$x^2 + y^2 - 6x + 2y + 9 = 0$$

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

$$(x^2 - 6x + 9) + (y^2 + 2y + 1) = -9 + 9 + 1$$

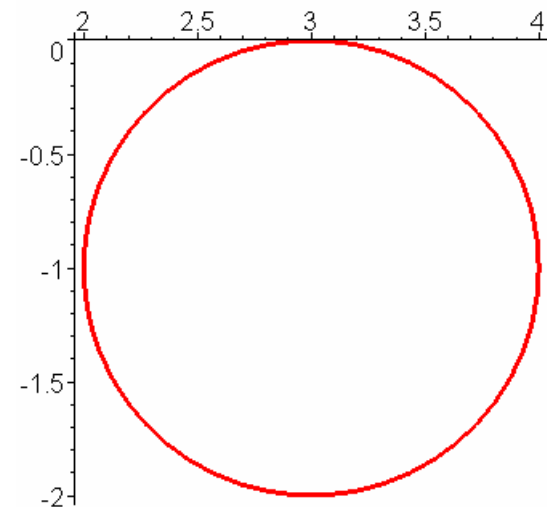
$$(x - 3)^2 + (y + 1)^2 = 1$$

$$(x - 3)^2 + (y - (-1))^2 = 1^2$$

Center (3,-1)

Radius 1

Since the radius = 1, use the center (3,-1) as a reference point and then move 1 point to the left, right, up and down.



Graph the following equation

$$x^2 + y^2 + 6x + 4y + 9 = 0$$

$$x^2 + y^2 + 6x + 4y + 9 = 0$$

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

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

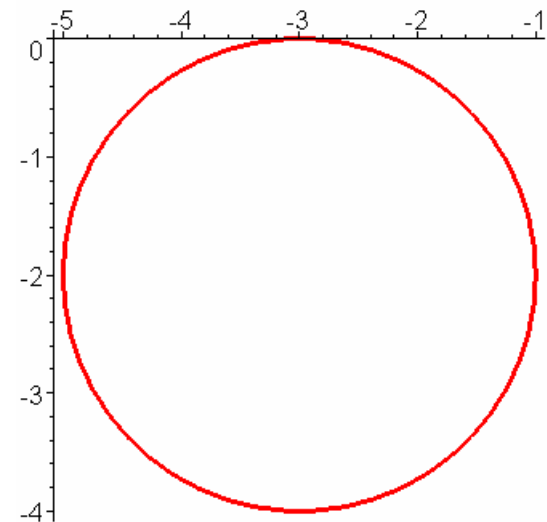
$$(x + 3)^2 + (y + 2)^2 = 4$$

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

Center (-3,-2)

Radius 2

Since the radius = 2, use the center (-3,-2) as a reference point and then move 2 points to the left, right, up and down.



Graph the following equation

$$x^2 + y^2 + x + y - \frac{1}{2} = 0$$

$$x^2 + y^2 + x + y - \frac{1}{2} = 0$$

$$(x^2 + x) + (y^2 + y) = \frac{1}{2}$$

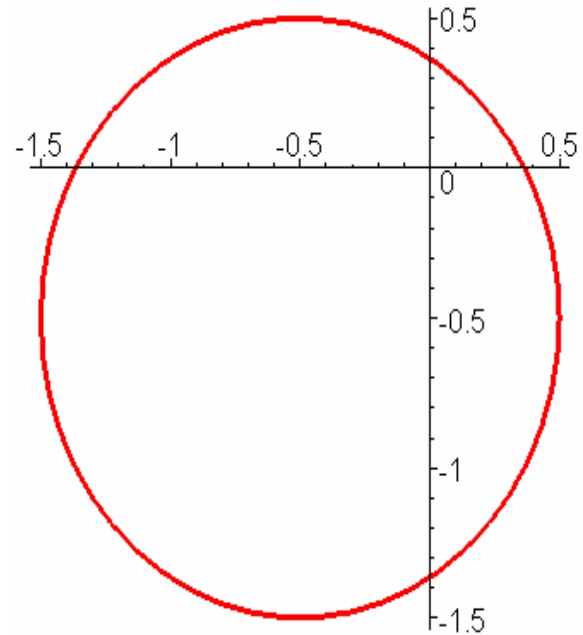
$$\left(x^2 + x + \frac{1}{4}\right) + \left(y^2 + y + \frac{1}{4}\right) = \frac{1}{2} + \frac{1}{4} + \frac{1}{4}$$

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

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

Center $\left(-\frac{1}{2}, -\frac{1}{2}\right)$
Radius 1

Since the radius = 1,
use the center $\left(-\frac{1}{2}, -\frac{1}{2}\right)$
as a reference point
and then move 1
point to the left,
right, up and down.



Graph the following equation

$$2x^2 + 2y^2 + 8x + 7 = 0$$

$$2x^2 + 2y^2 + 8x + 7 = 0$$

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

$$2(x^2 + 4x + 4) + 2y^2 = -7 + 8$$

$$2(x + 2)^2 + 2y^2 = 1$$

$$\frac{2(x + 2)^2}{2} + \frac{2y^2}{2} = \frac{1}{2}$$

$$(x + 2)^2 + y^2 = \frac{1}{2}$$

$$(x - (-2))^2 + (y - 0)^2 = \frac{1}{2}$$

Recall: 8
was
obtained
when
multiplied
by 2 and 4

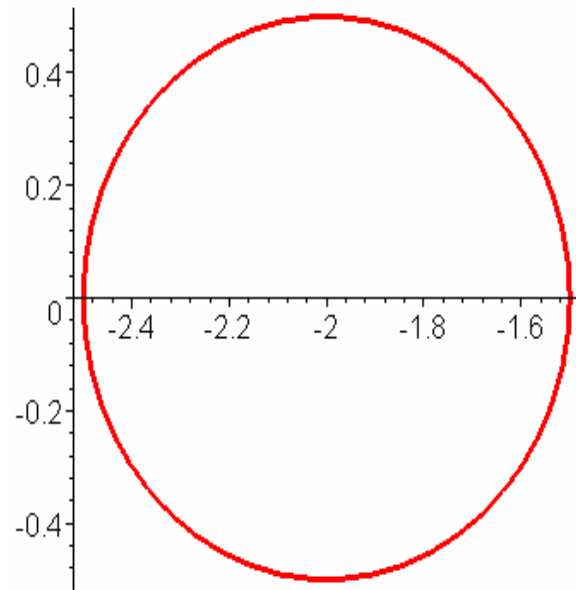
Center $(-2, 0)$

Radius $\frac{1}{2}$

Since the radius $=\frac{1}{2}$,

use the center $(-2, 0)$

as a reference point and
then move $\frac{1}{2}$ point to the
left, right, up and down.



Congratulations!!

You just completed
Graphing Circles