

Level 4: Algebra 3

1) In Level 3 we learned how to solve equations, for example: -

$$\begin{aligned} \text{a) } 3x + 7 &= 31 \\ 3x &= 24 \\ x &= 8 \end{aligned}$$

Subtract seven from both sides.
Divide both sides by three.

$$\begin{aligned} \text{b) } 9x - 12 &= 51 \\ 9x &= 63 \\ x &= 7 \end{aligned}$$

Add twelve to both sides.
Divide both sides by nine.

$$\begin{aligned} \text{c) } 8x + 2 &= 5x + 14 \\ 3x + 2 &= 14 \\ 3x &= 12 \\ x &= 4 \end{aligned}$$

Subtract $5x$ from both sides.
Subtract two from both sides.
Divide both sides by three.

2) Later in Level 3 we learned more about fractions and learned how to work with negative numbers. This knowledge can be applied to solving equations, for example: -

$$\begin{aligned} \text{a) } 4x + 5 &= 31 \\ 4x &= 26 \\ x &= \frac{26}{4} = \frac{13}{2} = 6\frac{1}{2} \end{aligned}$$

Subtract five from both sides.
Divide both sides by four then simplify the top-heavy fraction and re-write it as a mixed number.

$$\begin{aligned} \text{b) } 9x - 3 &= 5 \\ 9x &= 8 \\ x &= \frac{8}{9} \end{aligned}$$

Add three to both sides.
Divide both sides by nine. No further work required on the fraction.

$$\begin{aligned} \text{c) } 8x + 20 &= 4 \\ 8x &= -16 \\ x &= -2 \end{aligned}$$

Subtract 20 from both sides.
Divide both sides by eight.

3) Learn how to solve an equation with brackets, for example: -

$$4(2x + 1) + 10 = 29$$

$$8x + 4 + 10 = 29$$

$$8x + 14 = 29$$

$$8x = 15$$

$$x = \frac{15}{8} = 1\frac{7}{8}$$

Multiply out brackets.

Simplify.

Subtract 14 from both sides.

Divide by 8 and change to mixed number.

$$2(3x + 1) + 2(2x - 3) = -24$$

$$6x + 2 + 4x - 6 = -24$$

$$10x - 4 = -24$$

$$10x = -20$$

$$x = -2$$

Multiply out brackets.

Simplify.

Add four to both sides.

Divide both sides by ten.

$$3x + 2(2x - 3) = 2(2x + 10) - 5$$

$$3x + 4x - 6 = 4x + 20 - 5$$

$$7x - 6 = 4x + 15$$

$$3x - 6 = 15$$

$$3x = 21$$

$$x = 7$$

Multiply out brackets.

Simplify both sides.

Subtract 4x from both sides.

Add six to both sides.

Divide both sides by three.