

## Study Guide: Solving Equations and Inequalities

Please complete this study guide and submit it when you take your test. If you have questions, please make sure you ask me before December 14!!

### Solving Equations

- Your goal in solving equations is to get  $x$  to equal a number. This is often called “**isolating the variable.**”
- You can use number properties (**like distributive and associative properties**) to simplify terms on one side of the equal sign if possible.
- You can also **combine like terms** on each side of your equation.
- Use **if-then moves to modify BOTH SIDES** of the equation to create 1's or 0's in order to isolate the variable.

### Special Tips for Solving Word Problems

- **READ** the problem **VERY CAREFULLY**. Convert each important part of the problem from words to symbols before piecing it all together.
- Identify **WHAT** you are trying to solve. This will usually be your variable. This is usually a part of the question in a word problem.
- **LOOK FOR KEY WORDS** like “is” or “equal” and figure out what terms go on the left side of the equal sign, and what terms go on the right side of the equal sign.  
*Example:* Half of a number plus 4 **IS** the same as twice the sum of that number 1.
- In many cases, **DRAWING A PICTURE** will help immensely!  
*Example:* Three paintings are 18 inches in width and need to be evenly spaced on a wall that is 10 feet long. How much room is there going to be in between each painting?
- When you arrive at an answer always ask yourself: **DOES THIS MAKE SENSE??**

### Solving and Graphing Inequalities

When solving inequalities, if you are multiplying or dividing by a negative number (to make a 1 in order to isolate the variable), **you need to REVERSE the inequality sign.**

Example:

$500 - 20x \leq 200$	Original Problem
$500 - 20x - 500 \leq 200 - 500$	Subtract 500 from each side of the equation.
$-20x \leq -300$	Simplify
$-20x \div (-20) \leq -300 \div (-20)$	Divide both sides by $-20$
$x \geq 15$	Simplify AND <b>reverse the inequality sign because you divided by a negative number!</b>

#### Tips for setting up your inequality statements:

- Read the problem very carefully and create expressions that go on either side of the inequality.
- Phrases like “at most”, “no more than”, or “the maximum” usually mean the inequality symbol will be **less than or equal** ( $\leq$ ).
- Phrases like “at least”, “no less than”, or “the minimum” usually mean the inequality symbol will be **greater than or equal to** ( $\geq$ ).
- Many inequality problems can deal with ‘profit.’ Remember that profit is the money that you actually keep AFTER you earn revenue (from selling products) AND pay for your expense (like supplies or rent).

#### When graphing inequalities...

- Use rays to indicate that there are many solutions to a particular problem.
- Use an **open circle** when the starting point of your solution **IS NOT** a part of the solution set. This is associated with  $<$  and  $>$ .
- Use a **closed circle** when the starting point of your solution **IS** a part of the solution set. This is associated with  $\leq$  and  $\geq$ .
- Your arrow should go to the **right** when all solutions are **greater than** (or greater than or equal to) the starting point.
- Your arrow should go to the **left** when the all solutions are **less than** (or less than or equal to) the starting point.

NAME: \_\_\_\_\_

Math 7.1

Tran/ Rogove

Date: \_\_\_\_\_

### The Problem Set

Erika is hanging her little sister's artwork in her room on a 10 foot wall. She has 4 drawings, each of them are 15 inches wide. You want the artwork on the wall so that the distance from the edge of each drawing to the nearest edge of the wall is the same as the distance between drawings. What is that distance?

Three consecutive numbers are added together so that the first number plus 3 times the second plus 6 times the third number equal 115. What are the numbers?

The largest side of a triangle is 3 more than twice the smallest side. The third side is 8 more than the smallest side. Find the lengths of each side if the perimeter is 33.

On a recent trip to Staples, Mr. Rogove bought individual glue sticks for his daughter's class of 25 students. While in line, he picked up a diet coke and a bag of chocolate covered pretzels. The food/drink cost \$4.50. If the total bill came to \$23.25 (before tax), how much was each glue stick?

NAME: \_\_\_\_\_

Math 7.1

Tran/ Rogove

Date: \_\_\_\_\_

Jessica and Esther were doing Black Friday shopping at Hollister. Jessica bought 2 pairs of identical jeans (but different colors) and 5 tee shirts that each cost \$9.50. Her total bill was \$101. How much were each pair of jeans?

In the World's Strongest Man, contestants lift 5 huge stones to show off their strength. Each stone is 45 pounds heavier than the previous stone. If the total weight of the 5 stones is 1,950 pounds, how much does the heaviest stone weigh?

John is 6 times as old as Jane currently. In 3 years the sum of their ages will be 55. How old are they today?

Annie spends a fair amount of time in the morning getting ready for school. She spends half her time picking out her clothes and getting dressed. One third of her time is spent in the shower, and she spends 12 minutes eating breakfast. How many minutes does it take Annie to get ready for school?

NAME: \_\_\_\_\_

Math 7.1

Tran/ Rogove

Date: \_\_\_\_\_

Mr. Rogove decided to buy a deck of cards AND notebooks for each of the 12 members of the bridge club. Each notebook was \$1.75 and overall, Mr. Rogove spent \$51. How much did each deck of cards cost?

On second thought, Mr. Rogove decided to buy each of the 12 bridge players a deck of cards (different price from the deck in the previous problem) and he hosted a pizza party for the club. The pizza party cost Mr. Rogove \$65 and overall, he spent \$104. How much did each deck of cards cost?

A rectangle has a length of  $x + 2$  and a width of  $5\frac{1}{2}$  inches. The area is 44 square inches. Write an equation and find the length of the rectangle. (HINT: draw a picture!!)

A different rectangle has a length of  $x + 6$  and a width of  $7\frac{1}{3}$  inches. The area is  $62\frac{1}{3}$  square inches. Write an equation and find the length of the rectangle. (HINT: draw a picture!!)

NAME: \_\_\_\_\_

Math 7.1

Tran/ Rogove

Date: \_\_\_\_\_

Golfland charges a ball rental fee of 4.75 and then 1.50 for each round of miniature golf. If Trevor has \$20, how many rounds can he play at most?

Alison has \$850 in her bank account. Every week, she withdraws \$16 to pay for her dogwalker. What is the maximum number of weeks that Alison could her dog walked and still maintain \$275 in her bank account?

At most, Christian can spend \$75 on sandwiches and chips for a picnic. He already bought chips for \$9, and will buy sandwiches that cost \$4.50 each. Write and solve an inequality to show how many sandwiches he can buy.

Max earned \$7.55 per hour plus an additional \$100 in tips waiting tables on Saturday. He earned at least \$160 in all. What is the minimum number of hours that Max worked on Saturday?