1.0 Notes: Solving One-Step Equations

Solving an equation:

Inverse Operations:

Examples: Solve each equation for the variable. Show your work! You may use a calculator.

1) $x + 5 = 20$ 2) $15.45 = b + 3.1$ 3) $a - 8 = -11$

For #4 – 5, write an equation to represent each situation. Then solve the equation to answer the question.

4) Clownfish and angelfish are popular tropical fish. An angelfish can grow to be 12 inches long. If an angelfish is 8.5 inches longer than a clown fish, how long is a clownfish?

5) Jin is taller than Pete. The difference in their heights is 5.8 cm. Jin is 171.16 cm. How tall is Pete?

Examples: Solve for each variable. Show your work! You may use a calculator.

6) $30 = 3x$ 7) $\frac{a}{-2} = 18$ 8) $-2.4x = 7.44$

Reciprocal of a Fraction:

Solve each equation:

9) $-5 = \frac{1}{9}m$

10) $\frac{2}{3}x = 12$

For #11 – 12: Write an equation to represent each situation. Then solve your equation to answer the question.

11) Two-thirds of Chen's class plans to participate in the school talent show. If 16 students from the class plan to participate, how many students are in the class?

12) Samuel wants to buy as many apples as he can. He has $4.80, and the apples cost $0.80 each. How many apples can he buy?

1.1 Notes: Solving More Equations: 2-Step and with the Distributive Property

Steps for solving 2-step equations:

Examples: Solve for each variable. Show your work! You may use a calculator.

1) $2x - 4 = 16$

2) $7 = -3x + 5$

3) $1 - x = 13$

4) $\frac{n}{3} + 1 = 5$

5) $11 = \frac{3}{2}h - 5$

6) $4.2x - 5.1 = 11.8$

Using the Distributive Property to Solve Equations

The Distributive Property:

Steps for solving equations with the Distributive Property:

1.1 Notes, continued…

Solve each equation for the variable. Show your work. You may use a calculator.

7) $3(2y - 4) = 12$

8) $24 = 6(4 + 3a)$

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

10) $21.5 = -3.5(2n + 8)$

For #11 – 13: The clearance of the Golden Gate Bridge in San Francisco is 67 meters. This clearance is about 14.8 meters less than 2 times the clearance of the Brooklyn Bridge in New York City. What is the approximate clearance of the Brooklyn Bridge?

11) Work with your group to try to solve the problem with any method.

12) Write an equation to represent the situation.

13) Solve your equation from #12. Compare your answer to your result from #11.

1.2 Notes: Solving Equations by Combining Like Terms

Like Terms

Combining Like Terms

Steps for Solving Equations with Like Terms

Examples: Solve for the variable. Show your work. You may use a calculator.

1) $5x - 3x = 8$

2) $16 = y + 7y$

3) $4x + 8 + x = -12$

4) $-3b + 8b + 10 = 14$

5) $3 + 10a - a - 5 = -24$

6) $-16 = -4b + 8 + 2b + b$

7) $4.2h - 6 + 0.8h = 9$

8) $-12 = 5.3 - 4x + 2.2 + 2x$

9) $5x + 3(4 - 6x) = 15$

10) $-42 = 6x + 3 - (4x + 1)$

Some unusual situations. What do you think the value is for the variable in the two situations below?

Situation #1) $14x - 7(2x + 5) = 14$

Situation #2) $5a - 2(3a + 1) + a = -2$

1.3 Notes: Solving Equations with Variables on Both Sides

Steps for solving equations with variables on both sides:

Examples: Solve each equation below. Show your work.

1) $5x + 7 = 3x + 21$

2) $-7a - 4 = a + 3$

3) $6d + 4 = 5d$

4) $3(x - 5) = 2(4 - x)$

5) $-2(4a + 3) = 3(2 + 6a)$

6) $18x + 3(5 - 2x) = 4 + 6x$

7) $8b - 2(3b + 6) = 5 - (5b + 2)$

8) Work with a partner! Make up an equation with variables on both sides, and then exchange with a partner. Solve the equation your partner made, and then exchange your packet back so you have your own packet. Examine the solution your partner created. Do you agree with their solution? Discuss and correct as needed.

Unique Situations. Explore each unique situation below. What do you think the value of each variable will be?

9) $5g - 3 = 5g + 10$

10) $7h + 3 - h = 3 + 6h$

11) Create a problem that will have *no solution* and has variables on both sides. Write it down below:

Now *exchange papers* with a partner. Solve the new problem (show your work above.) Did you get *no solution?* Have a conversation with your partner about whether or not you agree with each other.

1.4 Notes: Solving Proportions and Equations with Fractions

What is a proportion?

Example: Work as a group or with a partner to think of as many fractions as you can that are equivalent to the fraction $\frac{1}{2}$. Write them below:

Now create a proportion showing that these fractions (or "ratios") are equal to each other.

Solving Proportions by using Cross-Multiplication:

Example: Solve $\frac{x}{3} = \frac{5}{4}$ by using cross-multiplication.

Examples: Solve each proportion below. Show your work.

1) $\frac{g}{7} = \frac{1}{4}$

2) $\frac{5}{x} = -\frac{20}{8}$

3) $\frac{4}{3} = \frac{5}{2a}$

4) $\frac{5}{x+3} = \frac{2}{7}$

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

More examples:

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

7) $\frac{b-2}{2} = \frac{5b+3}{7}$

Clearing the Fractions:

Solve each equation by clearing the fractions. Show your work. You may use a calculator.

8) $\frac{3}{4}x + 7 = -2$

9) $2 + \frac{4}{9}(5x + 1) = 7$

10) $\frac{11}{3}a + 5 = 6a + \frac{1}{3}$

11) $\frac{7}{5} - \frac{1}{3}b = 4 + 2b$

1.5 Notes: Solving Linear Inequalities

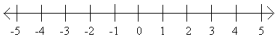
Inequality:

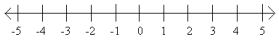
What do these symbols mean? How are they graphed on a number line?

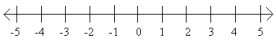
$<$ $\leq$ $>$ $\geq$

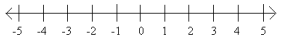
For #1 – 4: Graph each inequality on the provided number line. You try #3 and 4!

1) $x < 3$ 2) $x \geq -1$ 3) $x > 0$ 4) $x \leq -2$









Solving Inequalities with Addition and Subtraction:

Examples: Solve each inequality below. Graph your solution on the provided number line.

1) $g + 3 < 5$ 2) $6 \leq x - 2$ 3) $a - 3 > -5$

Exploration: Consider the inequality $4 < 6$. Is this inequality true or false?

Multiply both sides of the inequality by -1. Write the new inequality. Is it true or false?

What would we need to do to make the new inequality true?

Solving Inequalities by Multiplication or Division

Examples: Solve each inequality below. Graph your solution on the provided number line.

4) $3g < 15$

5) $-20 \leq 4x$

6) $-2a > 12$

7) $\frac{x}{3} \geq 4$

8) $-\frac{2}{5}b > 2$

9) $-3 \leq \frac{h}{-4}$

10) $3g - 6 < 15$

11) $-20 \leq 2x - 6$

12) $-5a + 2 > 12$

13) $-3(5 + 2x) \geq 42$

14) $5x - 1 > 8x + 11 + x$

1.6 Notes: Solving Compound Linear Inequalities

Exploration. Work with your partner to name as many numbers as possible that fit each description.

A) A number that is larger than 4 and less than 7.

B) A number that is less than 4 *or* a number that is larger than 7.

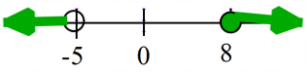
C) As a class, create a *compound* inequality for each description above. Shade each solution on a number line.

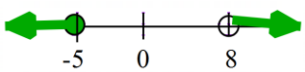
Compound Inequalities

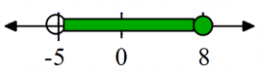
or	and

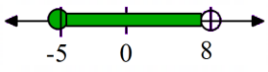
For #1 – 4, MATCH each compound inequality to its graph.

1) $-5 < x \leq 8$ 2) $x < -5$ or $x \geq 8$ 3) $x \leq -5$ or $x > 8$ 4) $-5 \leq x < 8$

A) 

B) 

C) 

D) 

Solving Compound Inequalities

or	and

For #5 – 10: Solve each compound inequality, and then graph your solution on the provided number line. Show your work! You may use a calculator.

5) $x - 3 < -6$ or $4x + 1 > 21$

6) $5x + 1 \geq 16$ or $\frac{3}{4}x > 21$

7) $-11 < x + 6 \leq 4$

8) $-2 < 5x + 8 \leq 28$

9) $-4x + 1 \geq -3$ or $\frac{4}{3}x - 2 > 10$

10) $5 \geq -\frac{1}{5}x - 3 \geq 0$