

Chapter 6: Graphing and solving linear relations

CH 6.3 - Modelling and solving linear equations

Solving equations in the form:

$$y = ax + b$$

and

$$y = \frac{x}{a} + b$$

$$\downarrow$$

$$y = \frac{1}{a}x + b \quad (\text{same thing})$$

Example $y = ax + b$

Key Points

$$24 = 3x + 3$$

$$\begin{array}{r} 21 = 3x \\ \underline{3} \quad \underline{3} \end{array}$$

$$7 = x$$

Verify by substitution.

$$24 = 3(7) + 3$$

$$24 = 21 + 3$$

$$24 = 24 \checkmark$$

Reverse order of operations •

SAMDEB

$\leftarrow +, \times, \div, x^3, ()$

Need to "Undo"

$\times 3, + 3$

$\div 3, - 3$ ← opposite operations

②

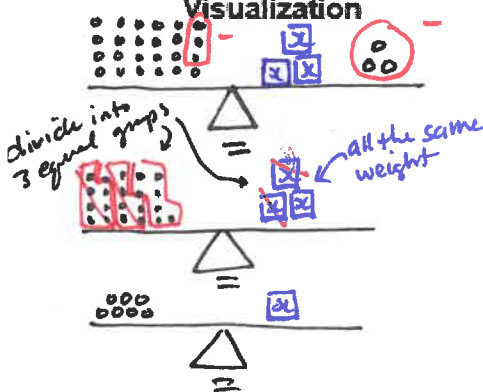
① order.

"Undo" everything that was done to variable in reverse order of operations

- Everything done to one side must be done to the other side

- First** - remove b by adding/subtracting it from both sides
- Second** - divide both sides by coefficient

Visualization



- need to keep the teeter to her balanced.
- must remove equal weight from both sides until only 1 $\square$ is left on one side.

- Model equation like a weigh scale or a teeter totter (seesaw)
- Both sides of equation are the weights on the ends and the equal symbol is the fulcrum (pivot point; middle)

Try it out:

$$-3g - 4 = 11 \quad g = -5$$

$$6r + 6 = 18 \quad r = 2$$

Name:

Math 9

Date:

Example $y = \frac{x}{a} + b$

Key Points

$\frac{x}{4} + 3 = 9$
 $-3 \quad -3$
 $(4) \frac{x}{4} = 6 \quad (4)$
 $x = 24$

SAMDEB.

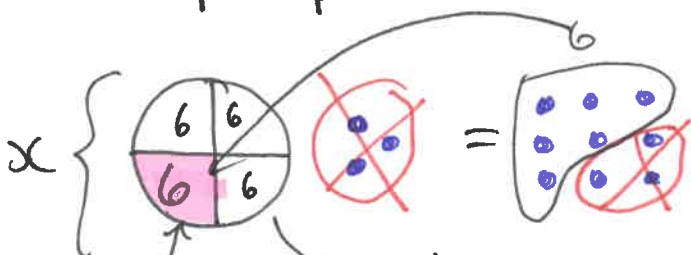
Undo...
 $\div 4, +3$
 $\times 4 \quad -3$
 $(2) \quad (1) \leftarrow \text{order}$

Verify by substitution.

$\frac{x}{4} + 3 = 9$
 $\frac{24}{4} + 3 = 9$
 $6 + 3 = 9$
 $9 = 9 \checkmark$

Visualization

$\frac{x}{4} \Rightarrow \frac{1}{4}x$



$\frac{1}{4}x$ or $\frac{x}{4}$

Try it out:

$\frac{x}{3} - 6 = 2 \quad x = 24$

$\frac{1}{4}$ of $x = 6$ so 4 four
quarters would be $6 \times 4 = 24$.

- need to know what $\frac{1}{4}x$ equals. without this added 3...
- so get rid of the extra 3...

- Same idea as the previous example except we now have a fraction of the variable
 - In other words our variable is now being divided by some value
- First - remove b by adding/ subtracting it from both sides
- Second - multiply both sides by coefficient
- Same idea as the previous example

$-4 = 3 - \frac{k}{7}$

$k = 49$

Practice Assignment

- worksheet provided in class
- If not in class: page 204 # 1, 2, 5-7(a and c only), choose 2 apply questions