

TEST NAME: Math Algebra 1 FAIM 2016 Form 1-B
TEST ID: 1549487
GRADE: Ninth Grade - Twelfth Grade
SUBJECT: Mathematics
TEST CATEGORY: State Interim Assessment

08/01/16, Math Algebra 1 FAIM 2016 Form 1-B

Student:

Class:

Date:

1. The solutions to the equation $f(x) = g(x)$ are -2 and 1 . If f and g are graphed on the same coordinate plane, which statement must be true?
 - A. The functions will intersect at $x = -2$ and $x = 1$.
 - B. The functions will intersect at $y = -2$ and $y = 1$.
 - C. Both functions will have y-intercepts at -2 and 1 .
 - D. Both functions will have x-intercepts at -2 and 1 .
2. What is the average rate of change of $f(x) = 2x^2 - 4x - 1$ over the interval of $x = 3$ to $x = 3.1$?
3. The formula to find the kinetic energy of an object measured in joules, E , is $E = \frac{1}{2}mv^2$, where m represents the mass of the object in kilograms and v represents the velocity (or speed) of the object in meters per second. What is the equation to find v in terms of E and m ?
4. If the expression $2x^5 - 162x$ is equivalent to $g(x)(x - 3)$, which expression could represent $g(x)$?
 - A. $(x^2 + 9)(x + 3)$
 - B. $(x^2 + 9)(x - 3)$
 - C. $2x(x^2 + 9)(x + 3)$
 - D. $2x(x^2 + 9)(x - 3)$

5. Let R denote a relation between two sets of data. The correlation coefficient of R is 0. What does this coefficient indicate?
6. A car purchased for \$20,000 depreciates annually at a rate of 8%. The value of the car t years after its purchase is given by the expression $20000(0.92)^t$. Which expression represents the monthly depreciated value at the rate at which the car is depreciating?
- A. $20,000(0.92^{\frac{1}{2}})^{12t}$
- B. $20,000(0.92^{12})^{\frac{1}{12}t}$
- C. $20,000(0.92^{\frac{1}{12}})^{\frac{1}{12}t}$
- D. $20,000(0.92^{12})^{12t}$
7. Since digital photography has become so popular, companies have developed online photo printing services. An online photo printing service will charge for printing and shipping of prints from photos sent by the buyer. At one company, the cost of 10 prints is \$5.25 and the cost of 200 prints is \$52.75. The cost of the prints varies linearly with the number of prints purchased.

Part A: What is the slope of the linear model and what does it represent in terms of the cost of a print and number of prints purchased?

Part B: What is the y -intercept of the linear model and what does it mean in terms of the cost to the buyer?

8. In a research experiment, the initial population of a colony of bacteria is 25 and doubles every hour. The population, y , of the colony after x hours can be represented by the function $y = 25(2)^x$. What values for the domain are reasonable in the given context?
- A. all real numbers
 - B. all real numbers greater than 0
 - C. all real numbers greater than or equal to 0
 - D. all real numbers greater than or equal to 25

9. Look at the sequence below.

0.2, 0.02, 0.002 ... $f(n)$

Write a recursive formula describing $f(n)$ in terms of $f(n - 1)$ where n represents the number of terms in the sequence. Be sure to define $f(1)$ in your answer.

10. A company creates boxes shaped like prisms. The square base for one of the boxes measures 3.456 meters on a side and measures 5.12 meters high. What is the volume of the box rounded to the appropriate number of significant digits?

- A. 61.1
- B. 61.2
- C. 61.15
- D. 61.16

11. The height, in feet, of a javelin t seconds after it is thrown is modeled by the function $h(t) = -4t^2 + 24t + 6$. After how many seconds does the javelin reach its maximum height of 42 feet?

12. Selected values of polynomial function f are given in the table below.

x	$f(x)$
-4	8
-1	3
0	-1
2	-2
5	-8

Which statement **must** be true?

- A. $f(x)$ is decreasing for all values of x such that $-4 < x < 5$.
 - B. $f(x)$ is negative for all values of x such that $-4 < x < 5$.
 - C. $f(x)$ has an x -intercept at $x = c$ such that $-1 < c < 0$.
 - D. $f(x)$ has a vertical asymptote at $x = c$ such that $-1 < c < 0$.
13. Ashton deposited \$1,000 into a bank account in which interest is compounded annually. The table below shows the total amount in his account at the end of different periods of time.

Time (in years)	Amount (in dollars)
0	1,000.00
1	1,082.50
3	1,268.48
7	1,741.79
11	2,391.70

What is the annual rate of return of Ashton's investment to the nearest hundredth of a percent?

14. Use the table to answer the question below.

x	$f(x)$
0	2
1	8
2	32
3	128
4	512

Which of these best represents the function shown in the table?

A. $f(x) = 2(4^x)$

B. $f(x) = x + 2$

C. $f(x) = 6x + 2$

D. $f(x) = x^5$

15. Use the complete-the-square method to find the minimum value of $f(x) = 3x^2 + 6x - c$.

16. The volume of a cylindrical water tank can be found using the expression Bh , where B represents the area of the base of the water tank, in square meters, and h represents the height of the water tank, in meters.

The tank is filled to exactly half its volume with water. Water has a density of 1 gm/cm^3 . Which expression represents the mass of the water in kilograms in the tank, given that mass is density times volume?

A. $1000Bh$

B. $500Bh$

C. $0.001Bh$

D. $0.0005Bh$

17. Neilson deposited \$800 in a savings plan offered by a local bank. The monthly balance in his savings account at the bank is shown in the table below.

Number of Months	Monthly Balance (in dollars)
1	816
2	832
3	848
4	864
5	880
6	896

How does Neilson's monthly balance change each month?

18. Aya is studying four different relations. She uses a number generator to determine inputs she will use for all of the relations and then calculates the outputs of the relation and records them. The numbers Aya plugs in to the relations are $\{2, 5, 8, 6, 5, 2, 8, 7, 9\}$, in that order. If the outputs are also recorded in order, which set of values shows outputs of a relation that is NOT a function?
- A. $\{2, 5, 8, 6, 5, 2, 8, 7, 9\}$
- B. $\{3, 6, 9, 6, 6, 3, 9, 1, 0\}$
- C. $\{3, 3, 3, 3, 3, 3, 3, 3, 3\}$
- D. $\{9, 6, 3, 5, 1, 6, 0, 3, 2\}$

19. The students in Mrs. Bria's algebra class are having their final exam today. The exam consists of 2-point questions and 5-point questions and is worth a total of 145 points.

Part A. A student needs a score of **at least** 116 points out of the possible 145 to get a B on the exam. Write a system of inequalities that can be used to determine the possible numbers of 2-point questions (t) and of 5-point questions (f) that would need to be answered correctly in order to receive **at least** a B on the exam. Assume that the values t and f will be restricted to positive integers only.

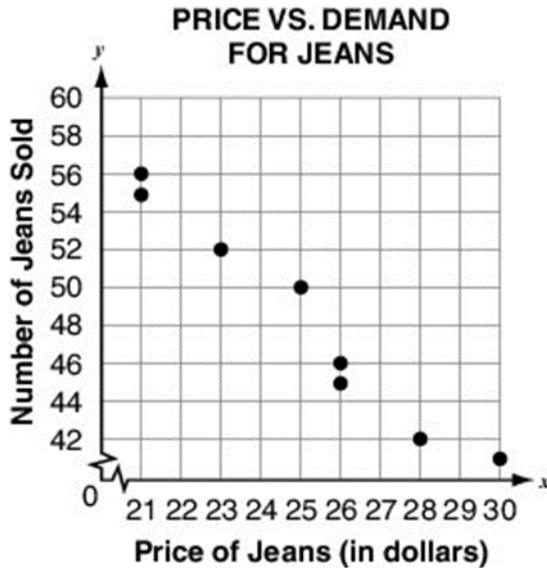
Part B. Combinations of correct 2-point and 5-point questions for three students are listed below.

- Jason got 15 of the 2-point questions and 18 of the 5-point questions correct.
- Nancy answered 11 of the 5-point and 12 of the 2-point questions correctly.
- Sammy correctly answered 18 of the 2-point questions and 24 of the 5-point questions.

Determine which students got **at least** a B on the exam and determine whether each of the three combinations is a reasonable solution in terms of the given context. Show your work.

Use words and/or numbers to show your work.

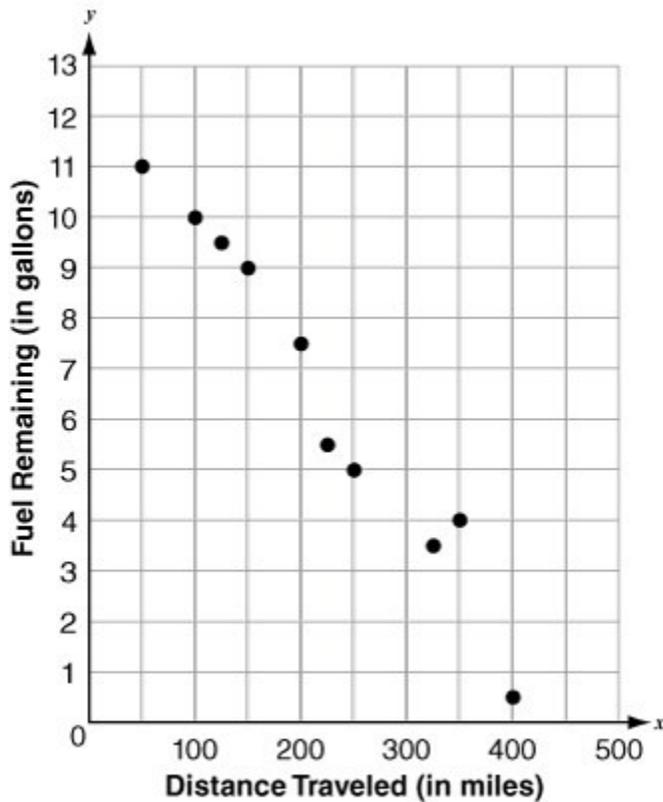
20. The scatter plot below shows the change in the demand for a pair of jeans at a store as the price changes. The sales manager uses $y = -1.75x + 92.13$ as a line of best fit.



What is the residual value to the nearest tenth when the price of jeans is \$28?

- A. -7.0
 - B. -1.1
 - C. 1.1
 - D. 7.0
21. A certain company's charges for tiling a rectangular room include the cost of the material used and a flat rate for installation. The length of a certain room is 2 feet more than its width, and the company's charges, in dollars, for tiling the room are $12.5x(x + 2) + 400$. What does 12.5 represent in this expression?

22. Jillian is planning a cross-country road trip and wants to know how far she can drive her car before she has to stop for gasoline. Before she leaves for her trip, she takes 10 different measurements of the fuel level in her gasoline tank after driving a certain number of miles. She creates the scatter plot below.



What is the equation of the line that **best** fits the data?

- A. $y = 0.02x + 12$
- B. $y = -0.02x + 12$
- C. $y = 0.029x + 12.8$
- D. $y = -0.029x + 12.8$

23. The vertical height, $f(x)$, of a football kicked at practice is modeled by the function, $f(x) = -0.0075x^2 + 1.5x$, where x represents the horizontal distance from the kicker. Both measurements are in feet.

Part A. Write the function in factored form.

Part B. Determine how far away the ball was from the kicker when it came back down to the ground.

Part C. Write the function in vertex form by completing the square.

Part D. Find the maximum height the football reached.

Use words and/or numbers to show your work.