

MULTIPLICATION AND DIVISION

4

Name: Key Date: _____ Period: _____

SECTION 4.6 SOLVING EQUATIONS & INEQUALITIES

Big Idea: How do we solve one and two step linear equations and inequalities?

REVIEW: ORDER OF OPERATIONS

- | | |
|---------------------------------------|---|
| 1. P: <u>parentheses</u> | 1. G: <u>grouping</u> |
| 2. E: <u>exponents</u> | 2. E: <u>exponents</u> |
| 3. MD: <u>multiplication/division</u> | 3. M(D): <u>multiplication/division</u> |
| 4. AS: <u>addition/subtraction</u> | 4. S(A): <u>subtraction/addition</u> |

EXPLORATION 1

Consider the following numerical expressions:

- a. $9 + 2 \cdot 3 - 2$ b. $9 + 2 \cdot (3 - 2)$ c. $(9 + 2) \cdot 3 - 2$

1. What similarities and differences do you notice between expressions in parts a and b?

same numerals but different parentheses

2. What similarities and differences do you notice between expressions in parts a and c?

same numerals but different parentheses

3. Evaluate the expressions in parts a, b, and c using the order of operations.

a. $9 + 2 \cdot 3 - 2$	b. $9 + 2 \cdot (3 - 2)$	c. $(9 + 2) \cdot 3 - 2$
$9 + 6 - 2$	$9 + 2(1)$	$(11) \cdot 3 - 2$
$15 - 2 = \textcircled{13}$	$9 + 2 = \textcircled{11}$	$33 - 2 = \textcircled{31}$

4. Why did you get different results?

the operations were grouped differently, so they were performed in different orders

EXPLORATION 2

When you go to Game Go shop and purchase three video games of equal cost, your total is \$84. What is the purchase price per game? Use the 4-step process to solve.

Step 1: Define the variable. Let x = the purchase price per game

Step 2: Translate the problem to an equation.

$$\begin{aligned} \text{Each CD costs } \$9. \\ 9x = \text{total cost of CDs} \\ 9x = 54 \end{aligned}$$

Step 3: Solve for the unknown.

$$\begin{aligned} 9x &= 54 \\ (9x) \div 9 &= 54 \div 9 \quad \text{OR} \quad \frac{9x}{9} = \frac{54}{9} \\ x &= 6 \end{aligned}$$

Step 4: Check your answer.

$$\begin{aligned} \text{Is } 9 \cdot 6 \text{ equal to } 54? \\ \text{Yes. } \checkmark \end{aligned}$$

EXAMPLE 1

Terry, Aissa, and Steve went to the snack bar to buy some snacks. They bought three slushies and a bag of Flaming Hot Chips which costs \$1. If they spent \$7 for all of this what was the cost of each slushie at the snack bar?

SOLUTION

Using the Four Step Process, we write an equation for this problem situation and solve it.

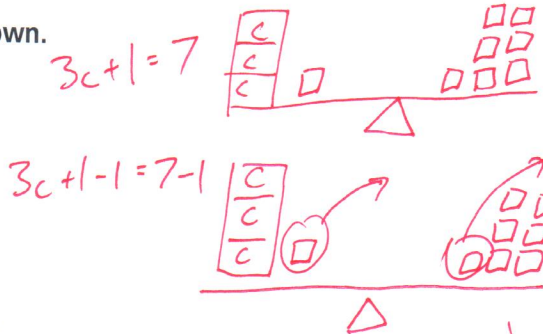
Step 1: Define the variable. c = cost of each slushie

Step 2: Translate the problem to an equation.

$$\begin{aligned} 3c &= \text{cost of slushies} \\ 3c + 1 &= \text{cost of slushies and chips} \\ 3c + 1 &= 7 \end{aligned}$$

Step 3: Solve for the unknown.

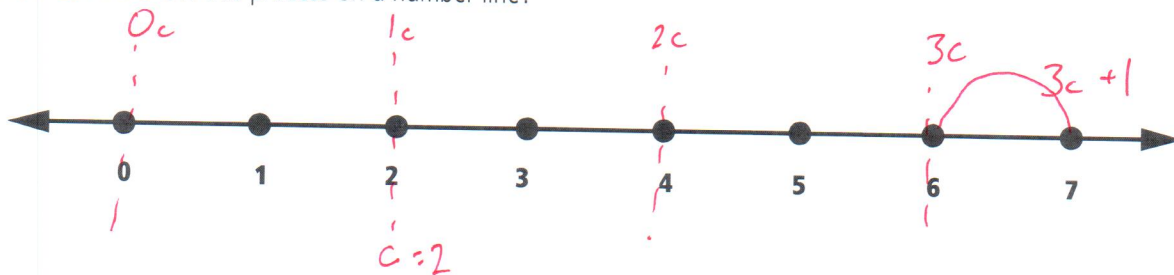
$$\begin{aligned} 3c + 1 &= 7 \\ 3c + 1 - 1 &= 7 - 1 \\ 3c &= 6 \\ \frac{3c}{3} &= \frac{6}{3} \\ c &= 2 \end{aligned}$$



Step 4: Check your answer.

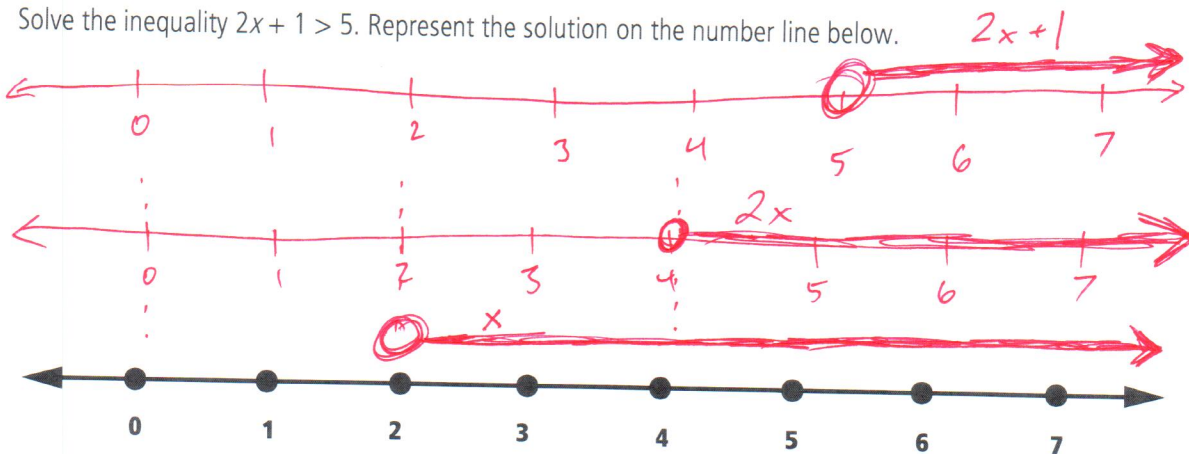
$$\begin{aligned} 3(2) + 1 &= \\ 6 + 1 &= 7 \quad \checkmark \end{aligned}$$

How can we show this process on a number line?



EXAMPLE 2

Solve the inequality $2x + 1 > 5$. Represent the solution on the number line below.



$2x + 1 > 5$ means $x > 2$ is the solution.

PRACTICE EXERCISES

1. $6 + 4 \div 2 \cdot 3 = \underline{12}$
 $6 + 2 \cdot 3 = 6 + 6$

5. $16 + (7 - 9) \cdot 3 = \underline{10}$
 $16 + (-2) \cdot 3$

2. $6 \div 3 + 2 \cdot 4 = \underline{10}$
 $2 + 8$

6. $-2 \cdot -5 + 27 \div 9 = \underline{13}$
 $10 + 3$

3. $(10 + 4) \div 2 - 7 = \underline{0}$
 $14 \div 2 - 7$
 $7 - 7$

7. $21 \div (-1 + 4) \cdot 8 = \underline{54}$
 $21 \div (3) \cdot 8$
 $7 \cdot 8$

4. $10 + 4 \div 2 - 7 = \underline{5}$
 $10 + 2 - 7$
 $12 - 7$

8. $14 + 6 \cdot 2 \div 4 = \underline{17}$
 $14 + 12 \div 4$
 $14 + 3$

CHALLENGE!

9. Solve these equations:

a. $4x = 24$

$\frac{4x}{4} = \frac{24}{4}$

$x = 6$

c. $6x - 1 = 20$

$6x - 1 + 1 = 20 + 1$

$\frac{6x}{6} = \frac{21}{6}$

$x = \frac{7}{2}$ or 3.5

b. $3x + 4 = 28$

$3x + 4 - 4 = 28 - 4$

$3x = 24$

$\frac{3x}{3} = \frac{24}{3}$

$x = 8$

d. $4x + 12 = 4$

$4x + 12 - 12 = 4 - 12$

$4x = -8$

$\frac{4x}{4} = \frac{-8}{4}$

$x = -2$

10. Edison bought 6 video games of equal cost at Komodo Dragons video game store for \$78. How much did each game cost?

$v = \text{cost of a video game}$

$6v = \text{total cost of video games}$

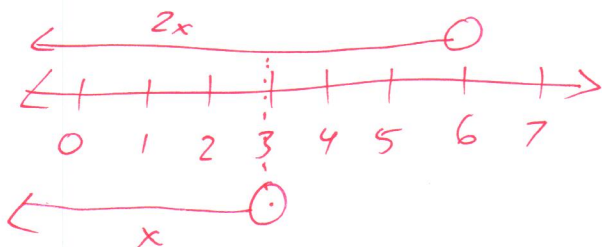
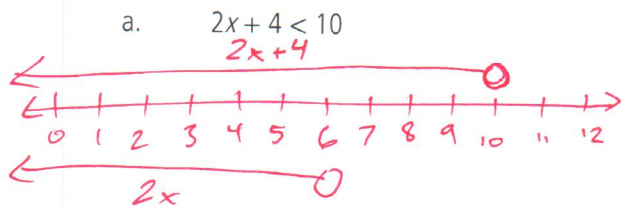
$6v = 78$

$\frac{6v}{6} = \frac{78}{6}$

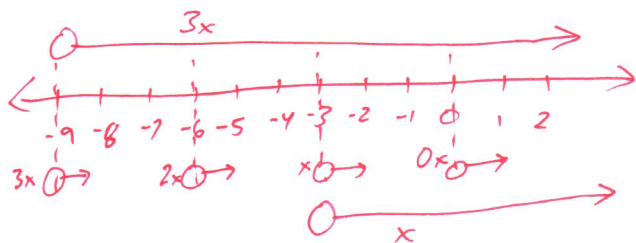
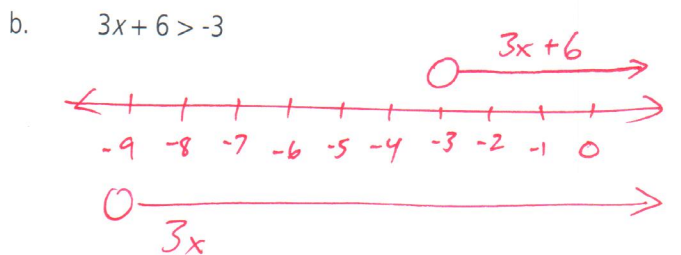
$v = 13$

a video game costs \$13

11. Solve the following inequalities. Represent the solutions to each inequality on a number line.



$x < 3$



$x > -1$

12. $15 - 3 \cdot 5 + 56 \div (-2 \cdot -4) - 7 = \underline{0}$

$15 - 3 \cdot 5 + 56 \div (8) - 7$

$15 - 15 + 7 - 7$

$0 + 7 - 7$

$0 + 0$

13. $64 \div [(1+7) \cdot (-2+1)] = \underline{-8}$

$64 \div [(8)(-1)]$

$64 \div [-8]$

-8

14. Jake had 58 pieces of candy. He ate 18 of them before five of his friends arrived. If he distributed the remaining pieces of candy equally among his friends, how many pieces of candy did each of his friends receive? Show all four steps.

step 1: c = number of pieces of candy each friend received

step 2: $5c$ = number of pieces of candy all friends received total

$5c + 18$ = number of candies Jake started with

$$5c + 18 = 58$$

step 3: $5c + 18 - 18 = 58 - 18$

$$5c = 40$$

$$\frac{5c}{5} = \frac{40}{5}$$

$c = 8$ Each friend received 8 pieces of candy

step 4: $5(8) + 18 = 40 + 18 = 58 \checkmark$

SUMMARY (What I learned today)
