

Distributive Property and Combining Like Terms

$$1) \quad 3(q-5) = 2(q+5)$$

$$3q - 15 = 2q + 10$$

$$\begin{array}{r} 3q - 15 \\ +15 \\ \hline 3q = 2q + 25 \\ -2q \quad -2q \\ \hline 1q = 25 \end{array}$$

$$1q = 25$$

$$3) \quad 7(6-2a) = 5(-3a+1)$$

$$42 - 14a = -15a + 5$$

$$\begin{array}{r} 42 - 14a \\ -5 + 14a \\ \hline 37 = -12 \end{array}$$

$$a = -37$$

$$5) \quad 6(3m+5) = 66$$

$$18m + 30 = 66$$

$$\begin{array}{r} 18m + 30 \\ -30 \quad -30 \\ \hline 18m = 36 \\ \hline 18 \quad 18 \end{array}$$

$$m = 2$$

$$7) \quad x - 2(x+10) = 12$$

$$x - 2x - 20 = 12$$

$$\begin{array}{r} -3x - 20 = 12 \\ +20 \quad +20 \\ \hline -3x = 32 \end{array}$$

$$\begin{array}{r} -3x = 32 \\ -3 \quad -3 \\ \hline x = -\frac{32}{3} \end{array}$$

$$x = -\frac{32}{3} \text{ or } -10\frac{2}{3}$$

$$2) \quad 8 - (3+b) = b - 9$$

$$8 - 3 - 1b = b - 9$$

$$\begin{array}{r} 8 - 3 - 1b \\ -1b \quad -5 \\ \hline -1b = b - 14 \end{array}$$

$$\begin{array}{r} -1b = b - 14 \\ -1b \quad -b \\ \hline -2b = -14 \end{array}$$

$$-2b = -14$$

$$b = 7$$

$$4) \quad (g+4) - 3g = 1+g$$

$$g+4-3g = 1+g$$

$$\begin{array}{r} -2g + 4 = 1 + g \\ -g \quad -4 \quad -4 \quad -g \\ \hline -3g = -3 \end{array}$$

$$-3g = -3$$

$$g = 1$$

$$6) \quad -5(x-3) = -25$$

$$\begin{array}{r} -5x + 15 = -25 \\ -15 \quad -15 \\ \hline -5x = -40 \end{array}$$

$$\begin{array}{r} -5x = -40 \\ -5 \quad -5 \\ \hline x = 8 \end{array}$$

$$x = 8$$

$$8) \quad -15 = 5(3q-10) - 5q$$

$$-15 = 15q - 50 - 5q$$

$$\begin{array}{r} -15 = 10q - 50 \\ +50 \quad +50 \\ \hline 35 = 10q \end{array}$$

$$\begin{array}{r} 35 = 10q \\ 10 \quad 10 \\ \hline q = 3.5 \end{array}$$

$$q = 3.5$$

you are really taking -1 through

$$9) \quad \underline{-8x} - 5 + \underline{3x} = \underline{7} + 4x - \underline{9}$$

$$\begin{array}{r} -5x - 5 \\ +5 \end{array} = \begin{array}{r} 4x - 2 \\ +5 \end{array}$$

$$\begin{array}{r} -5x = 4x + 3 \\ -4x \quad -4x \end{array}$$

$$x = -\frac{3}{9} \text{ or } -\frac{1}{3}$$

$$10) \quad 2n - 3(4n + 5) = -6(n - 3) - 1$$

$$\underline{2n} - \underline{12n} - 15 = \underline{-6n} + \underline{18} - 1$$

$$\begin{array}{r} -10n - 15 \\ +15 \end{array} = \begin{array}{r} -6n + 17 \\ +15 \end{array}$$

$$\begin{array}{r} -10n = -6n + 32 \\ +6n \quad +6n \end{array}$$

$$n = -8$$

Fractional Variables

$$\frac{-4n}{-4} = \frac{32}{-4}$$

$$11) \quad \frac{x}{4} - 3 = 8$$

$$+3 + 3$$

$$\frac{x}{4} = 11 \cdot \frac{4}{1}$$

$$x = 44$$

$$12) \quad \frac{x}{6} + 4 = 10$$

$$-4 -4$$

$$\frac{x}{6} = 6 \cdot \frac{6}{1}$$

$$x = 36$$

$$13) \quad \frac{x}{7} - 2 + 5 = 8$$

$$\frac{x}{7} + 3 = 8$$

$$\frac{x}{7} = 5 \cdot \frac{7}{1}$$

$$x = 35$$

$$14) \quad \frac{x+2}{3} = 6$$

$$15) \quad \frac{x-2}{4} = 10$$

$$16) \quad \frac{1}{3}(3x + 6) = 12$$

*Get rid of division first!

$$\frac{x+2}{3} = 6 \cdot \frac{3}{1} \quad x-2 = 40$$

$$x = 42$$

$$\begin{array}{r} x+2 = 18 \\ -2 \quad -2 \end{array}$$

$$x = 16$$

$$\begin{array}{r} 1x + 2 = 12 \\ -2 \quad -2 \end{array}$$

$$1x = 10$$

$$17) \frac{1}{3}x - 2 = 18$$

$$\quad \quad \quad +2 \quad +2$$

$$\frac{\frac{1}{3}x}{\frac{1}{3}} = \frac{20}{\frac{1}{3}}$$

Keep
change
flip

$$\frac{20}{1} \div \frac{1}{3}$$

$$\frac{20}{1} \times \frac{3}{1} = 60$$

Combining Like Terms

$$x = 60$$

$$18) \frac{2}{3}x + 2 = 14$$

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

$$\frac{\frac{2}{3}x}{\frac{2}{3}} = \frac{12}{\frac{2}{3}}$$

$$\frac{12}{1} \div \frac{2}{3}$$

$$\frac{12}{1} \times \frac{3}{2} = \frac{36}{2}$$

$$x = 18$$

$$19) \frac{3}{5}x + 10 = 70$$

$$\quad \quad \quad -10 \quad -10$$

$$\frac{\frac{3}{5}x}{\frac{3}{5}} = \frac{60}{\frac{3}{5}}$$

$$\frac{60}{1} \div \frac{3}{5}$$

$$\frac{60}{1} \times \frac{5}{3} = \frac{300}{3} = 100$$

$$x = 100$$

$$20) (2x) + 5 - 3 + (2x) - 7 = x + 3 - 5 + 2x$$

$$4x - 5 + 5 = 3x - 2 + 5$$

$$4x = 3x + 3$$

$$-3x \quad -3x$$

$$x = 3$$

$$21) (-7x) + 6 - 5 + 10 = -4 - 3 + 2x$$

$$-7x + 11 = -7 + 2x$$

$$-7x = -18 + 2x$$

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

$$-9x = -18$$

$$\frac{-9x}{-9} = \frac{-18}{-9}$$

$$x = 2$$

$$23) (-3x) - 4x - 4 + 5 = 10 - 11 + 2x$$

$$-7x - 1 = -1 + 2x$$

$$-7x = -2 + 2x$$

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

$$-9x = -2$$

$$\frac{-9x}{-9} = \frac{-2}{-9}$$

$$x = \frac{2}{9}$$

$$24) x + 7 - 8 = 2x + 7 - 3x + 5$$

$$x - 1 = -1x + 12$$

$$+1x \quad +1x$$

$$2x = 13$$

$$\frac{2x}{2} = \frac{13}{2}$$

$$x = 6\frac{1}{2}$$