TOPIC: THE SQUARE ROOT PROPERTY

Using the Square Root Property

◆ Recall: A quadratic equation in standard form is: $\boxed{ax^2 + bx + c = 0}$

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

New — **Square Root Property**

If $\quad x^2 = k$

then $\quad x =$

$x^2 = 16$

_____

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

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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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 ft². 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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Solve each quadratic equation. If roots are not real, use i.

(A)

$2x^2 + 18 = 0$

(B)

$\dfrac{w^2}{4} + 8 = 0$

(C)

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