

Key.

MATH 9 NOTES

UNIT 5 – SOLVING LINEAR EQUATIONS

REVIEW OF TYPE I (one step)

Examples (Basic)

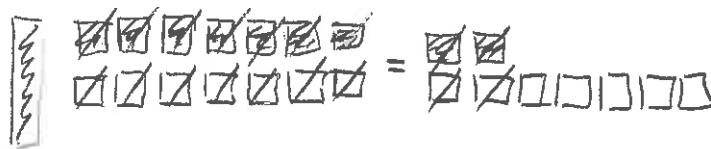
1. $x + 7 = 2$

$x + \cancel{7} - \cancel{7} = 2 - 7$

$x = -5$

* What you do on one side you must do on the other!

MODEL



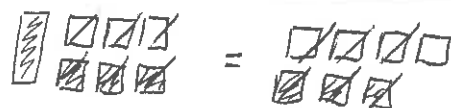
* Create zero pairs and remove.

$x = -5$

2. $y - 3 = -4$

$y - \cancel{3} + \cancel{3} = -4 + 3$

$y = -1$



$y = -1$

3. $2m = -6$

$\frac{2m}{2} = \frac{-6}{2}$

$m = -3$



each m tile is equal to -3

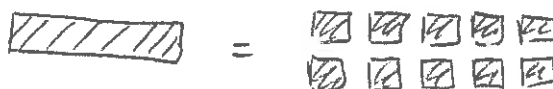
$m = -3$

4. $\frac{k}{2} = 5$

$(2) \frac{k}{2} = 5(2)$

$k = 10$

$2 \left(\frac{1}{2} \text{ "k" tile} \right) = (2 \text{ "k" tiles}) 2$



$k = 10$

MATH 9 NOTES

TYPE II (Two steps) Linear Equations

Examples

1. $2x + 3 = 4$

$$\begin{array}{r} 2x + 3 = 4 \\ -3 \quad -3 \end{array}$$

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

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

* isolate variable
* Solve for variable

2. $-6 = -3y - 3$

$$\begin{array}{r} -6 = -3y - 3 \\ +3 \quad +3 \end{array}$$

$$\frac{-3}{-3} = \frac{-3y}{-3}$$

$$1 = y$$

3. $-3 + 5m = 20$

$$\begin{array}{r} -3 + 5m = 20 \\ +3 \quad +3 \end{array}$$

$$\frac{5m}{5} = \frac{23}{5}$$

$$m = \frac{23}{5}$$

4. $-5t + 4 = 24$

$$\begin{array}{r} -5t + 4 = 24 \\ -4 \quad -4 \end{array}$$

$$\frac{-5t}{-5} = \frac{20}{-5}$$

$$1t = -4$$

5. $-\frac{1}{3}x + \frac{1}{3} = \frac{4}{3}$

$$\begin{array}{r} -\frac{1}{3}x + \frac{1}{3} = \frac{4}{3} \\ -\frac{1}{3} \quad -\frac{1}{3} \end{array}$$

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

$$x = -3$$

$$* \frac{4}{3} - \frac{1}{3} = \frac{3}{3} = 1$$

OR

* Multiply by LCM.

$$\begin{array}{r} 3 \quad 3 \quad 3 \\ \left(-\frac{1}{3}x \right) + \left(\frac{1}{3} \right) = \left(\frac{4}{3} \right) \end{array}$$

$$\begin{array}{r} -x + 1 = 4 \\ -1 \quad -1 \end{array}$$

$$\frac{-x}{-1} = \frac{4}{-1}$$

$$x = -3$$

MATH 9 NOTES

TYPE IV (Four steps 'ish') Linear Equations

Examples

$$1. 4(2x + 6) = 5(3x - 14)$$

$$8x + 24 = 15x - 70$$

$$\begin{array}{r} -15x \\ -15x \end{array}$$

$$-7x + 24 = -70$$

$$\begin{array}{r} -24 \\ -24 \end{array}$$

$$\frac{-7x}{-7} = \frac{-94}{-7}$$

$$x = \frac{94}{7}$$

$$2. 0.6(10m + 3) = 0.7(15m + 3)$$

$$6m + 1.8 = 10.5m + 2.1$$

$$\begin{array}{r} -6m \\ -6m \end{array}$$

$$1.8 = 4.5m + 2.1$$

$$\begin{array}{r} -2.1 \\ -2.1 \end{array}$$

$$\frac{-0.3}{4.5} = \frac{4.5m}{4.5}$$

$$m = 0.0\overline{66}$$

$$3. \frac{1}{2}(k + 10) = \frac{3}{4}(k + 20)$$

$$\rightarrow \frac{1}{2}k + \frac{1}{2}(10) = \frac{3}{4}k + \frac{3}{4}(20)$$

$$\frac{1}{2} - \frac{3}{4} = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$$

$$\rightarrow \frac{1}{2}k + 5 = \frac{3}{4}k + 15$$

$$\begin{array}{r} -\frac{3}{4}k \\ -\frac{3}{4}k \end{array}$$

$$\rightarrow -\frac{1}{4}x = \frac{10}{-1/4}$$

$$\rightarrow \frac{1}{2}k - \frac{3}{4}k + 5 = 15$$

$$\begin{array}{r} -\frac{1}{4}k \\ -\frac{1}{4}k \end{array}$$

$$\rightarrow x = 10 \times \left(-\frac{4}{1}\right)$$

$$\rightarrow \frac{1}{2}k - \frac{3}{4}k = 10$$

$$\rightarrow \boxed{x = -40}$$

* Use distributive property to distribute into brackets
* Solve remaining Type 3 equation.