

**PART A**

Place the answers to the following questions in the spaces provided at the right side of the page. Each correct answer is worth one mark.

1. Which of the following is the best way to determine the studying habits of Frontenac students? \_\_\_\_\_
- (a) Survey one random student from each grade level.  
 (b) Survey 50 random grade eleven students.  
 (c) Survey 25 random students from each grade level.  
 (d) Survey all students in the cafeteria at 9 am on Monday.
2. What type of correlation exists between hours of study and mark scored on an exam? \_\_\_\_\_
- (a) positive (b) negative (c) none (d) inverse
3. Richard needs a stratified sample from his class of 15 boys and 7 girls. If he chooses 6 students to survey, how many of them will be boys? \_\_\_\_\_
- (a) 6 (b) 4 (c) 2 (d) 3
4. Select the **correct** statement for the expression  $4x^2 - 5xy^2 + 6$ . \_\_\_\_\_
- (a) There are 2 terms.  
 (b) 5 is the coefficient of the second term.  
 (c)  $x$  is the only variable.  
 (d) 6 is the constant term.
5. What is the special name given to a polynomial like  $3xy^3 - 16x$ ? \_\_\_\_\_
- (a) monomial (b) binomial (c) trinomial (d) polynomial
6. Collect like terms:  $2x^2 - 3 + x - 5 + 6x - 5x^2$  \_\_\_\_\_
7. Expand:  $-3(x^2 - 2x + 7)$  \_\_\_\_\_
8. Simplify:  $\frac{30a^6b^4}{6a^2b}$  \_\_\_\_\_
9. Solve for  $x$ :  $\frac{-x}{7} = 5$  \_\_\_\_\_
10. Given the relation  $y = 4x - 7$ , state: \_\_\_\_\_
- (a) the slope \_\_\_\_\_  
 (b) the y-intercept \_\_\_\_\_  
 (c) the equation in standard form \_\_\_\_\_  
 (d) the slope of a line perpendicular to it \_\_\_\_\_



11. Write the equation of a vertical line that passes through (- 2, 4). \_\_\_\_\_

12. Brennan shovels snow as a part-time job. He charges a \$2 flat fee and \$8/hour.

(a) What is the independent variable for this relationship? \_\_\_\_\_

(b) Write an equation to represent the relationship. \_\_\_\_\_

(c) How much would Brennan charge for a 2.5 hour job? \_\_\_\_\_

(d) How long must he shovel to earn \$36 at a job? \_\_\_\_\_

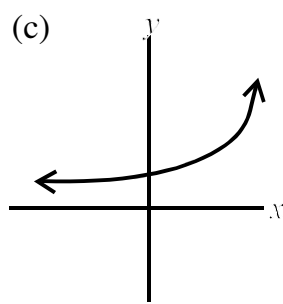
13. Which of the following represents a linear relationship? \_\_\_\_\_

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(a)

x	y
3	2
4	5
5	8
6	11
7	14

(b)  $y = x^2 + 1$

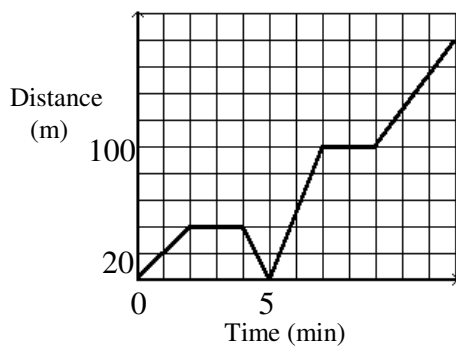


(d) none of these

14. A line with a slope of 2 is steeper than a line with a slope of - 3. True or False  
(circle one)



15. The following graph describes how Brooke goes from her locker to the cafeteria at lunch.



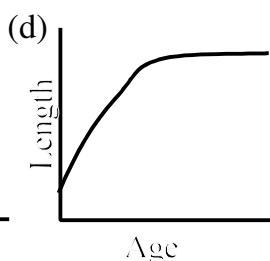
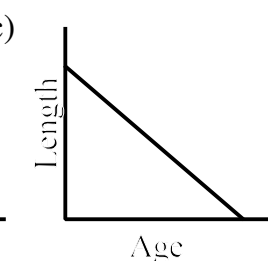
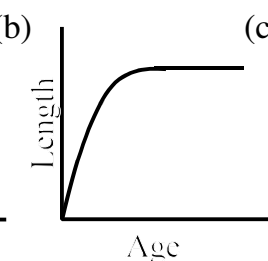
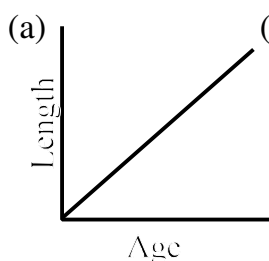
(a) During what time interval was Brooke travelling the slowest? (but still moving) \_\_\_\_\_

(b) During what time interval(s) was she stopped? \_\_\_\_\_

(c) How far away from her locker was she when she realized she had forgotten her lunch and turned around to go back for it? \_\_\_\_\_

(d) What is Brooke's average speed from 5 to 12 seconds, correct to 1 decimal place? \_\_\_\_\_

16. The length of a dog from nose to tail depends on its age. Which of the following graphs best describes this? \_\_\_\_\_



17. Kevin spent \$18 on chips and licorice over a period of time. The chips cost \$0.75 per bag and licorice costs \$0.25 per piece.

(a) Write an equation to represent how Kevin spent his money. \_\_\_\_\_

(b) What is the maximum number of chips he could buy for \$18? \_\_\_\_\_

18. Evaluate (no decimal answers):

(a)  $\left(\frac{2}{5}\right)^3$  \_\_\_\_\_

(b)  $-3^5$  \_\_\_\_\_

19. Write  $(-4)^{14} \div (-4)^2$  as a single power. Do not evaluate. \_\_\_\_\_

20. What is the complement of  $60^\circ$ ? \_\_\_\_\_

21. Corresponding angles form a C pattern. \_\_\_\_\_

True or False

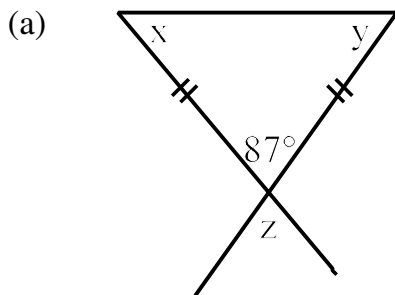
(circle one)

22. In any  $n$ -sided polygon, what is (a) the sum of the exterior angles? \_\_\_\_\_

(b) the sum of the interior angles? \_\_\_\_\_

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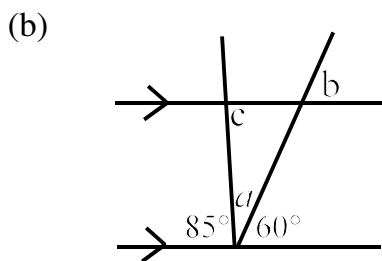
23. Find the value of each unknown angle.



x = \_\_\_\_\_

y = \_\_\_\_\_

z = \_\_\_\_\_

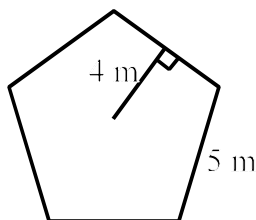


a = \_\_\_\_\_

b = \_\_\_\_\_

c = \_\_\_\_\_

24. What is the area of the following regular pentagon? \_\_\_\_\_



25. What is the surface area of a sphere with radius 15 cm, correct to 1 decimal place? \_\_\_\_\_

- 2 26. The area of the base of an hexagonal prism is  $x \text{ cm}^2$  and its height is  $y \text{ cm}$ .

(a) Write an expression for its volume. \_\_\_\_\_

(b) What is the volume of a pyramid with the same base and height? \_\_\_\_\_

## PART B

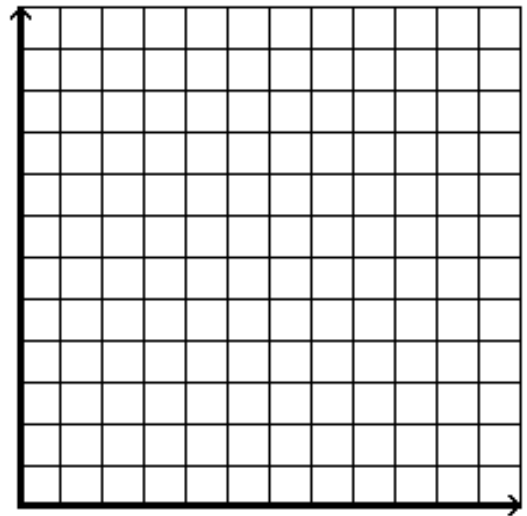
Give complete solutions for the remainder of the exam.

1. Teachers record the number of days of school students have missed. They also record student marks.



- 4 (a) Create a scatter plot of the data shown in the chart below.

Days of School Missed	Mark (%)
0	95
4	82
12	60
6	71
1	88
3	81



- 1 (b) Describe any trend in the data.

- 1 (c) Draw the line of best fit.

- 1 (d) Estimate the mark of a student who has missed 8 days. \_\_\_\_\_

- 1 (e) Did you interpolate or extrapolate in part (d)? \_\_\_\_\_

- 2 (f) Calculate the mean point for this data, correct to 1 decimal place. ( \_\_\_\_\_ , \_\_\_\_\_ )

2. Expand and simplify.

- 3,3 (a)  $5 - 4(2x - 5) + x(x^2 - 3x + 1)$       (b)  $(b + 3)(2b - 5)$

3    3. Factor.     $12x^3y^2 + 9x^2y^3 - 6xy^4$

3    4. Divide.     $\frac{8x^4 - 6x^3 + 2x}{2x}$

5. Solve each equation.

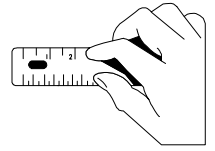
2,3    (a)  $-5x + 20 = 30$

(b)  $5(2 - x) = 7x - 26$

4    (c)  $\frac{x-2}{2} - \frac{x}{6} = -2$



6. On the grid provided, graph the relations below using the method indicated.

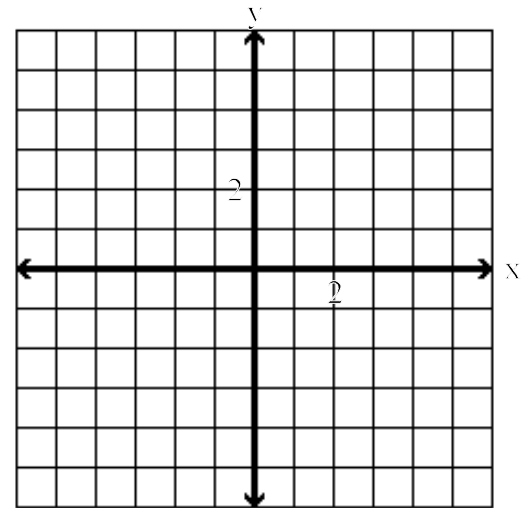


2 (a)  $y = -\frac{2}{3}x + 4$  ; slope,  $y$ -intercept method

2 (b)  $3x - 5y = 15$  ;  $x$  and  $y$ -intercept method

$x$ -intercept

$y$ -intercept



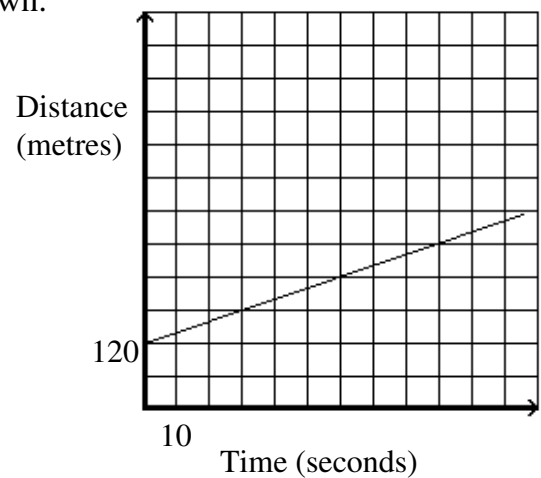
7. Answer the following questions using the graph shown.

1 (a) What is the slope of the line?

1 (b) What does the slope represent in this situation?

1 (c) What does the  $y$ -intercept represent?

2 (d) Write an equation for the line.



8. A line passes through the points  $(2, 5)$  and  $(-2, -3)$ . Algebraically, determine

2,3 (a) the slope of the line.

(b) the equation of the line in  $y = mx + b$  form.

9. Simplify using the laws for exponents.

2,2 (a)  $(8a^3b)(-2a^2b^5)$

(b)  $(3x^3y^5)^2$

10. Dance tickets are \$5 for students and \$6 for guests. At the last dance, \$1300 was collected and 250 people attended.

1 (a) State two variables that you would use in representing this situation. (Write 'let' statements.)

1 (b) Write an equation that represents the total number of people attending the last dance.

1 (c) Write an equation that represents the total money collected at the last dance.

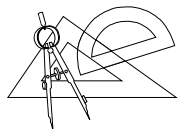
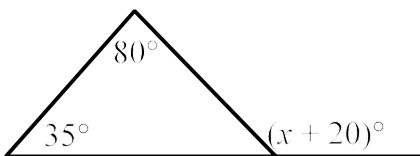
4 (d) Determine graphically, how many students and guests attended the dance..



2 11. Rearrange the following equation to be in  $y = mx + b$  form.

$$2x - 3y + 18 = 0$$

2 12. Solve for  $x$ . Show your work.



13. Erin works at Pizza Pizza. She notices one day how much empty space is around each pizza in its box.

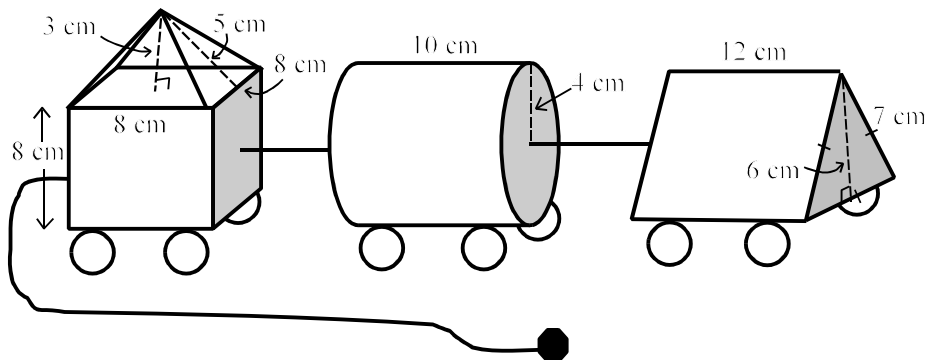
- 3 (a) If the box has a square base with side lengths of 36 cm, and each pizza averages 30 cm in diameter, how much of the box's bottom is **not** covered by pizza? Answer correct to 1 decimal place.



- 4 (b) Domino's Pizza boxes have octagonal bases. For the same size pizza, Domino's box would have a side length of 16 cm and an apothem of 18 cm. Does Domino's box use more or less cardboard for its base than Pizza Pizza? How much more or less?



14. Connor received the amazing Shape-0 Train for Christmas. It consists of the three 'shaped' train cars shown. They are not only fun but fillable! (Note: You may ignore the wheels and strings in all calculations.)



- 5 (a) Connor decides to fill the cars with coloured sand. How much sand would he need to perfectly fill the three cars? (Show your work and answer correct to 1 decimal place.)
- 1 (b) If coloured sand costs  $\$0.005/\text{cm}^3$ , what is the cost of the sand?
- 5 (c) Connor decides to paint all exposed faces of the **first** car of the train, including the bottom. What is the surface area to be painted?

