

1.3 SOLVING LINEAR EQUATIONS

Equation - MUST have an equal sign

Linear Equation - MUST have one variable and an equal sign (the graph will be a line)

EXAMPLES: Solve for the variable.

$$1. \quad \boxed{x} + 9 = 15$$

$$\begin{array}{r} \cancel{-9} \quad | \quad \cancel{-9} \\ \hline \boxed{x} = 6 \end{array}$$

$$2. \quad \cancel{-3} \boxed{y} = 36$$

$$\begin{array}{r} \cancel{-3} \quad | \quad \cancel{-3} \\ \hline \boxed{y} = -12 \end{array}$$

$$3. \quad 12n - 3 = 4n + 21$$

$$\begin{array}{r} \cancel{-4n} \quad | \quad \cancel{+4n} \\ \hline 8n - 3 = 21 \\ \cancel{+3} \quad | \quad \cancel{+3} \\ \hline \cancel{8n} = \frac{24}{8} \\ \hline \boxed{n = 3} \end{array}$$

$$4. \quad 5(m - 2) = -4(2m + 7) + m$$

$$\begin{array}{r} 5m - 10 = \cancel{-8m} - 28 + \cancel{1m} \\ 5m - 10 = \cancel{-7m} - 28 \\ \cancel{+7m} \quad | \quad \cancel{+7m} \\ \hline 12m - 10 = -28 \\ \cancel{+10} \quad | \quad \cancel{+10} \\ \hline \frac{12m}{12} = \frac{-18}{12} \\ \hline \boxed{m = -\frac{3}{2} \text{ or } -1.5} \end{array}$$

$$5. \quad 6(3 - d) = -5(2d + 9) + 18$$

$$18 - 6d = -10d - 45 + 18$$

$$18 - 6d = -10d - 27$$

$$+10d \quad +10d$$

$$18 + 4d = -27$$

$$-18 \quad -18$$

$$4d = -45$$

$$\frac{4d}{4} = \frac{-45}{4}$$

$$d = -\frac{45}{4} \text{ or } -11.25$$

$$6. \quad -1(g + 2) - 2g = -2(g + 1)$$

$$-g - 2 - 2g = -2g - 2$$

$$-3g - 2 = -2g - 2$$

$$+3g \quad +3g$$

$$-2 = g - 2$$

$$+2 \quad +2$$

$$0 = g$$

$$-3g - 2 = -2g - 2$$

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

$$-g - 2 = -2$$

$$+2 \quad +2$$

$$-g = 0$$

$$\frac{-g}{-1} = \frac{0}{-1}$$

$$g = 0$$

$$7. \quad \frac{7}{2}p - 1 = 2p + 5$$

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

$$\frac{3}{2}p - 1 = 5$$

$$+1 \quad +1$$

$$\frac{3}{2}p = 6 \cdot \frac{2}{3}$$

$$p = 4$$

$$8. \quad \frac{2}{3}w + \frac{1}{5} = 2w - \frac{3}{10}$$

$$-\frac{2}{3}w \quad -\frac{2}{3}w$$

$$\frac{1}{5} = \frac{4}{3}w - \frac{3}{10}$$

$$+\frac{3}{10} \quad +\frac{3}{10}$$

$$\frac{3}{4} \cdot \frac{1}{2} = \frac{4}{3}w \cdot \frac{3}{4}$$

$$\frac{3}{8} = w$$

$$9. \quad \frac{3}{4} \left(\frac{4}{5} f - 2 \right) = \frac{11}{4}$$

$$\frac{3}{4} \cdot \frac{4}{5} f - \frac{3}{4} \cdot 2 = \frac{11}{4}$$

$$\frac{3}{5} f - \frac{3}{2} = \frac{11}{4}$$

$$+ \frac{3}{2} \quad + \frac{3}{2}$$

$$\frac{7}{5} f = \frac{17}{4} \cdot \frac{5}{3}$$

$$f = \frac{85}{12}$$

$$10. \quad 3.1(k + 2) - 1.5k = 5.2(k - 4)$$

$$3.1k + 6.2 - 1.5k = 5.2k - 20.8$$

$$1.6k + 6.2 = 5.2k - 20.8$$

$$-1.6k \quad -1.6k$$

$$6.2 = 3.6k - 20.8$$

$$+ 20.8 \quad + 20.8$$

$$\frac{27}{3.6} = \frac{3.6k}{3.6}$$

$$7.5 = k$$