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Summer Edition

Seventh Grade Math

Activity 4

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This packet includes four sections that cover the major content of 7th grade math. Each section includes four pages of notes and practice for each topic. For additional support, visit KCS TV on YouTube for instructional videos that accompany each section.

The following content is included in this packet:

	Topic			
	I. Probability	**II. Integers & Rational Numbers**	**III. Ratios & Proportional Relationships**	**IV. Expressions, Equations, & Inequalities**
Activity 1	Experimental Probability of Simple Events	Adding Rational Numbers	Unit Rates	One-Step Equations with Rational Coefficients
Activity 2	Making Predictions with Experimental Probability	Subtracting Rational Numbers	Constant Rates of Change	Solving Two-Step Equations
Activity 3	Theoretical Probability of Simple Events	Multiplying Integers	Percent Increase and Decrease	Writing and Solving One-Step Inequalities
Activity 4	Making Predictions with Theoretical Probability	Applying Integer Operations	Applications of Percent	Solving Two-Step Inequalities

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Section IV Activity 1

One-Step Equations with Rational Coefficients

Using Addition to Undo Subtraction

Addition "undoes" subtraction. Adding the same number to both sides of an equation keeps the equation balanced.

$$x - 5 = -6.3$$
$$x - 5 + \mathbf{5} = -6.3 + \mathbf{5}$$
$$x = -1.3$$

Using Subtraction to Undo Addition

Subtraction "undoes" addition. Subtracting a number from both sides of an equation keeps the equation balanced.

$$n + \frac{3}{4} = -15$$
$$n + \frac{3}{4} - \frac{3}{4} = -15 - \frac{3}{4}$$
$$n = -15\frac{3}{4}$$

Be careful to identify the correct number that is to be added or subtracted from both sides of an equation. The numbers and variables can move around, as the problems show.

Solve using addition or subtraction.

1. $6 = m - \frac{7}{8}$ _____

2. $3.9 + t = 4.5$ _____

3. $10 = -3.1 + j$ _____

Multiplication Undoes Division

To "undo" division, multiply both sides of an equation by the number in the denominator of a problem like this one.

$$\frac{m}{3} = 6$$
$$3 \times \frac{m}{3} = 3 \times 6$$
$$m = 18$$

Division Undoes Multiplication

To "undo" multiplication, divide both sides of an equation by the number that is multiplied by the variable as shown in this problem.

$$4.5p = 18$$
$$\frac{4.5p}{4.5} = \frac{18}{4.5} = 4$$

Notice that decimals and fractions can be handled this way, too.

Solve using division or multiplication.

4. $\frac{y}{2.4} = 5$ _____

5. $0.35w = -7$ _____

6. $-\frac{a}{6} = 1$ _____

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Section IV Activity 2

Solving Two-Step Equations

Here is a key to solving an equation.

Example: Solve $3x - 7 = 8$.

Step 1:
- Describe how to form the expression $3x - 7$ from the variable x:
- Multiply by 3. Then subtract 7.

Step 2:
- Write the parts of Step 1 in the reverse order and use inverse operations:
- Add 7. Then divide by 3.

Step 3:
- Apply Step 2 to *both sides* of the original equation.
- Start with the original equation. $3x - 7 = 8$
- Add 7 to both sides. $3x = 15$
- Divide both sides by 3. $x = 5$

Describe the steps to solve each equation. Then solve the equation.

1. $4x + 11 = 19$

_____

2. $-3y + 10 = -14$

_____

3. $\frac{r - 11}{3} = -7$

_____

4. $5 - 2p = 11$

_____

5. $\frac{2}{3}z + 1 = 13$

_____

6. $\frac{w - 17}{9} = 2$

_____

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Section IV Activity 3

Writing and Solving One-Step Inequalities

When solving an inequality, solve it as if it is an equation. Then decide on the correct inequality sign to put in the answer.

When adding or subtracting a number from each side of an inequality, the sign stays the same. When multiplying or dividing by a positive number, the sign stays the same. When multiplying or dividing by a negative number, the sign changes.

$x + 5 > -5$

$x + 5 - 5 > -5 - 5$

$x > -10$

Check:
Think: 0 is a solution because $0 > -10$. Substitute 0 for x to see if your answer checks.

$x + 5 > -5$

$0 + 5 \stackrel{?}{} -5$

$5 > -5$ ✓

$x - 3 \leq 8$

$x - 3 + 3 \leq 8 + 3$

$x \leq 11$

Check:
Think: 0 is a solution because $0 \leq 11$. Substitute 0 for x to see if your answer checks.

$x - 3 \leq 8$

$0 - 5 \stackrel{?}{} 8$

$-5 \leq 8$ ✓

$-2x \geq 8$

$\frac{-2x}{-2} \leq \frac{8}{-2}$

$x \leq -4$

Dividing by a negative, so reverse the inequality sign.

Check:
Think: -6 is a solution because $-6 \leq -4$. Substitute -6 for x to see if your answer checks.

$-2x \geq 8$

$-2 \bullet -6 \stackrel{?}{} 8$

$12 \geq 8$ ✓

$\frac{x}{3} < -6$

$\frac{x}{(3)}(3) < (-6)(3)$

$x < -18$

Check: Think: -21 is a solution because $-21 < -18$. Substitute -21 for x to see if your answer checks.

$\frac{x}{3} < -6$

$\frac{-21}{3} \stackrel{?}{} -6$

$-7 < -6$ ✓

Solve each inequality. Check your work.

1. $n + 6 \geq -3$

2. $-2n < -12$

3. $\frac{n}{3} \leq -21$

4. $n - (-3) \geq 7$

5. $-15 + n < -8$

6. $6n > -12$

7. $-6 + n < -9$

8. $\frac{n}{-6} > -2$

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Section IV Activity 4

Solving Two-Step Inequalities

Real-world, two-step inequalities involve data that has to be analyzed and interpreted.

Example

An orchard has 300 fruit trees, but only 250 bore fruit this year. How many days will it take to pick the fruit if pickers pick at most 30 trees per day?

Solution

Step 1 List and analyze the information that is given.

- 250 trees in all to pick
- The pickers pick at most 30 trees per day.

Step 2 Write and solve the inequality.

$30d \leq 250$

$d \leq 8\frac{1}{3}$ days

Step 3 Interpret the answer.

The answer will be either 8 or 9 days. However, notice that the inequality is "less than or equal to."

The pickers will pick at most 240 trees in 8 days. They will not be able to pick all 250 trees in 8 days, and will need to work for 9 days.

List and analyze the information in each problem. Then, write an inequality, and solve and interpret the answer.

1. The community food bank has 750 meals to distribute over a 12-hour period. They need to save at least 50 of the meals for the volunteers. How many people can be served by the food bank in 10 hours, not including the volunteers?

_____

_____

2. A vegetable-oil recovery plant has already recycled 1,400 liters out of 2,500 liters of used oil. If the plant can recycle 24 liters of used oil per hour, about how many hours will it take to recycle what is left?

_____

_____

Answer Key

IV. Expressions, Equations, & Inequalities

Activity 1: One-Step Equations with Rational Coefficients

1. m = 6 7/8
2. t = 0.6
3. j = 13.1
4. y = 12
5. w = −20
6. a = −6

Activity 2: Solving Two-Step Equations

1. Subtract 11 from both sides. Then divide both sides by 4. x = 2
2. Subtract 10 from both sides. Then divide both sides by −3. y = 8
3. Multiply both sides by 3. Then add 11 to each side. r = −10
4. Subtract 5 from each side. Then divide both sides by −2. p = −3
5. Subtract 1 from each side. Then multiply both sides by 3/2 (or divide both sides by 2/3). z = 18
6. Multiply both sides by 9. Then add 17 to each side. w = 35

Activity 3: Writing and Solving One-Step Inequalities

1. $n \geq -9$
2. $n > 6$
3. $n \leq -63$
4. $n \geq 4$
5. $n < 7$
6. $n > -2$
7. $n < -3$
8. $n < 12$

Activity 4: Solving Two-Step Inequalities

1. $12n \leq (750 - 50)\ 10$
$12n \leq 7000$
$n \leq 583.3$
$n \leq 583.3$, so 583 people can be given meals in 10 hours
2. $24h > 2{,}500 - 1{,}400$
$24h > 1{,}100$
$h > 45.8$
$h > 45.8$, so it will take about 46 hours to recycle what is left of 2,500 liters of used oil.