

Mr. Nolfi

Victim: Mr. Solutions *Brilliantly done Mr. S.!!*

KU	APP	TIPS	COM
9/9	27/27	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. ✓	$5 + \frac{n}{4}$
(c) Four less than half a number	$\frac{n}{2} - 4$ ✓
(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) <i>A number is reduced by five, then the result is multiplied by -3 and finally, 4 is added. The final result is 14.</i> ✓	$-3(x - 5) + 4 = 14$

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)

width $\rightarrow w$ ✓
length $\rightarrow 2.25w$ ✓

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

$2(w + 2.25w) = 1040$ ✓ ✓



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

$$\begin{aligned}
 &2(w + 2.25w) = 1040 \\
 \therefore &2w + 4.5w = 1040 \\
 \therefore &6.5w = 1040 \\
 \therefore &\frac{6.5w}{6.5} = \frac{1040}{6.5} \quad \checkmark \\
 \therefore &w = 160 \quad \checkmark \\
 \therefore &2.25w = 2.25(160) = 360
 \end{aligned}$$

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

The width of an NFL football field is 160 feet and the length is 360 feet. ✓

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

$$\begin{aligned}
 &2(160) + 2(360) \\
 &= 320 + 720 \\
 &= 1040 \quad \checkmark
 \end{aligned}$$

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)

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

"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)

$$\begin{aligned} 3g + 1.25 &= 49.25 \\ \therefore 3g + 1.25 - 1.25 &= 49.25 - 1.25 \quad \checkmark \\ \therefore 3g &= 48 \\ \therefore \frac{3g}{3} &= \frac{48}{3} \quad \checkmark \end{aligned}$$

$$\therefore g = 16 \quad \checkmark$$

Gurpreet earns \$16/h,
Rida earns \$16.50/h
and Sara earns \$16.75/h ✓

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)

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 40 hours and selling 15 doghouses? (2 APP)

$$\begin{aligned} t &= 40, n = 15 \quad E = 12.75(40) + 50(15) \quad \checkmark \\ &= 1260 \quad \checkmark \end{aligned}$$

Brian would earn \$1260 for working 40 hours and selling 15 doghouses.

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

$$E = 1368.75, t = 25, n = ?$$

$$\begin{aligned} \therefore 1368.75 &= 12.75(25) + 50n \quad \checkmark \\ \therefore 1368.75 &= 318.75 + 50n \quad \checkmark \\ \therefore 1368.75 - 318.75 &= 318.75 + 50n - 318.75 \quad \checkmark \end{aligned}$$

$$\therefore 1050 = 50n$$

$$\therefore \frac{1050}{50} = \frac{50n}{50} \quad \checkmark$$

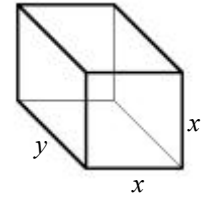
$$\therefore 21 = n \quad \checkmark$$

Brian needs to sell 21 doghouses to earn \$1368.75 for 25 hours of work.

-1C for not stating

-1C for not stating

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)

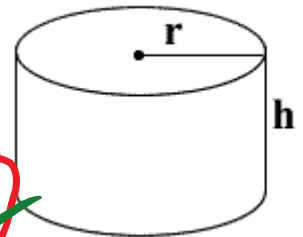
$$\begin{aligned}
 V &= x^2 h \\
 \therefore \frac{V}{h} &= \frac{x^2 h}{h} \\
 \therefore \frac{V}{h} &= x^2 \\
 \therefore \sqrt{\frac{V}{h}} &= \sqrt{x^2} \\
 \therefore x &= \sqrt{\frac{V}{h}}
 \end{aligned}$$

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

$$\begin{aligned}
 x &= \sqrt{\frac{V}{h}} \\
 &= \sqrt{\frac{200}{5}} \\
 &= \sqrt{40} \\
 &\approx 6.3
 \end{aligned}$$

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

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



$$\begin{aligned}
 A - 2\pi r^2 &= 2\pi r^2 + 2\pi rh - 2\pi r^2 \\
 \therefore A - 2\pi r^2 &= 2\pi rh \\
 \therefore \frac{A - 2\pi r^2}{2\pi r} &= \frac{2\pi rh}{2\pi r} \\
 \therefore h &= \frac{A - 2\pi r^2}{2\pi r}
 \end{aligned}$$

- (b) A cylinder has a surface area of 200 m^2 and a radius of 5 m . Use the formula that you developed in (a) to calculate the height of the cylinder. (2 APP) $A = 200, r = 5, h = ?$

$$\begin{aligned}
 h &= \frac{A - 2\pi r^2}{2\pi r} \\
 &= \frac{200 - 2(3.14)(5)^2}{2(3.14)(5)} \\
 &\approx 1.4
 \end{aligned}$$

The height is about 1.4 m .
 -1C for not stating

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]

Coin	Value of One Coin	Number of Coins	Value of Coins
Dime	\$0.10	d	$0.10d$
Nickel	\$0.05	$d+20$	$0.05(d+20)$
Total	N/A		\$41.35



Nickel = $5^c = \$0.05$



Dime = $10^c = \$0.10$

Value of dimes + Value of nickels = 41.35

$$0.10d + 0.05(d+20) = 41.35 \quad \checkmark \checkmark$$

$$\therefore 0.10d + 0.05d + 1 = 41.35$$

$$\therefore 0.15d + 1 = 41.35$$

$$\therefore 0.15d + 1 - 1 = 41.35 - 1$$

$$\therefore 0.15d = 40.35$$

$$\therefore \frac{0.15d}{0.15} = \frac{40.35}{0.15}$$

$$\therefore d = 269$$

$$\therefore d+20 = 269+20 = 289$$

There are 269 dimes and 289 nickels.

← -1c for not stating