

Feb 28-11:38 AM

The Equation of a Circle
in Standard Position

Oct 4/2011

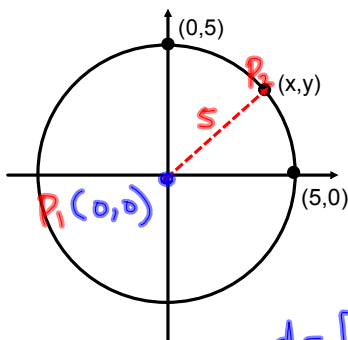
Circle: The set of all points that are equidistant from a reference point (the centre).

Standard Position: The centre of the circle is at the origin (0, 0).

We can use this definition, along with the distance formula, to determine the equation of a circle.

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Suppose we have a circle with a radius of 5, so every point on the circle is 5 units from the origin.



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$5 = \sqrt{(x - 0)^2 + (y - 0)^2}$$

$$5 = \sqrt{x^2 + y^2}$$

$$(5)^2 = (\sqrt{x^2 + y^2})^2$$

$$25 = x^2 + y^2$$

$$\text{or } x^2 + y^2 = 25$$

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In general, a circle has a radius, r , and the equation of a circle in standard position is:

$$x^2 + y^2 = r^2$$

Ex. 1. Write the equation of a circle in standard position with:

(a) $r = 2$

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

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

(b) $r = 3\frac{1}{5}$

$$= \frac{16}{5}$$

$$x^2 + y^2 = \left(\frac{16}{5}\right)^2$$

$$x^2 + y^2 = \frac{256}{25}$$

$$3 + \frac{1}{5} = \frac{16}{5}$$

$$\begin{aligned} 3\frac{1}{5} &= 3 + \frac{1}{5} \\ &= \frac{15}{5} + \frac{1}{5} \\ &= \frac{16}{5} \end{aligned}$$

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Ex.2 What is the radius of each circle?

(a) $x^2 + y^2 = 49$

(b) $x^2 + y^2 = 37$

$$x^2 + y^2 = r^2$$

$$r^2 = 49$$

$$r = \pm \sqrt{49}$$

$$r = \pm 7$$

but distances
are positive

$$\therefore r = 7$$

$$r^2 = 37$$

$$r = \pm \sqrt{37}$$

distance is positive

$$\therefore r = \sqrt{37}$$

$$r = 6.08$$

Skip
for
now

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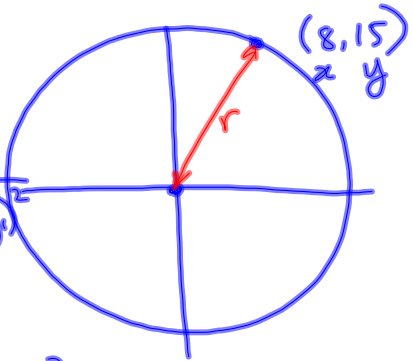
Assigned Work:

p.91-92 # 1, 2, 3a, 4, 5, 6, 8

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5.

(a) $r = ?$



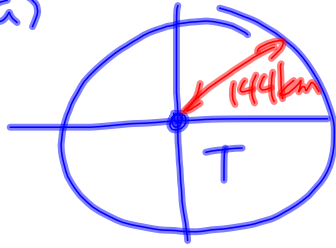
① $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

② $x^2 + y^2 = r^2$
 $(8)^2 + (15)^2 = r^2$
 $64 + 225 = r^2$
 $289 = r^2$
 $r = 17$

(b) $x^2 + y^2 = 17^2$
 $x^2 + y^2 = 289$

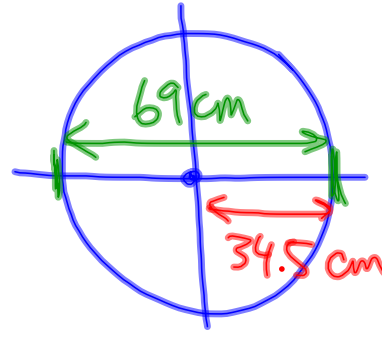
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8. (a)



$x^2 + y^2 = (144)^2$
 $x^2 + y^2 = 20736$

(c)



$x^2 + y^2 = (34.5)^2$
 $x^2 + y^2 = \left(\frac{69}{2}\right)^2$
 $x^2 + y^2 = \underline{\hspace{2cm}}$

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