

September 22, 2017

Circles

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

- Center:  $(h, k)$
- Radius:  $r$

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

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Ways to Solve Quadratics

① To factor

$$x^2 - x - 12 = 0$$

$$(x-4)(x+3) = 0$$

② Square Root Property

- $x^2 + 9 = 0$
$$\sqrt{x^2} = \pm\sqrt{-9}$$

$$x = \pm 3i$$
- $(x+2)^2 - 5 = 0$
$$\sqrt{(x+2)^2} = \pm\sqrt{5}$$

$$x+2 = \pm\sqrt{5}$$

$$x = -2 \pm \sqrt{5}$$

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③ Completing the Square

$ax^2 + bx + c = 0$

\* solve for  $x$

Can solve any quadratic

④ Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sep 22-8:15 AM

Completing the Square

uses

- ① To solve quadratics
- ② To convert an equation of a circle from general form to standard form.
- ③ To write a quadratic equation in standard form to vertex form.

$$ax^2 + bx + c = 0$$

↓

$$(x-h)^2 + k = 0$$
 Vertex Form
 

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$$\frac{ax^2 + bx + c}{a} = 0$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$x^2 + \frac{b}{a}x = -\frac{c}{a}$$

①  $\frac{b}{a} \cdot \frac{1}{2} = \frac{b}{2a}$

②  $(\frac{b}{2a})^2 = \frac{b^2}{4a^2}$  *add it to both sides*

$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{c}{a} + \frac{b^2}{4a^2}$$

*Perfect Square Trinomial*

$$\sqrt{(x + \frac{b}{2a})^2} = \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$x + \frac{b}{2a} = \pm \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$= \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

$$x + \frac{b}{2a} = \frac{\sqrt{b^2 - 4ac}}{2a}$$

$$- \frac{b}{2a} \quad - \frac{b}{2a}$$

$$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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