

# Solving Equations, Part 2 Key

1a.  $-6(x-3) - 26 = -8$   
 $-6x + 18 - 26 = -8$   
 $-6x - 8 = -8$   
 $\quad + 8 \quad + 8$

$$\frac{-6x}{-6} = \frac{0}{-6} \Rightarrow \boxed{x = 0} \text{ conditional}$$

b.  $3(2 - 5x) + 4(6x) = 12$

$$6 - 15x + 24x = 12$$

$$6 + 9x = 12$$

$$\frac{-6}{-6} \quad \frac{-6}{-6}$$

$$\frac{9x}{9} = \frac{6}{9} \Rightarrow x = \frac{6}{9} = \boxed{\frac{2}{3}} \text{ conditional}$$

c.  $\frac{2}{3}x + \frac{4}{3} = -\frac{2}{3} \Rightarrow \frac{3}{1} \left( \frac{2}{3}x + \frac{4}{3} \right) = \frac{3}{1} \left( -\frac{2}{3} \right)$

$$\Rightarrow \frac{3}{1} \cdot \frac{2}{3}x + \frac{3}{1} \cdot \frac{4}{3} = \frac{3}{1} \left( -\frac{2}{3} \right)$$

$$2x + 4 = -2$$

$$\quad - 4 \quad - 4$$

$$\frac{2x}{2} = \frac{-6}{2} \Rightarrow \boxed{x = -3} \text{ conditional}$$

d.  $\frac{2(x+1)}{4} = 3x - 2 \Rightarrow \frac{4}{1} \cdot \frac{2(x+1)}{4} = 4(3x - 2)$

$$2x + 2 = 12x - 8$$

$$\frac{-12x}{-12x} \quad \frac{-12x}{-12x}$$

$$-10x + 2 = -8$$

$$\quad - 2 \quad - 2$$

$$-10x = -10$$

$$\frac{-10x}{-10} = \frac{-10}{-10}$$

$$\boxed{x = 1} \text{ conditional}$$

e.  $x + \frac{7}{6} = 2x - \frac{7}{6} \Rightarrow \frac{6}{1} \left( x + \frac{7}{6} \right) = \frac{6}{1} \left( 2x - \frac{7}{6} \right)$

$$6x + \frac{6}{1} \cdot \frac{7}{6} = 12x - \frac{6}{1} \cdot \frac{7}{6} \Rightarrow 6x + 7 = 12x - 7$$

$$\frac{-12x}{-12x} \quad \frac{-12x}{-12x}$$

$$\boxed{x = \frac{7}{3}} \text{ conditional}$$

$$-6x + 7 = -7$$

$$\quad - 7 \quad - 7 \Rightarrow \frac{-6x}{-6} = \frac{-14}{-6}$$



cont'd

$$f. 14x + 7 = 7(2x + 1) \Rightarrow 14x + 7 = 14x + 7$$

This expression is always true (an identity)

$$g. 3x - 7 = 3(x + 1) \Rightarrow \begin{array}{r} 3x - 7 = 3x + 3 \\ -3x \quad -3x \\ \hline -7 = 3 \end{array}$$

Contradiction

X has no solution

$$h. -2(6x - 5) + 4 = -12x + 14$$

$$-12x + 10 + 4 = -12x + 14$$

$$-12x + 14 = -12x + 14$$

identity

X is all real numbers

$$i. 2(x + 3) - 5 = 5x - 3(1 + x) \Rightarrow 2x + 6 - 5 = 5x - 3 - 3x$$

$$\Rightarrow \begin{array}{r} 2x + 1 = 2x - 3 \\ -2x \quad -2x \\ \hline 1 = -3 \end{array}$$

Contradiction

X has no solution

$$. 5y + 2(y - 6) = 4(y + 1) - 2 \Rightarrow 5y + 2y - 12 = 4y + 4 - 2$$

$$\Rightarrow \begin{array}{r} 7y - 12 = 4y + 2 \\ -4y \quad -4y \\ \hline 3y - 12 = 2 \end{array}$$

$$\begin{array}{r} 3y - 12 = 2 \\ +12 \quad +12 \\ \hline 3y = 14 \end{array}$$

$$\frac{3y}{3} = \frac{14}{3} \Rightarrow$$

$$\boxed{y = \frac{14}{3}}$$

Conditional

$$. \frac{5(x-1)}{4} = \frac{3(x+1)}{2} \Rightarrow$$

$$\frac{\cancel{4}}{1} \cdot \frac{5(x-1)}{\cancel{4}} = \frac{\cancel{4}^2}{1} \cdot \frac{3(x+1)}{\cancel{2}} \Rightarrow$$

$$5(x-1) = 6(x+1) \Rightarrow$$

$$\begin{array}{r} 5x - 5 = 6x + 6 \\ -6x \quad -6x \\ \hline -x - 5 = 6 \end{array}$$

$$\frac{-x}{-1} = \frac{11}{-1}$$

$$\boxed{x = -11}$$