

# Equations Challenge Answer Key

1.  $5x + 3 + 2x - 6x = 4 + 12$

$$\begin{array}{r} x + 3 = 16 \\ -3 \quad -3 \\ \hline x = 13 \end{array}$$

2.  $2t + 6 = 2(t + 4)$

$$\begin{array}{r} 2t + 6 = 2t + 8 \\ -2t \quad -2t \\ \hline 6 \neq 8 \leftarrow \text{different} \end{array}$$

NO solutions

3.  $4(w - 3) - w = w - 6$

$$\begin{array}{r} 4w - 12 - w = w - 6 \\ 3w - 12 = w - 6 \\ -w \quad -w \\ \hline 2w - 12 = -6 \\ +12 \quad +12 \\ \hline 2w = 6 \end{array}$$

$$\frac{2w}{2} = \frac{6}{2}$$

$$w = 3$$

4.  $5y - 15 = 5(y - 3)$

$$\begin{array}{r} 5y - 15 = 5y - 15 \\ -5y \quad -5y \\ \hline -15 = -15 \leftarrow \text{same} \end{array}$$

Infinite solutions

6.  $2(a - 4) + 5a = -22$

$$2a - 8 + 5a = -22$$

$$7a - 8 = -22$$

$$\begin{array}{r} 7a - 8 = -22 \\ +8 \quad +8 \\ \hline 7a = -14 \\ \hline a = -2 \end{array}$$

$$a = -2$$

5.  $6(4k - 1) = 12(2k + 3)$

$$\begin{array}{r} 24k - 6 = 24k + 36 \\ -24k \quad -24k \\ \hline -6 \neq 36 \leftarrow \text{different} \end{array}$$

NO solutions

NO solutions

7.  $3(6 - 4p) = 2(-6p + 4)$

$$\begin{array}{r} 18 - 12p = -12p + 8 \\ +12p \quad +12p \\ \hline 18 \neq 8 \leftarrow \text{different} \end{array}$$

NO solutions

8.  $3(b - 4) + 3 = -2b + 5b - 9$

$$3b - 12 + 3 = 3b - 9$$

$$3b - 9 = 3b - 9$$

$$\begin{array}{r} -3b \quad -3b \\ \hline -9 = -9 \leftarrow \text{same} \end{array}$$

Infinite solutions

9. Example:  $2x + 4 = 2x - 8$

10. Example:  $2x + 4 = 2x + 4$