

Grade 9 Academic Math
Units 1 to 3 - Cumulative Test

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Name: Ms. Solutions

28/25

KU	APP	TIPS	COM
33/33	28	14/14	10/10

Modified True/False (7 KU)

Indicate whether each statement is true or false. If false, change the underlined part to make the statement true.1. T/F F A line that goes downwards to the right has a positive slope.Change: negative2. T/F F The slope of a vertical line is zero.Change: undefined3. T/F F $x^2 + x^2 = x^4$ Change: $2x^2$ 4. T/F F $-4^2 = (-4)(-4)$ Change: $-4(4)$ 5. T/F F $x^2(x^4) = x^8$ Change: x^6 6. T/F F The independent variable is always plotted on the y-axis.Change: x-axis7. T/F F "Triple a number less than 4 is fifteen" can be modelled as $3n - 4 = 15$.Change: $4 - 3n = 15$

Multiple Choice (6 KU)

For questions 8 to 13, select the best answer. Write the letter of your choice in the provided blank space.

8. d For the line with equation $y = \frac{-3}{5}x + 4$, if the run is 10, the rise must be...

(a) 6

(b) -3

(c) 3

(d) -6

9. a $y = -2$ is the correct solution for which equation?(a) $y - 3 = -5$ (b) $2y - 5 = 1$ (c) $4y + 8 = -4$ (d) $3y + 1 = 5$ 10. d The expression $(-3a^3)^2$ is equivalent to...(a) $-3a^5$ (b) $-3a^6$ (c) $9a^5$ (d) $9a^6$ 11. a When the formula $A = \pi r^2$ is rearranged to solve for r , the resulting equation is...(a) $r = \sqrt{\frac{A}{\pi}}$ (b) $r = \sqrt{\frac{\pi}{A}}$ (c) $r = \sqrt{A - \pi}$ (d) $r = \sqrt{\pi - A}$ 12. c When the expression $-2 - 3(-4)$ is evaluated, the result is...

(a) -20

(b) -14

(c) 10

(d) 1

13. a Which equation describes a line with the steepest slope?(a) $y = -10x$ (b) $y = 9x$ (c) $y = -3x$ (d) $y = 5x$

14. Simplify the following algebraic expression.

$$-3(2d^2 - 5d - 1) - 4d(d^2 + 6d - 3) \quad (5 \text{ KU})$$

$$= -6d^2 + 15d + 3 - 4d^3 - 24d^2 + 12d$$

$$= -4d^3 - 6d^2 - 24d^2 + 15d + 12d + 3$$

$$= -4d^3 - 30d^2 + 27d + 3$$

15. Simplify first. Then substitute and evaluate.

$$\frac{10b^7d^3(6bd^2)}{3(2b^2d)^4}, \quad b = -3, d = -1 \quad (5 \text{ KU})$$

$$= \frac{10(6)b^7bd^3d^2}{3(2)^4(b^2)^4d^4}$$

$$= \frac{60b^8d^5}{48b^8d^4}$$

$$= \left(\frac{60}{48}\right)\left(\frac{b^8}{b^8}\right)\left(\frac{d^5}{d^4}\right)$$

$$= \frac{5}{4}(1)(d^1)$$

$$= \frac{5}{4}d$$

$$= \frac{5}{4}(-1)$$

$$= -\frac{5}{4}$$

16. Solve each of the following equations. Wherever required, show the operation that is performed to each side.

(a) $-3(q-5)+1=-(8-6q) \quad (5 \text{ KU})$

$$-3q+15+1=-8+6q$$

$$\therefore -3q+16-6q=-8+6q-6q$$

$$\therefore -9q+16=-8$$

$$\therefore -9q+16-16=-8-16$$

$$\therefore -9q=-24$$

$$\therefore \frac{-9q}{-9} = \frac{-24}{-9} \Rightarrow q = \frac{8}{3}$$

(b) $\frac{2(b-3)}{3} = \frac{-4b}{9} \quad (5 \text{ KU})$

$$\therefore \frac{2(b-3)}{3} = \frac{-4b}{9}$$

$$\therefore 6(b-3) = -4b$$

$$\therefore 6b-18 = -4b$$

$$\therefore 6b-18+4b = -4b+4b$$

$$\therefore 10b-18 = 0$$

$$\therefore 10b-18+18 = 0+18$$

$$\therefore 10b = 18$$

$$\therefore \frac{10b}{10} = \frac{18}{10} \Rightarrow b = \frac{9}{5}$$

17. Solve the following equation showing all steps. Then check your solution to verify that it is correct. (7 APP)

$$\frac{3p}{4} - \frac{p+2}{6} = \frac{2(p+3)}{9} + 12$$

$$\therefore \frac{36}{1}\left(\frac{3p}{4}\right) - \frac{36}{1}\left(\frac{p+2}{6}\right) = \frac{36}{1}\left(\frac{2(p+3)}{9}\right) + 36(12)$$

$$\therefore 27p - 6(p+2) = 4(-2)(p+3) + 432$$

$$\therefore 27p - 6p - 12 = -8p - 24 + 432$$

$$\therefore 21p - 12 = -8p + 408$$

$$\therefore 21p - 12 + 8p = -8p + 408 + 8p$$

$$\therefore 29p - 12 = 408$$

$$\therefore 29p - 12 + 12 = 408 + 12$$

$$\therefore 29p = 420$$

$$\therefore \frac{29p}{29} = \frac{420}{29}$$

$$\therefore p = \frac{420}{29}$$

Left-hand Side

Right-hand Side

$$\frac{3p}{4} - \frac{p+2}{6}$$

$$= \frac{3}{4}\left(\frac{420}{29}\right) - \frac{1}{6}\left(\frac{420}{29} + 2\right)$$

$$= \frac{315}{29} - \frac{1}{6}\left(\frac{478}{29}\right)$$

$$= \frac{315}{29} - \frac{239}{87}$$

$$= \frac{315 \times 3}{29 \times 3} - \frac{239}{87}$$

$$= \frac{945}{87} - \frac{239}{87}$$

$$= \frac{706}{87}$$

$$= \frac{2(p+3)}{9} + 12$$

$$= \frac{2}{9}\left(\frac{420}{29} + \frac{87}{29}\right) + 12$$

$$= \frac{2}{9}\left(\frac{507}{29}\right) + 12 \times \frac{87}{87}$$

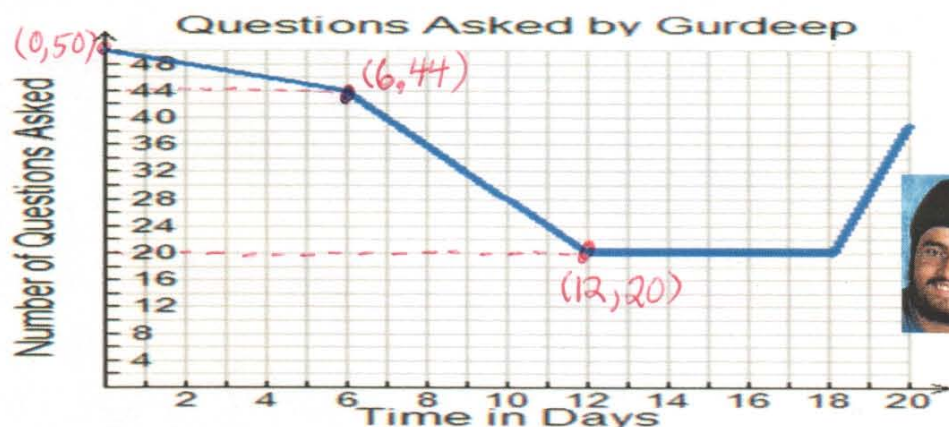
$$= \frac{-338}{87} + \frac{1044}{87}$$

$$= \frac{706}{87}$$

Since L.S. = R.S.

$p = \frac{420}{29}$ is correct

18. Gurdeep is famous for asking a large number of questions during every class discussion. (Hey! This reminds me of _____.) The following graph shows the number of questions that he asked in Mr. Nolfi's class each day during the first twenty school days. (8 APP)



Is it day 1 or 2?
Are the tests marked yet?
Do you think CPSS will ever have a surfing team?
Sir, what did you eat for lunch yesterday?
Blah, blah, blah, blah, blah, blah, blah, blah...



- (a) On what days did the number of questions remain constant? Explain.

• Days 12 to 18 ✓
• The graph is a horizontal line (slope is zero, dependent variable doesn't change) ✓

- (b) At what rate did the number of questions decrease for the first 6 days?

$$m = \frac{44 - 50}{6 - 0} = \frac{-6}{6} = -1 \quad \checkmark$$

The number of questions decreased at a rate of 1 per day. ✓

- (c) At what rate did the number of questions decrease from day 6 to day 12?

$$m = \frac{20 - 44}{12 - 6} = \frac{-24}{6} = -4 \quad \checkmark$$

The number of questions decreased at a rate of 4 per day. ✓

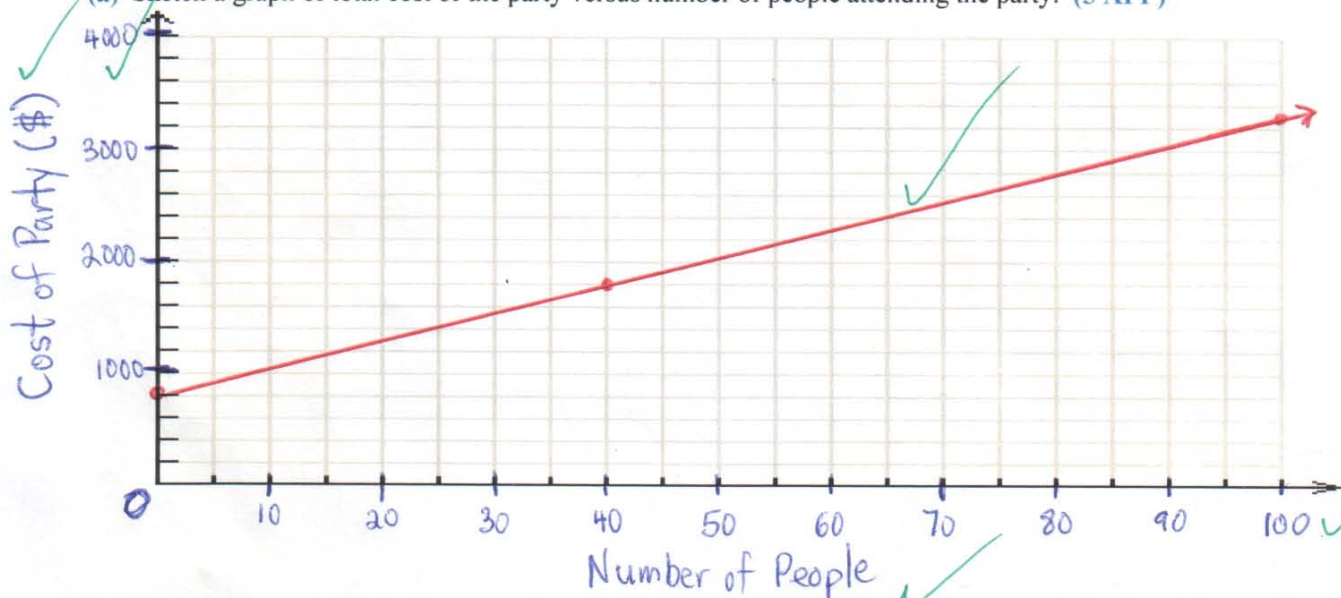
- (d) Let Q represent the number of questions asked and t represent the time in days. Write an equation that expresses Q in terms of t for the first six school days.

$m = -1$ (from (b)), $b = 50$ (from graph)

$$\therefore Q = -t + 50 \quad \checkmark \quad \checkmark$$

19. Aisha had a fancy dinner party for her fourteenth birthday. She rented a banquet hall for \$450 and hired a DJ for \$350. In addition, she paid \$25 *per person* for the meal that was served at the party.

- (a) Sketch a graph of total cost of the party versus number of people attending the party. (5 APP)



- (b) Let C represent the total cost of the party and let p represent the number of people attending the party. Write an equation relating C to p . (3 APP)

$$C = 25p + 800$$

- (c) Explain the *meaning* of the slope and y-intercept. (2 APP)

Slope = $m = 25$ dollars per person

y-intercept = $b = \$800$

= cost of DJ +
banquet hall rent

- (d) Altogether, Aisha paid \$2575 for her birthday party. How many people attended the party? (4 TIPS)

Total cost = 2575

$$\therefore 25p + 800 = 2575$$

$$\therefore 25p + 800 - 800 = 2575 - 800$$

$$\therefore 25p = 1775$$

$$\therefore \frac{25p}{25} = \frac{1775}{25}$$

$$\therefore p = 71$$

Seventy-one people attended Aisha's big birthday bash.

20. Oats 'n' Barley bulk food store sells cashews at \$18/kg and peanuts at \$6/kg. If the store wants to make a mixture of 50 kg of cashews and peanuts to sell for \$9/kg, how many kilograms of cashews and how many kilograms of peanuts must be in the mixture?

- (a) Complete the following table. Remember that all quantities must be expressed in terms of *a single variable*. (2 TIPS)

Quantity	Representation	Cost (Dollars)
Kilograms of peanuts in the 50 kg mixture.	p	$6p$
Kilograms of cashews in the 50 kg mixture.	$50 - p$	$18(50 - p)$

- (b) Translate the following sentence into an equation: (3 TIPS)

"In the 50 kg mixture, the cost of the peanuts plus the cost of the cashews is the total cost of the mixture."

$$6p + 18(50 - p) = 450$$

→ 50 kg (\$9/kg) = \$450

- (c) Now solve the equation and state a conclusion. (5 TIPS)

$$6p + 18(50 - p) = 450$$

$$\therefore 6p + 900 - 18p = 450$$

$$\therefore -12p + 900 - 900 = 450 - 900$$

$$\therefore -12p = -450$$

$$\therefore \frac{-12p}{-12} = \frac{-450}{-12}$$

$$\therefore p = 37.5$$

$$\text{and } 50 - p = 12.5$$

The mixture should contain 37.5 kg of peanuts and 12.5 kg of cashews.