TEST NAME: **Math Algebra 1 FAIM 2016 Form 2-B**
TEST ID: **1549489**
GRADE: **Ninth Grade - Twelfth Grade**
SUBJECT: **Mathematics**
TEST CATEGORY: **State Interim Assessment**

Student:

Class:

Date:

1. Which situation could be represented by an exponential function?

   A. an account that earns $400 per year

   B. an account that earns 4% interest, compounded monthly, each year

   C. an account that earns 1% the first year, 2% the second year, 3% the third year and so on

   D. an account that earns $100 the first year, $200 second year, $300 the third year and so on

2. To the nearest integer, what is $f(-2)$ for the graph of the function f shown below?
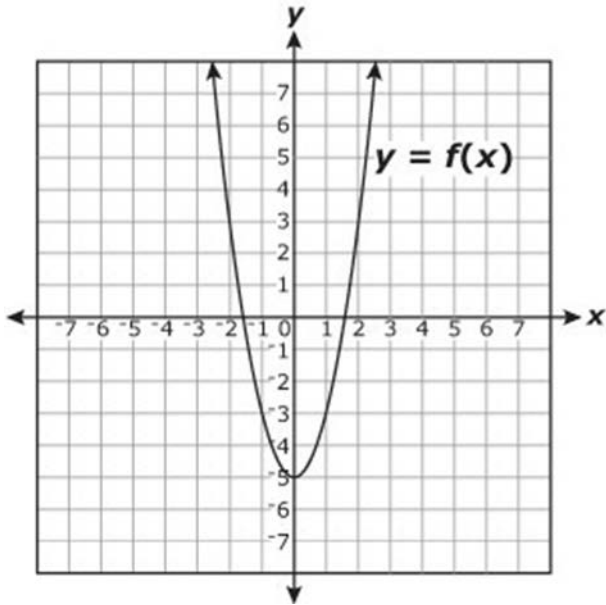
3. A quadratic equation $x^2 - 8x + 9 = 0$ is rewritten in the form $(x - p)^2 = q$. What are the values of p and q?

4. If $x = -2$ is a solution to the equation $f(x) = g(x)$, which of these statements **must** be true?

   A. The graphs of f and g intersect each other at $x = -2$.

   B. The graphs of f and g intersect each other at $x = 2$.

   C. The graphs of f and g intersect the x-axis at -2.

   D. The graphs of f and g intersect the y-axis at -2.

5. Joel has d dimes and q quarters with a total value of $25.50. Write an equation that represents the total amount **in dollars** in terms of d and q that Joel has.

6. The student council is selling rolls of gift wrap and ribbon for the holiday season. The council charges $10 for a roll of gift wrap and $3.50 for a roll of ribbon.

   The student council will receive, as profit, 60% of the total sales. The student council has a fundraising goal of at least $1,500.

   Let g equal the number of rolls of gift wrap sold and let r equal the number of rolls of ribbon sold.

   Which inequality represents the student council meeting its fundraising goal?

   A. $10g + 3.5r \leq 1,500$

   B. $10g + 3.5r \geq 1,500$

   C. $10g + 3.5r \leq 2,500$

   D. $10g + 3.5r \geq 2,500$

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7. Zuna drew the following scatter plot.

ZUNA'S DATA
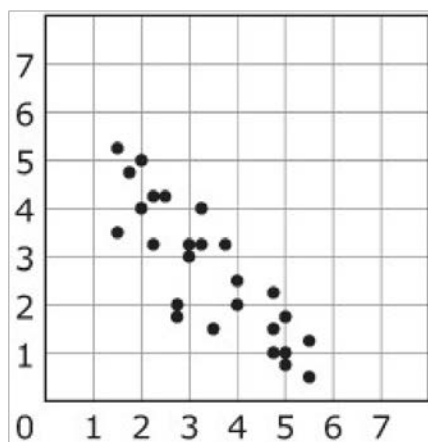
Part A. Which family of functions (linear, quadratic, or exponential) would be most appropriate to model the data?

Part B. Give one reason that supports your response.

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8. A nurse recorded the ages and systolic blood pressure of a group of 10 patients who visited the hospital.

Age	Blood Pressure (in mmHg)
37	121
40	125
45	132
48	143
54	130
54	127
60	129
64	139
74	132
76	127

What is the **best** estimate for the correlation coefficient, *r*?

A. $r = 1$

B. $r = -1$

C. $0 < r < 1$

D. $-1 < r < 0$

9. Factor the expression below.

$$\frac{3}{4}x^2 + \frac{31}{20}x - \frac{3}{5}$$

10. A ruler can measure the length to the nearest 0.1 centimeter. Which of these lengths is the most precise measurement the ruler could make of a wire that measures 13.58 cm?

   A. 13 cm

   B. 13.5 cm

   C. 13.6 cm

   D. 14 cm

11. What is the value of $f(2)$ when $f(x) = x^4 + 3x^2 - 6x + 8$?

12. A square kitchen is x feet on each side. The counters cover the length of the kitchen on two sides to a depth of 3 feet. There is also a table that measures 3 feet by 4 feet.
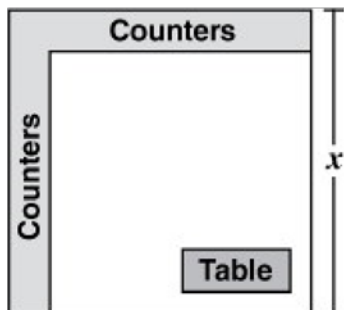
Which expression represents the area, **in square feet**, of the floor space that is NOT covered by the table and counters?

   A. $x^2 - 6x - 21$

   B. $x^2 + 6x - 3$

   C. $x^2 - 6x - 12$

   D. $x^2 - 6x - 3$

13. In marine biodegradation tests, a substance was found to decay according to the formula $y = y_0 e^{-kt}$, where y represents the amount of the substance that is left after t years, y_0 represents the initial amount of the substance, and k represents the decay constant for this type of substance. Using this formula, the value of k was determined to be 0.0144. How many kilograms of an initial amount of 200 kilograms of this substance will be left after 240 years? Round your answer to the nearest hundredth.

14. In a biology lab experiment, a student observes that the number of cells in sample A is decreasing exponentially while the number in sample B is decreasing linearly. Which statement is possibly **correct**?

    A. In both samples, the number of cells decreases by 200 every hour.

    B. In both samples, the number of cells decreases by a factor of 0.96 every hour.

    C. In sample A, the number of cells decreases by 200 every hour, and in sample B, the number of cells decreases by a factor of 0.96 every hour.

    D. In sample A, the number of cells decreases by a factor of 0.96 every hour, and in sample B, the number of cells decreases by 200 every hour.

15. What is the expression $-x^2 + 6x + 2$ written in the form $a(x - h)^2 + k$?

16. Representations of two quadratic functions, *f* in the table and *g* on the graph, are shown.

f

x	f(x)
3	-4
4	-7
5	-8
6	-7
7	-4

g
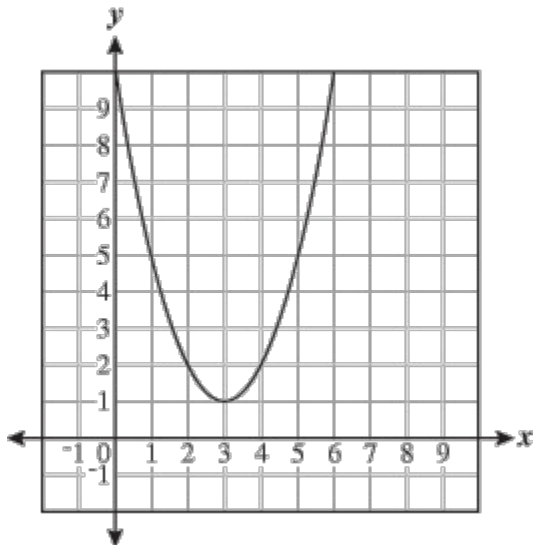
Which of the following has the greatest value?

A. the *x*-value of the minimum of *f*

B. the *x*-value of the minimum of *g*

C. the *y*-value of the minimum of *f*

D. the *y*-value of the minimum of *g*

17. Let *n* indicate the position of a term in the sequence below. For example, when $n = 2, f(n) = 4$.

$-2, 4, -8, 16, -32, 64, \dots$

Write an explicit function in terms of *n* that describes this sequence.

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18. What are the zeros of the function $f(x) = 3x^2 - 3x - 18$?

   A. 2 and -3

   B. -2 and 3

   C. 6 and -3

   D. -6 and 3

19. A radioactive element decays by about 50% per day, according to the equation $y = y_0(0.50)^x$, where y represents the amount of the element left after x days and y_0 represents the initial amount of the element.

   Part A. Write the equation that can be used to approximate the hourly rate of decay of the element.

   Part B. Determine the approximate percentage of the element that decays per hour.

   Use words and/or numbers to show your work.

20. The scatter plot represents the relationship between the number of hours studied and scores earned on a science midterm.

NUMBER OF HOURS VS. SCORES
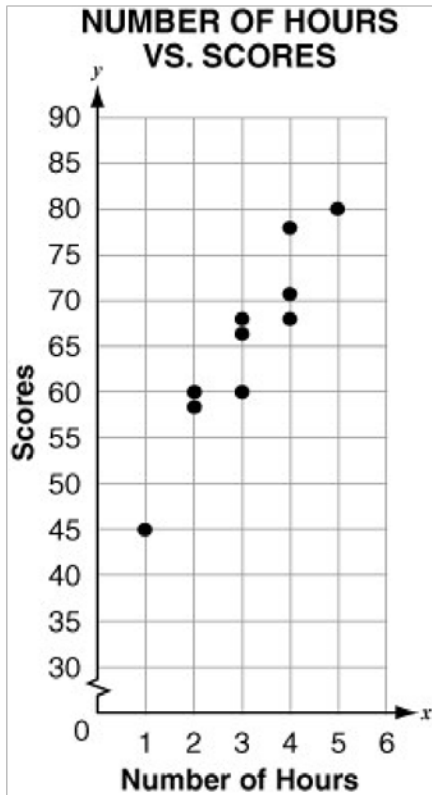
Which of these functions **best** fits the data shown in the scatter plot?

A. $y = \frac{1}{8}x + 40$

B. $y = \frac{1}{10}x + 30$

C. $y = 8x + 40$

D. $y = 10x + 30$

21. Walker deposits $500 into a bank account that earns simple interest of 5 % each year. He plans to deposit and save $150 that he earns mowing lawns at the beginning of each year. Walker's grandma also gives him $250 a year which he saves, but that is not put into his bank account. Write a function *f* that represents the amount of money Walker has after *x* years of saving.

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22. Lisa solves a quadratic equation as shown below.

$$6 = x^2 + 2x - 8$$
$$6 = (x + 4)(x - 2)$$
$$6 = x + 4 \text{ and } 6 = x - 2$$
$$x = 2 \text{ and } x = 8$$

Which of these **best** describes the error in her work?

A. The last line should be $x = 2$ or $x = 8$.

B. The 6 should have been subtracted from both 6 and $x^2 + 2x - 8$ before factoring.

C. Only $(x + 4)$ or $(x - 2)$ should be set equal to 6, not both factors.

D. The 6, 2, and -8 should be simplified to 3, 1, and -4 before factoring.

23. A model rocket is launched from a high platform at a celebration. The height in meters, h, of the model rocket until it hits the ground is modeled by the expression $h = -4.9x^2 + 19.6x + 24.5$, where x represents the time in seconds after the launch.

Part A. Write the expression in factored form and find the zeros of the function.

Part B. What do the zeros of the function represent in terms of the given context?

Part C. The midpoint of the x-intercepts represents the x-coordinate of the vertex of the function. Using this reasoning, determine how many seconds it will take for the model rocket to reach its **maximum** height.

Part D. What is the **maximum** height of the model rocket after it is launched?

Use words and/or numbers to show your work.

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