Name:_____ Per:_____

SECONDARY MATH I // MODULE 4
EQUATIONS AND INEQUALITIES – 4.2

4. 2 Elvira's Equations

A Solidify Understanding Task

Elvira, the cafeteria manager, likes to keep track of the things she can count or measure in the cafeteria. She hopes this will help her improve the efficiency of the cafeteria. To remind herself to keep track of important quantities, she has made a table of variables and descriptions of the things she wants to record. Here is a table of things she has decided to keep track of.

Symbol	**Meaning** (description of what the symbol means in context)	**Units** (what is counted or measured)
S	Number of students that buy lunch in the salad line	
W	Number of students that buy lunch in the sandwich line	
P	Number of students that buy lunch in the pizza line	
F	Number of food servers in the cafeteria	
M_T	Number of minutes it takes to serve lunch to all students	
C	Number of classes in the school	
P_L	Price per lunch	
A		
R		
T		
D_F		
M		

Elvira has written the following equation to describe a cafeteria relationship that seems meaningful to her. She has introduced a new variable A to describe this relationship.

$$A = \frac{S+W+P}{C}$$

1. What does A represent in terms of the school and the cafeteria? Record this information in the table above.

2. Using what you know about manipulating equations, solve this equation for S. Your solution will be of the form S = *an expression written in terms of the variables* A, C, W and P.

3. Does your expression for S make sense in terms of the meanings of the other variables? Explain why or why not.

Here is another one of Elvira's equations.

$$R = P_L(S + W + P)$$

4. What does R represent in terms of the school and the cafeteria? Record this information in the table above.

5. Using what you know about manipulating equations, solve this equation for P_L.

6. Does your expression for P_L make sense in terms of the meanings of the other variables? Explain why or why not.

7. Elvira notices that she uses the expression $S + W + P$ a lot in writing other expressions. She decides to represent this expression using the variable T, so that $T = S + W + P$. What does T represent in terms of the school and the cafeteria? Record this information in the table above.

Elvira is having a meeting with the staff members who work in the lunchroom. She has created a couple of new equations for the food servers.

$$D_F = \frac{T \cdot P_L}{F} \qquad\qquad M = \frac{M_T}{T}$$

8. a. What does D_F represent in terms of the school and the cafeteria? Record this information in the table above.

9. a. What does M represent in terms of the school and the cafeteria? Record this information in the table above.

b. Solve this equation for T. Describe why your solution makes sense in terms of the other variables.

10. One of the staff members suggests that they need to write expressions for each of the following. Using the variables in the table, what would these expressions look like?

    a. The average number of students served each minute

    b. The average number of minutes students wait in the pizza line

READY, SET, GO! **Name** **Period** **Date**

READY

Topic: Isolate a variable with inverse operations.

Isolate the indicated variable and then fill in the blank for the statement that follows.

1. Solve for x; $ax = 7$ — I can find $1x$ or x by _____ on both sides of the equation.
2. Solve for p; $8 + p = w$ — I can find $1p$ or p by _____ on both sides of the equation.
3. Solve for m; $e = mc^2$ — I can find $1m$ or m by _____ on both sides of the equation.
4. Solve for t; $d = rt$ — I can find $1t$ or t by _____ on both sides of the equation.
5. Solve for r; $d = rt$ — I can find r by _____ on both sides of the equation.
6. Solve for h; $7 - h = 0$ — I can find h by _____ on both sides of the equation.
7. Solve for b; $b - 11 = 3$ — I can find b by _____ on both sides of the equation.
8. Solve for y; $\frac{1}{2}y = k$ — I can find y by _____ on both sides of the equation.
9. Solve for h; $A = \frac{bh}{2}$ — I can find h by _____ on both sides of the equation.
10. Solve for x; $y = mx + b$ — I can find x by _____ on both sides of the equation.

SET

Topic: Defining and interpreting variables and units of measure.

Jaxon likes to be organized, so he made the following chart. He has decided to keep track of the miles he runs and the time he spends running. He attends P.E. class on Monday, Wednesday, and Friday, but he goes to school everyday. *Fill in the Units column on the chart.*

Symbol	Meaning (Description of what the symbol means in context)	Units (What is counted or measured)
M	Number of miles ran in PE class on Mondays	
W	Number of miles ran PE class on Wednesdays	
F	Number of miles ran PE class on Fridays	
S	Number of miles from Jaxon's house to the school.	
H	Time (in hours) to travel to school	
t_M	Time (in minutes) spent running in PE on Monday	
t_W	Time (in minutes) spent running in PE on Wednesday	
t_F	Time (in minutes) spent running in PE on Friday	

Make meaning of the expressions below, write what they each mean!
If an expression does not make sense, say why.

11. $M + W + F$
12. $4(M + W + F)$
13. $2S$
14. $t_M + t_W + t_F$
15. $\frac{t_M + t_W + t_F}{3}$
16. $5(2H)$
17. $M + H$

GO

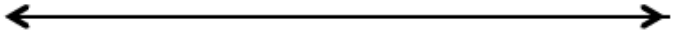
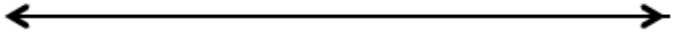
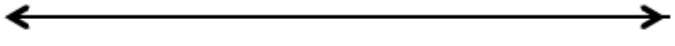
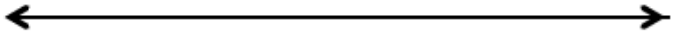
Topic: Set notation to interval notation. Inequalities on a number line.

Below you will find the domains of several different functions. The domains are described in either set notation or interval notation. Fill in the missing notation.

Set Notation	Interval Notation
18. $\{x \mid x \in \mathbb{R},\ -2 < x < 6\}$	
19.	[-4, 7]
20. $\{x \mid x \in \mathbb{R},\ x \geq -9\}$	
21.	(0, 13]
22. $\{x \mid x \in \mathbb{R},\ -15 \leq x \leq -8\}$	
23.	[-32, -15)
24.	$(-\infty, \infty)$

25. Which notation, interval or set, would most appropriate when working with a domain of whole numbers?

For each of the inequalities provided graph the values being described on the numbers line.

26. $x < 6$	
27. $x > 5$	
28. $x \geq -9$	
29. $-7 \leq x < 0$	
30. $3 \leq x \leq 25$	
31. $-15 < x \leq 8$