

Unit 8 Solving Equations & Inequalities

8.0 Equation Solving With Integers

Recall: To **solve** an equation means to find the value of the variable which satisfies the equation
[Reviewed in 6.0 already]

Ex. Solve: $2x + 6 = 20$

$$\begin{array}{r} 2x + 6 = 20 \\ -6 \quad -6 \\ \hline 2x = 14 \\ \frac{2}{2} \quad \frac{2}{2} \\ \hline x = 7 \end{array}$$

* isolate variable

* opposite operations on both sides

Equations with Variable on Both Sides

Ex. Solve:

a) $8x = 3x - 15$

$$\begin{array}{r} 8x = 3x - 15 \\ -3x \quad -3x \\ \hline 5x = -15 \\ \frac{5}{5} \quad \frac{5}{5} \\ \hline x = -3 \end{array}$$

* isolate variable terms from constant terms

b) $6x - 5 = 2x + 7$

$$\begin{array}{r} 6x - 5 = 2x + 7 \\ -2x \quad -2x \quad +5 \quad +5 \\ \hline 4x = 12 \\ \frac{4}{4} \quad \frac{4}{4} \\ \hline x = 3 \end{array}$$

work slow!

c) $-5 - 8t = -9t - 7$

$$\begin{array}{r} -5 - 8t = -9t - 7 \\ +9t \quad +9t \quad +5 \quad +5 \\ \hline t = -2 \end{array}$$

d) $-5m - 2 = 3m - 2$

$$\begin{array}{r} -5m - 2 = 3m - 2 \\ +8m \quad +8m \\ \hline 8m = 0 \\ \frac{8}{8} \quad \frac{8}{8} \\ \hline m = 0 \end{array}$$

e) $z - 2 = 2z - 4$

$$\begin{array}{r} z - 2 = 2z - 4 \\ -z \quad -z \\ \hline -1z = -2 \\ \frac{-1}{-1} \quad \frac{-2}{-1} \\ \hline z = 2 \end{array}$$

* $-9 = 5$
 $9 = -5$

$-b = -8$
 $b = 8$

Unsimplified Equations

Ex. Solve:

a) $3(a - 3) + 7 = 5a - 8 - 4a$

$$3a - 9 + 7 =$$

$$3a - 2 = a - 8$$

$$2a = -6$$

$$a = -3$$

* simplify each side separately
↳ distribute, like terms

b) $7 - 3(5t - 10) = 67$

$$7 - 15t + 30 =$$

$$37 - 15t = 67$$

$$-15t = 30$$

$$t = -2$$

c) $6p - (5p + 5) = -8 - 2(p + 12)$

$$6p - 5p - 5 = -8 - 2p - 24$$

$$p - 5 = -2p - 32$$

$$3p = -27$$

$$p = -9$$