

**Grade 9 Academic Math**  
**Unit 2 – Part B Practice Test – Using Equations to Solve Problems**

Mr. Nolfi

Victim: \_\_\_\_\_

KU	APP	TIPS	COM
/9	/27	/8	/10

1. Complete the following table: [6 COM]

<i>English Phrase or Sentence</i>	<i>Algebraic Expression or Equation</i>
(a) Triple a number reduced by ten	
(b)	$5 + \frac{n}{4}$
(c) Four less than half a number	
(d) The sum of two consecutive integers is 10001.	
(e) Twice the distance travelled, increased by 9 is 119.	
(f)	$-3(x - 5) + 4 = 14$

2. The *perimeter* of an NFL football field is exactly 1040 feet. If the length of the field is 2.25 *times* longer than the width, find the *dimensions* (i.e. length and width) of the field. [9 KU in total]

(a) Construct an algebraic model. (2 KU)

(b) Translate the problem into an equation. (2 KU)



(c) Solve the equation. (3 KU)

(d) State a conclusion. (1 KU)

(e) Check the solution. (1 KU)

3. Rida earns \$0.50 per hour *more than* Gurpreet but \$0.25 per hour *less than* Sara. Altogether, the three students earn \$49.25 per hour. **[8 APP in total]**

- (a) Let  $g$  represent Gurpreet's hourly wage. Express Rida's and Sara's hourly wages in terms of  $g$ . **(2 APP)**

<i>Student</i>	<i>Expression Representing Hourly Wage</i>
Gurpreet	$g$
Rida	
Sara	

"Wage" = Money that is paid regularly for doing work.

- (b) Use the following sentence to write an equation: **(2 APP)**

"Altogether, the three students earn \$49.25 per hour."

- (c) Now *solve your equation* and *state a conclusion*. **(4 APP)**

4. Brian is a doghouse "salesperson." He is paid \$12.75 per hour worked *plus* \$50.00 per doghouse sold. **[9 APP in total]**

- (a) Complete the table by writing an *algebraic expression* for the amount earned in each case. **(3 APP)**

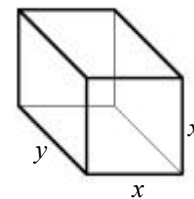
<i>Quantity</i>	<i>Variable Representing Quantity</i>	<i>Amount Earned...</i>
Number of Hours Worked	$t$	... for working $t$ hours
Number of Doghouses Sold	$n$	... for selling $n$ doghouses
Total Earnings (\$)	$E$	... in total



- (b) How much would Brian earn for working for 40 hours and selling 15 doghouses? **(2 APP)**

- (c) How many doghouses must Brian sell to earn \$1368.75 for 25 hours of work? **(4 APP)**

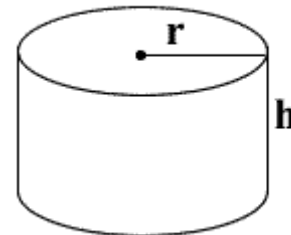
5. Shown at the right is a shape known as a *square prism*. Its volume can be found using the formula  $V = x^2 h$ .



- (a) Rearrange the formula to isolate  $x$ . (That is, solve for  $x$  in terms of  $h$  and  $V$ .) (3 APP)

- (b) Given that  $h = 5$  and  $V = 200$ , use the equation that you obtained in (a) to solve for  $x$ . (2 APP)

6. The surface area of a cylinder with radius  $r$  and height  $h$  is found using the formula  $A = 2\pi r^2 + 2\pi r h$ .



- (a) *Solve* for  $h$  in terms of  $r$ . (3 APP)

- (b) A cylinder has a surface area of  $200 \text{ m}^2$  and a radius of  $5 \text{ m}$ . Use the formula that you developed in (a) to calculate the height of the cylinder. (2 APP)

7. Sam is saving nickels and dimes in a jar. The jar contains 20 more nickels than dimes and altogether, the value of the coins is \$41.35. How many nickels and dimes are in the jar? [8 TIPS]

<i>Coin</i>	<i>Value of One Coin</i>	<i>Number of Coins</i>	<i>Value of Coins</i>
Dime	\$0.10	$d$	
Nickel	\$0.05		
Total	N/A		\$41.35



Nickel =  $5^c = \$0.05$



Dime =  $10^c = \$0.10$