Name_____ Period _____ Date _____

6-10
STUDENT PACKET

MATHLINKS: GRADE 6
STUDENT PACKET 10
EXPRESSIONS AND EQUATIONS 2

WORD BANK

Word or Phrase	Definition or Description	Example or Picture
area		
distributive property		
equation		
exponential notation		
expression		
inverse operations		
order of operations		
perimeter		
solve an equation		
variable		
volume		

NUMERICAL AND VARIABLE EXPRESSIONS

Summary

We will apply the conventions for order of operations. We will write, simplify, and evaluate expressions.

Goals

- Understand and use the conventions for order of operations.
- Read, write, and simplify numerical expressions.
- Evaluate variable expressions for specific values of the variables.
- Apply the distributive property to generate equivalent expressions.

Warmup

Circle each true statement below. Draw a star next to the circled statements that correctly illustrate the distributive property.

1. $31 + 17 = 17 + 31$	2. $8(4 + 9) = 8(4) + 8(9)$
3. $4 \bullet x = x \bullet 4$	4. $a(b + c) = ab + ac$
5. $5(2 + p) = 10 + p$	6. $24x + 18y = 2(12x + 9y)$
7. $24x + 18y = 3(8x + 6y)$	8. $24x + 18y = 6(4x + 3y)$

9. Use the distributive property to rewrite the expression $12m + 36n$ in at least two different ways so that it is the product of a whole number and a variable expression.

ORDER OF OPERATIONS REVISITED

Recall the order of operations conventions.

Order of Operations
Step 1: Simplify expressions that are grouped. Step 2: Simplify expressions with exponents. Step 3: Perform multiplication and division from left to right. Step 4: Perform addition and subtraction from left to right.

Simplify each expression	**List the operations in order from first to last**
1. $32 \div (5 - 1)^2 \bullet 8$	• Step 1 $(5 - 1)$ • Step 2 (4^2) • Step 3 $(32 \div 16)$ • Step 3 again $(2 \bullet 8)$
2. $48 \div 6 \bullet 2^3$	
3. $20 - 5 \bullet 3 + 6$	

Use the formulas $A = s^2$ and $V = s^3$ to find the area of each square and volume of each cube below with side lengths s units.

	4. Given: $s = 9$ cm	5. Given: $s = \frac{1}{2}$ cm
Area of a square	$A =$ _____	$A =$ _____
Volume of a cube	$V =$ _____	$V =$ _____

ORDER OF OPERATIONS PROBLEMS

Place parentheses in the equations below so that they are true. Write "none needed" if the equation is already true. (Extra parentheses to make the order of operations clear are permitted.)

1. $6 + 3 \bullet 6 \div 3 = 18$	2. $6 + 3 \bullet 6 \div 3 = 12$
3. $1 = \dfrac{3 \bullet 8 - 6}{4 + 2}$	4. $3 = \dfrac{3 \bullet 8 - 6}{4 + 2}$

5. Mindy says that both sets of parentheses for the problem to the right are necessary to make the equation true. Is Mindy correct? ___ Explain.

$$(17 - 5) + 4 \div \left(6 \bullet \frac{1}{3}\right) = 8$$

Target numbers. Use exactly one 2, one 4, and one 6, along with any mathematical operations and symbols, to create expressions that meet the following conditions.

For example, one way to read the target number 26: $26 = 2 + 4 \bullet 6$

6. The target number is less than or equal to 6.	7. The target number is between 12 and 18.	8. The target number is a two digit number that is less than 26.

9. Evaluate $\frac{1}{2}x^2 + \frac{1}{5}x^3$ for $x = 10$. Show all work.

GOING BACK TO THE PIZZA SHOP

Menu Items and Prices
(The variable represents the cost of an item.)

Cheese slice (c)	$1.00	Small drink (s)	$0.95
Pepperoni slice (p)	$1.25	Medium drink (m)	$1.20
Daily special slice (d)	$1.75	Large drink (L)	$1.60

From the menu above, write variable expressions for the cost of each order below. Then substitute in values for each variable and find the total cost of the order.

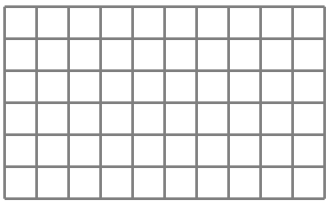
Food Order (in words)	Variable expression for the cost of the order	Substitute and find total cost
1. One slice of pepperoni, 2 slices of the daily special, and 3 medium drinks.		
2. Four orders of a slice of cheese and a large drink.		

3. For problems 1 and 2 above, describe the mathematical operations you performed to find the total cost, and in what order you performed those operations.

For problem 1:	For problem 2:

The tablecloth at the pizza shop is made out of grid paper.

4. On the grid to the right, draw a sketch and shade two squares: one 3 units by 3 units and the other 4 units by 4 units.



5. Write a numerical expression for the total number of square units shaded. Use exponents in your expression.

6. Calculate the total number of square units you shaded.

EXPRESSIONS WITH WORDS, SYMBOLS, AND NUMBERS

Complete the table below.

	Words	Symbols	Evaluate if $x = 5$ and $y = 10$
1.		$2(x + y)$	
2.	double x squared and then add y		
3.			30
4.		$2x + y$	
5.			225
6.	x squared plus y squared		
7.		$2x – y$	
8.	$2x$ subtracted from $2y$		
9.			2500
10.	the square of the sum of 2 and $2x$		

PRACTICE

1. A rectangle has perimeter P, length L, and width W.
   - Sketch a rectangle to the right.
   - Label the sides with L and W.

2. Write an equation for each description below.

   a. Giselle says, "I found the perimeter of the rectangle by adding length to width to length to width." Write the perimeter formula Giselle used.

   b. Marta says, "I found the perimeter of the rectangle by doubling the length, doubling the width, and then adding the two products." Write the perimeter formula Marta used.

   c. Alexandria says, "I found the perimeter of the rectangle by adding L and W, and then multiplying the sum by 2." Write the perimeter formula Alexandria used.

3. A rectangle has $L = 7$ cm and $W = 5$ cm. Use the formulas above to find the perimeter of the rectangle. Show all work.

a. Giselle's formula:	b. Marta's formula:	c. Alexandria's formula:

4. What do your answers in problem 3 tell you about the three formulas in problem 2?

5. Use the distributive property to rewrite the expression $10a + 20b$ in at least two different ways so that it is the product of a whole number and a variable expression.

6. Consider the variable expression $x + y + x + y + x + y$.

   a. Write this expression as the sum of two terms.

   b. Use the distributive property to rewrite this expression as a product of a whole number and a variable expression.

PRACTICE (Continued)

Simplify each expression.

7. $50 - (4 + 3)^2 + 3 \bullet 5$	8. $\dfrac{4(8 - 6)^3}{\frac{1}{2} + 3 \bullet \frac{1}{2}}$

Evaluate each expression.

9. $(ab)^2$ if $a = 4$ and $b = 3$	10. ab^2 if $a = 4$ and $b = 3$

Use exactly one 3, one 5, and one 8, along with any mathematical operations and symbols, to create expressions that meet the following conditions.

11. The target number is a one-digit odd number.	12. The target number is an even number between 10 and 20.	13. The target number is a two digit number that is greater than 30 but less than 40.

14. Remove one set of parentheses from the equation below so that it is still a true equation.

$(9 + 5) + (8 \bullet 3) - 16 \div 2 = 30 \rightarrow$ _____

EQUATION SOLVING STRATEGIES

Summary

We will solve equations using mental math, the concept of balance, and an "undoing" procedure.

Goals

- Use mental strategies and logical reasoning to solve equations.
- Use the concept of balance to solve equations.
- Understand that addition and subtraction are inverse operations.
- Understand that multiplication and division are inverse operations.
- Use inverse operations to solve equations.

Warmup

Write two different equations below in the form 10 = _____ .

The expression in the blank must have:

- at least three numbers
- at least two mathematical operations
- at least one set of parentheses

Example: $10 = \frac{4 + 2(9-1)}{2}$ Check: $\frac{4 + 2(9-1)}{2} = \frac{4 + 2(8)}{2} = \frac{4 + 16}{2} = \frac{20}{2} = 10$

1. Equation: Check:	2. Equation: Check:

SOLVING EQUATIONS

To solve an equation, find all values of the variable that make the equation true.
A value that makes an equation true is called a solution.

Solve each equation below using mental math. Check each solution by substituting it into the original equation.

1. $4x = 12$ Check: $4(\_\_\_\_) = 12$ $12 = 12$	2. $n + 10 = 24$ Check:	3. $12 = 20 - k$ Check:
4. $\frac{w}{6} = 6$ Check:	5. $14 = v - 2$ Check:	6. $5 = \frac{45}{p}$ Check:
7. $\frac{9}{2} = \frac{81}{h}$ Check:	8. $130 + r = 150$ Check:	9. $2m = 1$ Check:

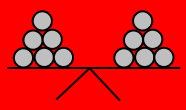
BALANCE SCALES

An equal sign signifies that two expressions have the same value.

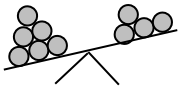
Balance scales can help us picture equations and inequalities. Let each "marble" be equal to one unit of weight.

Start with this balanced scale (equation).

Equation
6 = 6



Inequality
6 > 4



Do not start with this unbalanced scale (inequality).

For each problem below, start with the **balanced** scale above (6 = 6). Then draw a sketch to illustrate the action and write the resulting equation or inequality.

1. Three marbles are removed from the right side of the scale. Equation or inequality:	2. Two marbles are added to the right side of the scale. Equation or inequality:
3. Four marbles are removed from both sides of the scale. Equation or inequality:	4. One marble is added the right side of the scale. Equation or inequality:
5. The numbers of marbles on both sides of the scale are doubled. Equation or inequality:	6. Only one-third the numbers of marbles on both sides of the scale remain. Equation or inequality:

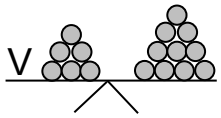
7. Under what conditions does a scale in balance remain in balance?

8. Under what conditions does a scale in balance become unbalanced?

BALANCE SCALES AND EQUATIONS

On the scales below, V represents a cup with an unknown number of marbles in it. Because the cup has an unnamed value, we may use a variable, like *x,* as a placeholder.

1. Write a variable equation for this balance scale.

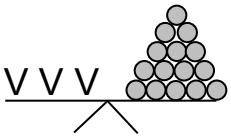


2. How many marbles must be in the cup for the scale to be balanced? _____

3. Remove six marbles from both sides of the scale and sketch the resulting picture. Is this scale still balanced? Explain.

4. Write the equation that illustrates this new picture.

5. Write a variable equation for this balance scale.



6. How many marbles must be in each cup for the scale to be balanced? _____ (Each cup must hold the same number of marbles.)

7. Divide both sides of the scale into three equal parts and sketch the picture that illustrates **one equal part** on each side. Is this scale still balanced? Explain.

8. Write the equation that illustrates this new picture.

Use the idea of a balance scale to solve each equation below. Show or write what you are doing to **both sides** of each equation.

9. $k + 7 = 15$	10. $96 = p + 55$	11. $4u = 12$	12. $152 = 19v$

DOING AND UNDOING

1. Carla looked at the equation $x + 17 = 29$ and said, "I see that a number plus 17 is 29. I can undo addition with subtraction. Therefore, the unknown number must be 29 – 17."

   - She started with x and wrote:

     x → add 17 → 29

   - Then she started with 29 and wrote:

     29 → subtract 17 → 12

   Use Carla's reasoning to solve $x - 25 = 13$.

Solve for the unknown. Circle your choice of strategy: mental math (MM), the concept of balance (B), or a doing-undoing procedure (DU). Show your work as needed.

2. $x + 25 = 50$ MM B DU	3. $y + 24 = 78$ MM B DU	4. $n + 132 = 426$ MM B DU
5. $x - 18 = 4$ MM B DU	6. $m - 86 = 34$ MM B DU	7. $p - 57 = 109$ MM B DU

8. The weight of a bag of apples, a, is unknown. The weight of a bag of oranges is 5 pounds.

   a. Write an expression for the weight of a grocery bag filed with the bag of oranges and the bag of apples.

   b. Write an equation to show that the total weight of the grocery bag is 12 pounds. Then solve the equation.

DOING AND UNDOING (Continued)

9. Darla looked at the equation $4x = 64$ and said, "I see that 4 times a number is 64. I can undo multiplication with division. Therefore, the number must be $\frac{64}{4}$."

   - She started with x and wrote:

     $x \rightarrow$ multiply by 4 $\rightarrow$ 64

   - Then she started with 64 and wrote:

     64 $\rightarrow$ divide by 4 $\rightarrow$ 12

   Use Darla's reasoning to solve $\frac{x}{3} = 18$.

Solve for the unknown. Circle your choice of strategy: mental math (MM), the concept of balance (B), or a doing-undoing procedure (DU). Show work as needed.

10. $25x = 50$ MM B DU	11. $14y = 98$ MM B DU	12. $18n = 360$ MM B DU
13. $\frac{x}{4} = 10$ MM B DU	14. $\frac{m}{9} = 30$ MM B DU	15. $\frac{p}{6} = 23$ MM B DU

16. The weight of a bag of apples, a, is unknown. There are 10 apples in the bag.

    a. Write an expression for the average weight of an apple in the bag.

    b. Write an equation to show that the average weight of an apple in the bag is 6 ounces. Then solve the equation.

PRACTICE WITH EQUATION SOLVING STRATEGIES

Solve each equation. Write MM if you used mental math. Otherwise show all work.

1. $5 - x = 1$	2. $16 = n + 2$
3. $7m = 42$	4. $\frac{y}{8} = 3$
5. $a - 13 = 62$	6. $d + 99 = 157$
7. $148 = 4p$	8. $\frac{k}{3} = 29$
9. $184 = v - 42$	10. $500 = w + 250$
11. $11h = 121$	12. $300 = \frac{f}{6}$

13. The weight of a bag of apples, a, is unknown. You have 15 bags of apples that are all of this weight.

    a. Write an expression for the total weight of the bags of apples you have.

    b. Write an equation to show that the total weight of the apple bags is 180 pounds. Then solve the equation.

SOLVING EQUATIONS WITH FRACTIONS AND DECIMALS

Summary

We will solve equations that include fraction, decimal coefficients, and constants.

Goals

- Use mental math strategies, the concept of balance, and the concept of inverse operations to solve equations that include fractions and decimals.

Warmup

Compute.

1. 4.7 + 8.6	2. 19.2 – 7.8
3. (4.2)(3.9)	4. $\frac{10.92}{1.2}$
5. $2\frac{3}{4} + 5\frac{1}{6}$	6. $8\frac{5}{6} - 3\frac{1}{3}$
7. $\frac{3}{10} \bullet \frac{2}{9}$	8. $\frac{4}{3} \div \frac{2}{9}$

MORE SOLVING EQUATIONS

1. The left side of a balanced scale has 5 pounds of potatoes. The right side of the scale has $\frac{1}{2}$ of a large bag of potatoes.

   a. Write an equation that describes the situation where p represents the weight of a large bag of potatoes.

   b. What is the weight of a full bag of potatoes? _____

Solve for the unknown. Circle whether you are using mental math (MM), the concept of balance (B), or a doing-undoing procedure (DU). Show work as needed.

2. $n + 4.5 = 5$ MM B DU	3. $\frac{9}{15} = \frac{p}{5}$ MM B DU	4. $6 = 7\frac{1}{2} - k$ MM B DU
5. $\frac{w}{10} = 0.6$ MM B DU	6. $6 = \frac{1}{4}v$ MM B DU	7. $2.4 = 3c$ MM B DU
8. $\frac{7}{v} = \frac{42}{18}$ MM B DU	9. $2.3 + r = 3.6$ MM B DU	10. $2m = 5$ MM B DU

11. The left side of a balanced scale has 24 ounces of tangerines. The right side of the scale has $\frac{2}{3}$ of a bag of tangerines. Write an equation that describes this situation. Then solve for the number of ounces in one full bag.

MORE SOLVING EQUATIONS (Continued)

Solve using any strategy. Write MM if mental math is used. Otherwise show work.

12. $x + 2.5 = 5$	13. $y + 0.4 = 0.8$	14. $4.22 = n + 1.8$
15. $x - 2.5 = 5$	16. $y - 0.4 = 0.8$	17. $4.22 = n - 1.8$
18. $2 = x + \frac{1}{2}$	19. $m + \frac{1}{4} = 1\frac{3}{8}$	20. $p + \frac{2}{3} = \frac{3}{4}$
21. $2 = x - \frac{1}{2}$	22. $m - \frac{1}{4} = 1\frac{3}{8}$	23. $p - \frac{2}{3} = \frac{3}{4}$

24. The weight of a bag of apples, a, is unknown. The weight of a bag of oranges is 2.4 pounds.

    a. Write an expression for the weight of a grocery bag filled with the bags of oranges and apples.

    b. Write an equation to show that the total weight of the grocery bag is $6\frac{4}{5}$ pounds. Then solve the equation.

SOLVING EQUATIONS PRACTICE

Solve using any strategy. Write MM is mental math is used. Otherwise show work.

1. $x + 3.5 = 4.9$	2. $y + 0.4 = 2.2$	3. $0.9y = 2.7$
4. $0.3y = 0.36$	5. $x + 2\frac{1}{2} = 3\frac{3}{8}$	6. $m + \frac{3}{4} = \frac{4}{5}$
7. $\frac{1}{3}m = \frac{5}{6}$	8. $\frac{2}{3}p = \frac{1}{6}$	9. $0.4p = \frac{1}{5}$
10. $m - \frac{3}{4} = \frac{4}{5}$	11. $10 = \frac{v}{5.5}$	12. $\frac{w}{\frac{1}{4}} = 3$

13. Hector has spent 6.25 hours working on a project so far, and knows he has to work h hours more tonight to finish it.

    a. Write an expression for the total amount of time Hector will have worked on his project to complete it.

    b. Write an equation to show that the total number hours Hector will have worked is $9\frac{1}{2}$.

    Then solve the equation.

SKILL BUILDERS, VOCABULARY, AND REVIEW

SKILL BUILDER 1

1. Find the product of 40.1 and 34 using any method.

2. Find the quotient of 436.48 and 35.2 using any method.

3. Stefan has a balance of $456.34 in his checking account.

   a. If Stefan deposits a check worth $34.17, what is his new balance?

   b. Stefan is saving up to pay for an outdoor trip that costs $800. After the deposit, how much more money does Stefan need to save?

4. Maria spelled 18 out of 20 words correctly on her first spelling test.

   a. Write Maria's score on the first spelling test as a percentage.

   b. On Maria's next spelling test, she spelled 9 out of 10 words correctly. Based on these scores, explain if Maria is improving her spelling or not.

5. Circle all expressions below that are equivalent to $4y + 8$.

   $4(y + 2)$ $2y + 8 + 2y$ $4(y + 8)$ $12y$ $2 + 6 + 3y + y$

SKILL BUILDER 2

Simplify the given expressions first if possible. Then complete the table below.

Expression (simplify first if possible)	Number of terms	Constant term(s)	Terms(s) with variables	Coefficient of the variable(s)
1. $4m + n + 7$				
2. $13k + 2k$				

3. Write expressions for the total number of dogs and cats given the information below.
   a. The number of dogs is 21 and the number of cats is 13.
      Numerical expression: _____
   b. The number of dogs is d and the number of cats is c.
      Variable expression: _____

4. Write equations showing the number of crackers in each group is 6, given the information below.
   a. Anne has 24 crackers. She puts them into 4 equal groups.
      Numerical equation: _____
   b. Anne has m crackers. She puts them into 4 equal groups.
      Variable equation: _____

Compute.

5. (82.3)(45)	6. 46.98 ÷ 9

7. Circle all expressions below that are equivalent to $w + 5w + 9$.

   $3(2w + 3)$ $6(w + 9)$ $6w + 9$ $15w$ $3(2w + 3)$

SKILL BUILDER 3

Simplify.

1. $45 - (2 + 3)^2 + 4 \bullet 6$	2. $\dfrac{2(7 - 4)^2}{5 \bullet \frac{1}{2} + \frac{1}{2}}$

Evaluate.

3. $(xy)^2$ if $x = 2$ and $y = 3$	4. xy^2 if $x = 2$ and $y = 3$

5. Explain why your answers to problems 3 and 4 are not the same even though $(xy)^2$ and xy^2 look similar.

6. Consider the variable expression $3x + y + x + 4y + 2x + 5y$.

   a. Write this expression as the sum of two terms.

   b. Use the distributive property to rewrite this expression as a product of a whole number and a variable expression.

Rewrite each number in its equivalent representations below.

	Fraction or mixed number	Decimal	Percent
7.	$1\frac{3}{5}$		
8.		2.5	
9.			9.2%

SKILL BUILDER 4

Menu Item (The variable representing the cost of an item.)	**Price**
Regular Bagel (r)	$1.50
Deluxe Bagel (d)	$2.00
Cream Cheese (c)	$0.50
Small drink (s)	$1.25
Medium drink (m)	$1.75
Large drink (L)	$2.25

Find a menu item above with a cost that makes the following equations true. Within the same problem, the ☐ refers to the same item. In different problems, the ☐ need not represent the same menu item.

1. $r + \square = d$

Menu item: _____

Cost of menu item: _____

2. $3(m + L) = 3(\square + r + d)$

Menu item: _____

Cost of menu item: _____

Use substitution to determine whether the statements are true or false.

3. $r + s < 2.50$

4. $d + m < 4.00$

5. $3L > 2(c + d)$

6. $2m > r + d$

7. Circle all of the numbers that are equal to 20%.

20 0.20 0.2 0.020 $\frac{2}{10}$ $\frac{2}{5}$ $\frac{1}{5}$ $\frac{20}{10}$

SKILL BUILDER 5

Solve each equation below. If you used mental math, write MM. Otherwise show your work. Check each solution by substituting it into the original equation.

1. $3x = 12$ Check: $3(\_\_\_\_) = 12$ $12 = 12$	2. $n + 5 = 20$ Check:	3. $10 = 18 - k$ Check:
4. $6 = \frac{h}{3}$ Check:	5. $12 = v - 7$ Check:	6. $2(x + 1) = 8$ Check:
7. $\frac{10}{4} = \frac{5}{m}$ Check:	8. $140 + r = 200$ Check:	9. $3m = 1$ Check:

SKILL BUILDER 6

Solve using any strategy. Write MM if mental math is used. Otherwise show your work.

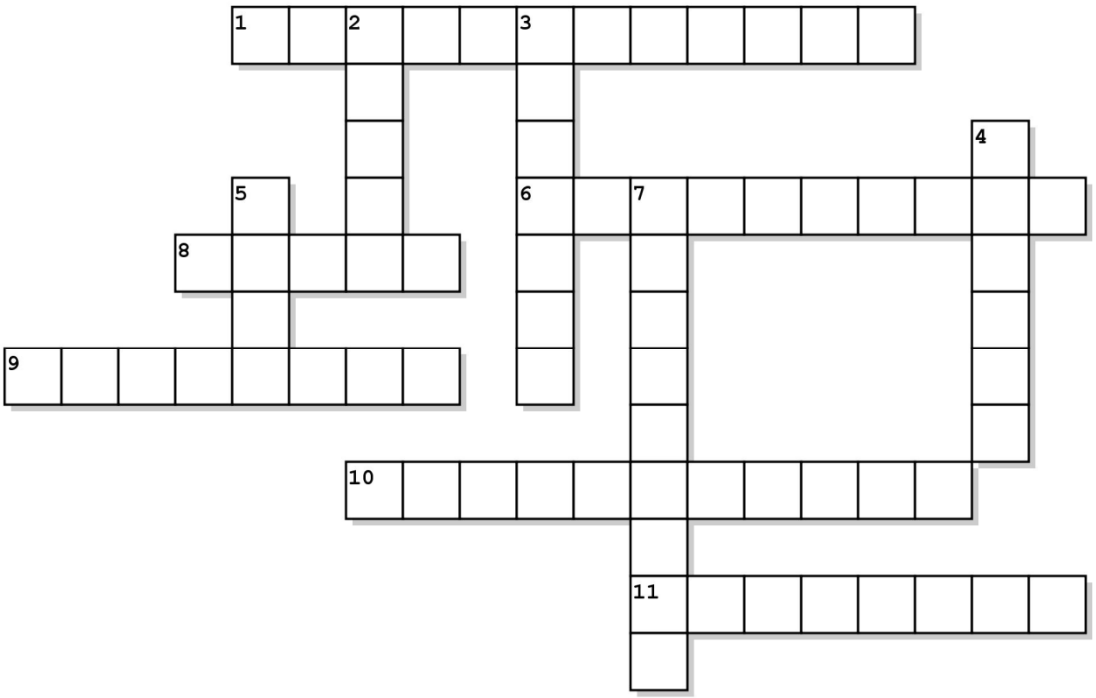
1. $x - 2.5 = 7.5$	2. $y + 1.2 = 2.2$	3. $0.8y = 2.4$
4. $0.45 = 0.5y$	5. $x + 2\frac{1}{4} = 3\frac{3}{8}$	6. $m + \frac{3}{8} = \frac{3}{4}$
7. $\frac{1}{2}m = \frac{5}{6}$	8. $\frac{2}{3}p = 5$	9. $0.6p = \frac{1}{5}$
10. $m - \frac{5}{2} = \frac{4}{5}$	11. $12 = \frac{w}{35}$	12. $\frac{w}{2} = 4$

13. Harley has done 3.2 hours of chores so far, and knows he has to work h hours more this week to get his allowance.

    a. Write an expression for the total amount of time Harley will work.

    b. Write an equation to show that the total number hours Harley will have worked is $6\frac{3}{5}$. Then solve the equation.

FOCUS ON VOCABULARY



Across

1 a property: 50 + 20 = 5(10 + 4)

6 a mathematical phrase, such as 3 + 4(5)

8 Conventions for performing operations are called ____ of operations.

9 an unknown, such as *x*

10 notation, such as 5^3

11 a mathematical sentence such as 0.5*x* = 10

Down

2 find the solution of an equation

3 Addition and subtraction are an example of ___ operations.

4 measure of capacity in cubic units

5 measure of a surface in square units

7 the distance around a figure

(For word hints, see the word bank and other vocabulary used in this packet.)

SELECTED RESPONSE

Show your work on a separate sheet of paper and select the best answer(s).

1. Identify the expressions below that have a value of 25. Choose ALL that apply.

   A. $1 + 4^2$ B. $2 + 3 \bullet 5$ C. $(1 + 4)^2$ D. $(2 + 3) \bullet 5$

2. Identify the equations that are true if $x = 3$.

   A. $x - 7 = 10$ B. $x + 7 = 10$ C. $15 = 5x$ D. $\frac{x}{5} = 15$

3. A balance scale is balanced with 10 identical marbles on each side. Which of the following actions will leave the scale still balanced? Choose ALL that apply.

   A. Remove 5 marbles from both sides.

   B. Add 3 marbles to both sides.

   C. Triple the number of marbles on each side.

   D. Move 5 marbles from one side to the other.

4. Find the solution for the following equation: $h + 7 = 21$. Use any method.

   A. $h = 28$ B. $h = 14$ C. $h = 3$ D. $h = \frac{1}{3}$

5. Which expression(s) represents the value of x in the equation $x + \frac{1}{3} = \frac{3}{4}$?

   A. $\frac{3}{4} + \frac{1}{3}$ B. $\frac{3}{4} - \frac{1}{3}$ C. $\frac{3}{4} \div \frac{1}{3}$ D. $\frac{3}{4} \bullet \frac{1}{3}$

6. Which of the following is the solution to the equation $2.4m = 12$?

   A. $m = \frac{1}{2}$ B. $m = 9.6$ C. $m = 5$ D. $m = 14.4$

KNOWLEDGE CHECK

Show your work on a separate sheet of paper and write your answers on this page.

10.1 Numerical and Variable Expressions

Simplify each expression.

1. $45 - 5 \bullet 3 - 9$	2. $36 \div (1 + 2)^2 \bullet 6$

Use exactly one 2, one 5, and one 8, along with any mathematical operations and symbols, to create expressions that meet the following conditions.

3. The target number is 18.	4. The target number is an odd number less than 10.

10.2 Equation Solving Strategies

Solve each of the following equations. If you used mental math, write MM. Otherwise show your work. Check each solution by substituting it into the original equation.

5. $40 = m + 3$	6. $8 = k \div 7$

4. A balance scale is balanced with 12 identical marbles on each side.

   Describe 2 different actions you could do that would leave the scale still balanced.

   Describe 2 different actions you could do that would leave the scale unbalanced.

10.3 Solving Equations With Fractions and Decimals

Solve using any strategy.

8. $12 = \frac{3}{4}h$	9. $1.2 + w = 13.45$

HOME-SCHOOL CONNECTION

Here are some problems to review with your young mathematician.

1. Simplify the expression. $34 - (3 + 2)^2 + 4 \cdot 5$

Evaluate.

2. $a + b^2$ if $a = 3$ and $b = 4$

3. $(a + b)^2$ if $a = 3$ and $b = 4$

4. Explain why your answers to problems 2 and 3 are not the same even though $(a + b)^2$ looks similar to $a + b^2$.

Solve each of the following equations. If you used mental math, write MM. Otherwise show your work.

5. $\frac{d}{3} = 5$

6. $v - 3.4 = 17.56$

Parent (or Guardian) Signature_____

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COMMON SCORE STATE STANDARDS – MATHEMATICS

STANDARDS FOR MATHEMATICAL CONTENT

6.NS.B	**Compute fluently with multi-digit numbers and find common factors and multiples.**
6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.EE.A	**Apply and extend previous understandings of arithmetic to algebraic expressions.**
6.EE.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.2a	Write, read, and evaluate expressions in which letters stand for numbers: Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*
6.EE.2b	Write, read, and evaluate expressions in which letters stand for numbers: Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*
6.EE.2c	Write, read, and evaluate expressions in which letters stand for numbers: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.
6.EE.3	Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*
6.EE.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*
6.EE.B	**Reason about and solve one-variable equations and inequalities.**
6.EE.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and are all nonnegative rational numbers.

STANDARDS FOR MATHEMATICAL PRACTICE

MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP6	Attend to precision.
MP7	Look for and make use of structure.