MPM 1D0

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

Mr. Nolfi

Victim: _Mr. Solutions_ Well done as usual!

KU	APP	TIPS	COM
9 /9	17/17	8 /8	10/10

1. Complete the following table: **[6 COM]**

English Phrase or Sentence	Algebraic Expression or Equation
(a) Triple a number reduced by ten	$3x - 10$ ✓
(b) Five more than a number divided by 4 ✓	$5 + \dfrac{n}{4}$ ✓
(c) Four less than half a number	$\dfrac{y}{2} - 4$ OR $\dfrac{1}{2}y - 4$
(d) The sum of two consecutive integers is 10001.	$x + x + 1 = 10001$ ✓
(e) Twice the distance travelled, increased by 9 is 119.	$2d + 9 = 119$ ✓
(f) The product of -3 and five less than a number, all increased by 4 gives a result of 14. ✓	$-3(x - 5) + 4 = 14$

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)**

Quantity	Representation
width	w
length	$2.25w$

✓

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

Perimeter is 1040

w

$2.25 w$

$w + 2.25w + w + 2.25w = 1040$ ✓

(c) Solve the equation. **(3 KU)**

$6.5w = 1040$ ✓

$\therefore \dfrac{6.5w}{6.5} = \dfrac{1040}{6.5}$ ✓

$\therefore \ w = 160$ ✓

(d) State a conclusion. **(1 KU)**

The width of the field is 160 feet and the length is $2.25(160) = 360$ feet ✓

(e) Check the solution. **(1 KU)**

$160 + 160 + 360 + 360$
$= 1040$ ✓

3. <mark>Rida earns $0.50 per hour *more than* Gurpreet but $0.25 per hour *less than* Sara.</mark> 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)**

Student	Expression Representing Hourly Wage
Gurpreet	g
Rida	$g + 0.5$
Sara	$g + 0.75$

— Must be $0.25 less than Sara's wage

"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."

$$g + g + 0.5 + g + 0.75 = 49.25$$

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

$$3g + 1.25 = 49.25$$
$$\therefore 3g + 1.25 - 1.25 = 49.25 - 1.25$$
$$\therefore 3g = 48$$
$$\therefore \frac{3g}{3} = \frac{48}{3}$$
$$\therefore g = 16$$

Gurpreet earns $16.00 per hour, Rida earns $16.50 per hour and Sara earns $16.75 per hour.

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

Quantity	Variable Representing Quantity	Amount Earned…
Number of Hours Worked	t	… for working *t* hours $12.75t$
Number of Doghouses Sold	n	… for selling *n* doghouses $50n$
Total Earnings ($)	E	… in total $12.75t + 50n$

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

$$t = 40, \quad n = 15, \quad E = ?$$
$$\therefore E = 12.75(40) + 50(15)$$
$$= 510 + 750 = 1260$$

He earned $1260.

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

$$t = 25, \quad E = 1368.75, \quad n = ?$$
$$1368.75 = 12.75(25) + 50n$$
$$\therefore 1368.75 = 318.75 + 50n$$
$$\therefore 1368.75 - 318.75 = 318.75 + 50n - 318.75$$
$$1050 = 50n$$
$$\therefore \frac{1050}{50} = \frac{50n}{50}$$
$$\therefore 21 = n$$

Brian will need to sell 21 doghouses to make $1368.75 for working 25 hours.

COM

5. Naquan is saving nickels and dimes in a jar. The jar contains 10 more nickels than dimes, and altogether, the value of the coins is $16.25. How many nickels and dimes are in the jar? **[8 TIPS]**

Nickel = 5¢ = $0.05

Dime = 10¢ = $0.10

Solution

Coin	Number of Coins	Value of Coins ($)
Dimes	d ✓	$0.10d$ ✓
Nickels	$d+10$ ✱	$0.05(d+10)$

✱✱ The value of the coins is $16.25

$$0.10d + 0.05(d+10) = 16.25 \checkmark\checkmark$$

$$\therefore 0.10d + 0.05d + 0.5 = 16.25 \checkmark$$

$$\therefore 0.15d + 0.5 = 16.25$$

$$\therefore 0.15d + 0.5 - 0.5 = 16.25 - 0.5 \checkmark$$

$$\therefore 0.15d = 15.75$$

$$\therefore \frac{0.15d}{0.15} = \frac{15.75}{0.15} \checkmark$$

$$\therefore d = 105 \checkmark \quad (d+10 = 115)$$

Naquan has 105 dimes and 115 nickels. ← COM

Check: $105(0.10) + 115(0.05)$
$$= 10.5 + 5.75$$
$$= 16.25$$