

## Simple Quadratic Equations Extension

### Example Problems

EXAMPLE 1: Solve the following quadratic equation,

$$(4x)^2 = 64.$$

SOLUTION: The first important thing is to notice that because the  $4x$  is surrounded by brackets, which means we first need to square root both sides,

$$\begin{aligned}\sqrt{(4x)^2} &= \sqrt{64}, \\ 4x &= \pm 8.\end{aligned}$$

Next to simplify  $4x$  into  $x$  we need to divide by 4, but we need to remember that  $\pm 8$  really represents 8 or  $-8$ . Because of this when we divide by 4 we need to do it to both of the values on the RHS,

$$\begin{aligned}\frac{4x}{4} &= \frac{-8}{4}, \frac{8}{4}, \\ x &= -2, 2.\end{aligned}$$

Then once again we can simplify  $-2, 2$  into  $\pm 2$  and so

$$x = \pm 2.$$

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EXAMPLE 2: Solve the following equation,

$$(x - 4)^2 = 49.$$

SOLUTION: First we need to square root both sides of the equation,

$$\begin{aligned}\sqrt{(x - 4)^2} &= \sqrt{49}, \\ x - 4 &= \pm 7.\end{aligned}$$

Next we will add 4 to both sides, but with addition and subtraction it is even more important we separate  $\pm 7$  into  $-7$  and  $7$ ,

$$\begin{aligned}x - 4 + 4 &= -7 + 4, 7 + 4, \\x &= -3, 11.\end{aligned}$$

Notice that because of the last step we have two different solutions that cannot be combined using the  $\pm$  symbol, so we will just leave them separate.

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EXAMPLE 3: Solve the following equation,

$$3x + 4 = \frac{25}{3x + 4}.$$

SOLUTION: First we have  $x$  on both sides of the equation, which we need to rectify. Since  $3x + 4$  is the denominator of the fraction on the RHS, we can multiply both sides by  $3x + 4$ .

## Question Bank

NOTE: Any questions where you get a decimal as an answer can be rounded to 2 decimal places.

1. Solve the following equations.

(a) .

## Answers

1. (a)  $x = \pm 3$