

Grade 9 Academic Math
Unit 2 – Solving Equations – Part A

Mr. Nolfi

Victim:

Mr. Solutions *inspiring work Mr. S.!!*

KU	APP	COM
32/32	16/16	10/10

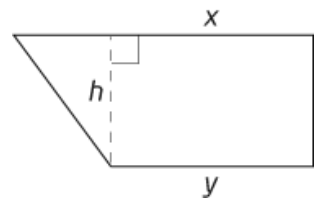
Modified True/False (3 KU)*✓ = 1/2 mark*Indicate whether each statement is true or false. If false, change the underlined part to make the statement true.

1. F ✓ $x = 2$ is the solution to the equation $4x - 2 = 4 - 2x$. Change: $x = 1$ ✓
2. F ✓ “Four reduced by triple a number is fifteen” is modelled by $3n - 4 = 15$. Change: $4 - 3n = 15$ ✓
3. F ✓ The algebraic expression $x - 5$ is equivalent to $5 - x$. Change: $-5 + x$ ✓
or $x + (-5)$

Multiple Choice (7 KU)

For questions 4 to 10, select the best answer. Write the letter of your choice in the provided blank space.

4. b ✓ Which is the correct solution for $x + 2 = 10$?
(a) $x = 12$ (b) $x = 8$ (c) $x = 2$ (d) $x = 6$
5. b ✓ $y = -2$ is the correct solution for which equation?
(a) $2y - 5 = 1$ (b) $y - 3 = -5$ (c) $3y + 1 = 5$ (d) $4y + 8 = -4$
6. c ✓ Andre sells electronic items such as digital music players and cell phones. He is paid \$15/h plus 5% commission on sales. Which expression represents Andre's total earnings?
(a) $0.5t + 15s$ (b) $0.05t + 15s$ (c) $15t + 0.05s$ (d) $15t + 0.5s$
7. b ✓ The area of a trapezoid with parallel sides x and y and height h is given by the equation $A = \frac{1}{2}h(x + y)$. Which is the correct formula for y ?
(a) $y = 2Ah - x$ (b) $y = \frac{2A - hx}{h}$ (c) $y = 2Ah + x$ (d) $y = \frac{2A}{hx}$
8. b ✓ The distance, d , in kilometres, a spaceship travels in t hours is given by the formula $d = 40000t$. How long will it take the spaceship to travel 120000 km?
(a) $0.3 h$ (b) $3 h$ (c) $30 h$ (d) $300 h$
 $\frac{120000}{40000} = 3$
9. b ✓ The perimeter of a rectangle can be found using the equation $P = 2l + 2w$. To isolate w , which of the following is the first step that you would perform to both sides?
(a) Add $2l$ (b) Subtract $2l$ (c) Multiply by $2l$ (d) Divide by $2l$
10. a ✓ Which of the following is a correctly rearranged form of the equation $y = mx + b$?
(a) $b = y - mx$ (b) $b = y + mx$ (c) $b = mx - y$ (d) $m = xy + b$



11. Solve each of the following equations. Remember to show the operation that is performed to each side.

(a) $-9y - 17 = -8$ (3 KU)

$$\therefore -9y - 17 + 17 = -8 + 17 \checkmark$$

$$\therefore -9y = 9$$

$$\therefore \frac{-9y}{-9} = \frac{9}{-9} \checkmark$$

$$\therefore \boxed{y = -1} \checkmark$$

(b) $-3 + 7x - 8 + 3x = -x - 13$ (4 KU)

$$\therefore 10x - 11 = -x - 13 \checkmark$$

$$\therefore -10x - 11 + x + 11 = -x - 13 + x + 11 \checkmark$$

$$\therefore 11x = -2$$

$$\therefore \frac{11x}{11} = \frac{-2}{11} \checkmark$$

$$\therefore \boxed{x = \frac{-2}{11}} \checkmark$$

(c) $-7(w-5)+1 = -(8-2w)$ (5 KU)

$$\therefore -7w + 35 + 1 = -8 + 2w \checkmark$$

$$\therefore -7w + 36 - 2w - 36 = -8 + 2w - 2w - 36 \checkmark$$

$$\therefore -9w = -44$$

$$\therefore \frac{-9w}{-9} = \frac{-44}{-9} \checkmark$$

$$\therefore \boxed{w = \frac{44}{9}} \checkmark$$

(d) $\frac{-2(b-4)}{5} = -3$ (4 KU)

$$\therefore \frac{5}{1} \left(\frac{-2(b-4)}{5} \right) = 5(-3) \checkmark$$

$$\therefore -2(b-4) = -15 \checkmark$$

$$\therefore -2b + 8 = -15$$

$$\therefore -2b + 8 - 8 = -15 - 8 \checkmark$$

$$\therefore -2b = -23$$

$$\therefore \frac{-2b}{-2} = \frac{-23}{-2}$$

$$\therefore \boxed{b = \frac{23}{2}} \checkmark$$

12. Rearrange each formula to solve for the indicated variable.

(a) $v = u + at$, for t (3 KU)

$$\therefore v - u = u + at - u \checkmark$$

$$\therefore v - u = at$$

$$\therefore \frac{v-u}{a} = \frac{at}{a} \checkmark$$

$$\therefore \boxed{t = \frac{v-u}{a}} \checkmark$$

(b) $P = I^2 R$, for I (3 KU)

$$\therefore \frac{P}{R} = \frac{I^2 R}{R} \checkmark$$

$$\therefore \frac{P}{R} = I^2$$

$$\therefore \sqrt{\frac{P}{R}} = \sqrt{I^2} \checkmark$$

$$\therefore \boxed{I = \sqrt{\frac{P}{R}}} \checkmark$$

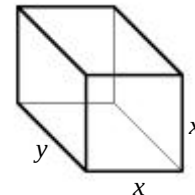
13. Solve the following equation. Then check your solution to verify that it is correct. (10 APP)

$$\frac{5u}{2} - \frac{1}{4}(u+3) = 9 - \frac{2u+3}{3} \quad (\text{The solution is } u = 3.)$$

$$\begin{aligned} \therefore \frac{12}{1} \left(\frac{5u}{2} \right) - \frac{12}{1} \left(\frac{1}{4} (u+3) \right) &= 12(9) - \frac{12}{1} \left(\frac{2u+3}{3} \right) \\ \therefore 6(5u) - 3(u+3) &= 108 - 4(2u+3) \\ \therefore 30u - 3u - 9 &= 108 - 8u - 12 \\ \therefore 27u - 9 &= 96 - 8u \\ \therefore 27u - 9 + 8u + 9 &= 96 - 8u + 8u + 9 \\ \therefore 35u &= 105 \\ \therefore \frac{35u}{35} &= \frac{105}{35} \\ \therefore u &= 3 \end{aligned}$$

Left-hand Side	Right-hand Side
$\frac{5u}{2} - \frac{1}{4}(u+3)$	$9 - \frac{2u+3}{3}$
$= \frac{5(3)}{2} - \frac{1}{4}(3+3)$	$= 9 - \frac{2(3)+3}{3}$
$= \frac{15}{2} - \frac{1}{4} \left(\frac{6}{1} \right)$	$= 9 - \frac{6+3}{3}$
$= \frac{15}{2} - \frac{6}{4}$	$= 9 - \frac{9}{3}$
$= \frac{15}{2} - \frac{3}{2}$	$= 9 - 3$
$= \frac{12}{2}$	$= 6$
$= 6$	
$\therefore \text{L.H.S.} = \text{R.H.S.}, \leftarrow \text{-1C for not stating}$	
$u=3 \text{ satisfies the equation}$	

14. Shown at the right is a shape known as a **square prism**. Its surface area can be found using the formula $A = 2x^2 + 4xy$.



(a) Rearrange the formula to isolate y. (That is, solve for y in terms of x and A.) (4 APP)

$$\begin{aligned} A - 2x^2 &= 2x^2 + 4xy - 2x^2 \\ \therefore A - 2x^2 &= 4xy \\ \therefore \frac{A - 2x^2}{4x} &= \frac{4xy}{4x} \end{aligned}$$

$$\therefore y = \frac{A - 2x^2}{4x}$$

(b) Given that $x = 10$ and $A = 500$, use the equation that you obtained in (a) to solve for y. (2 APP)

$$\begin{aligned} y &= \frac{500 - 2(10)^2}{4(10)} \\ &= \frac{15}{2} \end{aligned}$$