

3.3 – Solve Multi-Step Equations

Solve each equation. Show all steps and circle your solution.

$$1. \quad 4 = \frac{2}{3}x + 9 - \frac{1}{3}x$$

$$4 = \frac{2}{3}x + (-\frac{1}{3}x) + 9$$

$$4 = \frac{1}{3}x + 9$$

$$\underline{-9} \quad \underline{-9}$$

$$3(-5) = (\frac{1}{3}x)3$$

$$-15 = x$$

$$\boxed{x = -15}$$

$$2. \quad (-\frac{2}{3})10 = -\frac{2}{3}(4x+5)$$

$$-15 - 4x + 5$$

$$\underline{-5} \quad \underline{-5}$$

$$-20 = 4x$$

$$\underline{4} \quad \underline{4}$$

$$\boxed{x = -5}$$

$$3. \quad -8 = \frac{1}{3}x + x$$

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

$$\boxed{x = -6}$$

$$4. \quad 5x + 4 - 8x = 13$$

$$5x + 4 + (-8x) = 13$$

$$-3x + 4 = 13$$

$$\underline{-4} \quad \underline{-4}$$

$$-3x = 9$$

$$\underline{-3} \quad \underline{-3}$$

$$\boxed{x = -3}$$

$$5. \quad 3x + 2(x+5) = 15$$

$$3x + 2x + 10 = 15$$

$$5x + 10 = 15$$

$$\underline{-10} \quad \underline{-10}$$

$$5x = 5$$

$$\underline{5} \quad \underline{5}$$

$$\boxed{x = 1}$$

$$6. \quad 4x - (2x+3) = 7$$

$$4x + (-1)(2x+3) = 7$$

$$4x + (-2x) + (-3) = 7$$

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

$$\underline{+3} \quad \underline{+3}$$

$$2x = 10$$

$$\underline{2} \quad \underline{2}$$

$$\boxed{x = 5}$$

$$7. \quad x - (3x - 9) = -5$$

$$x + (-1)(3x + (-9)) = -5$$

$$x + (-3x) + 9 = -5$$

$$\begin{array}{r} -2x + 9 = -5 \\ \underline{-9} \quad \underline{-9} \end{array}$$

$$\begin{array}{r} -2x = -14 \\ \underline{-2} \quad \underline{-2} \end{array}$$

$$x = 7$$

$$8. \quad 13x - 4(2x - 5) = 15$$

$$13x + (-4)(2x + (-5)) = 15$$

$$13x + (-8x) + 20 = 15$$

$$\begin{array}{r} 5x + 20 = 15 \\ \underline{-20} \quad \underline{-20} \end{array}$$

$$\begin{array}{r} 5x = -5 \\ \underline{5} \quad \underline{5} \end{array}$$

$$x = -1$$

$$9. \quad \frac{1}{2}x + \frac{2}{5}(x - 2) = -1$$

$$\frac{5}{10}x + \frac{4}{10}x + \left(-\frac{4}{5}\right) = -1$$

$$\begin{array}{r} \frac{9}{10}x + \left(-\frac{4}{5}\right) = -1 \\ \underline{-\frac{4}{5}} \quad \underline{-\frac{4}{5}} \end{array}$$

$$\frac{10}{9} \left(\frac{9}{10}x\right) = \left(-\frac{1}{5}\right) \left(\frac{10}{9}\right)$$

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

$$10. \quad 4x - (x + 3) = 6$$

$$4x + (-1)(x + 3) = 6$$

$$4x + (-x) + (-3) = 6$$

$$\begin{array}{r} 3x + (-3) = 6 \\ \underline{+3} \quad \underline{+3} \end{array}$$

$$\begin{array}{r} 3x = 9 \\ \underline{3} \quad \underline{3} \end{array}$$

$$x = 3$$

$$11. \quad x - 2(3x - 9) = -7$$

$$x + (-2)(3x + (-9)) = -7$$

$$x + (-6x) + 18 = -7$$

$$\begin{array}{r} -5x + 18 = -7 \\ \underline{+18} \quad \underline{+18} \end{array}$$

$$\begin{array}{r} -5x = -25 \\ \underline{-5} \quad \underline{-5} \end{array}$$

$$x = 5$$

$$12. \quad -14x - 4(2x - 5) = 9$$

$$-14x + (-4)(2x + (-5)) = 9$$

$$-14x + (-8x) + 20 = 9$$

$$\begin{array}{r} -22x + 20 = 9 \\ \underline{+20} \quad \underline{+20} \end{array}$$

$$\begin{array}{r} -22x = -11 \\ \underline{-22} \quad \underline{-22} \end{array}$$

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