

TOPIC: THE SQUARE ROOT PROPERTY

Using the Square Root Property

◆ Recall: A quadratic equation in standard form is:

Recall

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

► When we can't solve a quadratic by _____, we need to use other methods.

New

Square Root Property

$$\text{If } x^2 = k$$

$$\text{then } x =$$

$$x^2 = 16$$

Use if: $ax^2 + c = 0$ ($b = \underline{\hspace{1cm}}$)

OR $(x + h)^2 = k$

EXAMPLE

Solve the quadratic equation using the square root property.

$$(A) \ 4x^2 - 8 = 0$$

$$(B) \ (x + 1)^2 = 4$$

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PRACTICE

Solve each quadratic equation using the square root property.

(A) $2y^2 = 54$

(B) $3x^2 + 3 = 51$

(C) $(2z - 3)^2 = 16$

EXAMPLE

If Ethan drops his drone from a height of 58 meters, how long will it take before it hits the ground?

Use $h = 9.8t^2$, where h is the height (in feet) and t is the time (in seconds).

EXAMPLE

The area of a square garden is 196 ft^2 . What is the length of one side of the garden?

EXAMPLE

Ava is building a ramp that forms a right triangle with the ground. The ramp is 19 ft long (the hypotenuse), and the height from the ground to the platform is 6 ft. How long is the base of the ramp along the ground?

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Imaginary Solutions

◆ When using the square root property, you may get _____ (or complex) solutions. (e.g. $x = \pm\sqrt{-1} = \pm i$)

EXAMPLE

Solve the given quadratic equation using the square root property.

$$2x^2 + 32 = 0$$

Recall

If $x^2 = k$
then $x = \pm\sqrt{k}$

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PRACTICE

Solve each quadratic equation. If roots are not real, use i .

(A) $2x^2 + 18 = 0$

(B) $\frac{w^2}{4} + 8 = 0$

(C) $(3z - 1)^2 + 5 = 0$