

**TEST NAME: Math Algebra 2 FAIM 2016 Form 1-B**

**TEST ID: 1549491**

**GRADE: Ninth Grade - Twelfth Grade**

**SUBJECT: Mathematics**

**TEST CATEGORY: State Interim Assessment**

Student:

Class:

Date:

1. Which of these is equivalent to the expression  $\sqrt{-(-25)} - \sqrt{-25}$ ?

A.  $10i$

B.  $-10i$

C.  $5-5i$

D.  $5+5i$

2. A train departs from its initial city at 12:00 noon ( $t=0$ ). Sarai is interested in how the overall speed of the train changes during its journey. (For example, during a five-minute stop-over at a station, the train's overall speed for the journey would slowly decrease.)

Determine the domain of the function  $s$ , which represents the overall speed from noon until  $t$  minutes into the trip.

3. A personal trainer has developed an exercise plan for beginners. For the first 10 days, the beginner increases his or her daily exercise time by 4 minutes. On the third day, the beginner exercises for 16 minutes.

Which expression models the number of minutes the beginner will exercise on the  $n$ th day?

A.  $8n-6$

B.  $8n-4$

C.  $4n+4$

D.  $4n+12$

4. Two functions are defined as  $g(x) = 4x - 3$  and  $f(x) = \frac{2}{3}x^2 - 4$ . What is the difference in the average rate of change of  $g$  and  $f$  over the interval from  $x=0$  to  $x=3$ ?
5. The number of mold spores on a spoiled piece of fruit is modeled by the equation  $N(t) = 4 \cdot 10^{5t}$ , where  $N(t)$  represents the number of mold spores and  $t$  represents the time in hours since the initial introduction of mold. Which equation can be used to determine how many hours will pass before there are 120 mold spores on the piece of fruit?
- A.  $t = \log(6)$  hours
- B.  $t = \frac{\log(30)}{5}$  hours
- C.  $t = \frac{\log(120)}{5 \log(4)}$  hours
- D.  $t = \frac{\log(120)}{5 \log(40)}$  hours
6. If  $P(A) = 0.34$ ,  $P(B) = 0.65$ , and  $P(A \text{ and } B) = 0.3$  what is  $P(A \text{ or } B)$ ?
7. Which expression shows the factors of the equation  $y = (x - 10)^2 - 36$ ?
- A.  $(x - 6)^2$
- B.  $(x - 6)(x + 6)$
- C.  $(x - 16)(x + 16)$
- D.  $(x - 16)(x - 4)$

8. Philip has two bags. One bag contains 3 white balls and 5 black balls, and the other bag contains 4 red balls and 6 green balls. Philip picks one ball, without looking, from each bag.

Part A. What is the probability that Philip picks a white ball from the first bag and then a red ball from the second bag?

Part B. Are these two events dependent or independent? Use the probability found in Part A to validate your answer.

Use words and/or numbers to show your work.

9. What is the remainder of the division  $(x^3 + 4x^2 - 2x + 7) \div (x + 2)$ ?

- A. 7
- B. 19
- C. 27
- D. 35

10. In the system of equations shown, what is the value of the **y-coordinate** of the solution?

$$y = 2x + 6$$

$$2y = 6x - 20$$

11. In an auditorium, there are 12 seats in the first row and the number of seats increases by 3 in each successive row. If there are 30 rows in the auditorium, how many seats does the last row have?

- A. 63
- B. 75
- C. 99
- D. 102

12. A survey was conducted to find the favorite subject—physics, chemistry, or algebra—among 100 students in a high school. The findings of the survey concluded that 54 students liked physics, 48 liked chemistry, and 43 liked algebra. The findings also indicated that 18 students liked both physics and algebra, 20 liked both physics and chemistry, 15 liked both chemistry and algebra, and 8 students liked all three subjects. How many students said their favorite subject was chemistry *only*?
13. Marco is calculating the conditional probability of events  $A$  and  $B$ . If he determines that  $P(A|B) = P(A)$  and  $P(B|A) = P(B)$ , which statement describes events  $A$  and  $B$ ?
- A.  $A$  and  $B$  are disjoint events.
  - B.  $A$  and  $B$  are dependent events.
  - C.  $A$  and  $B$  are independent events.
  - D.  $A$  and  $B$  are complementary events.
14. There are 2,545 students in Hassan's school. He surveys a group of 125 randomly selected students to find out whether they are right-handed or left-handed. The results of his survey show that only 10 of the sample population is left-handed. Assuming a 99% confidence level ( $z$  – score = 2.58), what is the margin of error for this survey? Round your answer to the nearest tenth percent.

15. Kelly wants to determine whether soil containing nitrogen increases the weight of worms compared with soil without nitrogen. She chose 7 worms in each type of soil and measured their weights; her results are shown below.

Worms' Weight in Soil with Nitrogen (in milligrams)	Worms' Weight in Soil without Nitrogen (in milligrams)
57	54
46	35
35	26
24	34
13	28
12	23
50	44

A simulation was run to figure out what differences in means and medians could be expected to occur simply because of random chance. If the experiment and simulation results show no convincing evidence that the worms' weights increase more in the soil with nitrogen than in the soil without nitrogen, which of these could describe the simulation results?

- A. The simulated mean and median difference is close to 1.
- B. The simulated mean and median difference is close to 7.
- C. The simulated mean and median difference is close to 34.
- D. The simulated mean and median difference is close to 35.
16. Which of these expressions is an equivalent form of the complex expression  $(x + 3i)(x - 4i)$ ?
- A.  $x^2 - ix + 12$
- B.  $x^2 - ix - 12$
- C.  $x^2 - 12$
- D.  $x^2 + 12$

17. The table below represents the survey results of 50 people who were asked whether they prefer jogging outdoors or going to the local gym as their exercise program.

EXERCISE PREFERENCE		
	Jogging	Gym
Men	12	16
Women	20	2

To the nearest hundredth, what is the probability that a person chosen from the survey will prefer going to the gym given that the person chosen is a woman?

18. The table below shows the number of married and unmarried people who work in a factory.

	Married	Unmarried	Total
Females	300	200	500
Males	500	400	900
Total	800	600	1,400

Alexandra randomly chooses a person who works in the factory. Benedict randomly chooses a male who works in the factory.

Which statement **best** compares the probability of Alexandra choosing a married male worker versus Benedict choosing a married male worker?

- A. Both Alexandra and Benedict need to select one of the 300 married male workers, so the probabilities are equal.
- B. Alexandra has a greater probability of success, because a greater fraction of females working in the factory are married. If the female workers were less likely to be married, Benedict's probability would be higher.
- C. Benedict's experiment requires both that the condition (worker is male) and success (worker is married) be met. Alexandra has only one (compound) criterion, and is more likely to choose a married male worker.
- D. Benedict has a greater probability of success, because he is choosing from a smaller pool of workers. If there were no women working at the factory, the two probabilities would be equal.

19. What is the sum of the first 7 terms of the geometric sequence  $6, 3, \frac{3}{2}, \dots$ ? Round your answer to the nearest thousandth.
20. The Centers for Disease Control and Prevention (CDC) studied the research that correlated students' physical activity to their academic performance in school.

Part A. Forty-three articles detailing 50 different studies from school districts across the United States were used for the CDC report. Why would the research not be as significant if it included students from only one school district? Explain your answer.

Part B. The table below shows the percentage of high school students who participated in physical activity and physical education in 2011.

**PERCENTAGE OF HIGH SCHOOL STUDENTS PARTICIPATING IN PHYSICAL ACTIVITY AND PHYSICAL EDUCATION, BY GENDER, 2011**

Type of Activity	Females	Males
At least 60 minutes/day of physical activity <sup>a</sup>	18.5%	38.3%
Attended physical education class daily <sup>b</sup>	27.2%	34.6%

<sup>a</sup> Any kind of physical activity that increased heart rate and made them breathe hard some of the time for at least 60 minutes per day on each of the 7 days before the survey

<sup>b</sup> Attended physical education classes 5 days in an average week when they were in school

What are two observations, related to the information in the table, that can be made according to the data?



21. For what value of  $x$  is the equation  $27^{x-4} = 3^{5(x+2)}$  true?

A.  $-\frac{3}{2}$

B.  $-3$

C.  $-\frac{7}{2}$

D.  $-11$

22. A store offers a 25% discount on a brand of cell phones. The final price of the phone includes a sales tax of 7% on the purchase price.

Part A. If the original price of a phone before the discount was  $x$ , write functions  $d$  representing the price of the phone after the discount, and  $s$ , representing the sales tax.

Part B. Using your answers from part A, write a function,  $f$ , to represent the final price of the phone.

Part C. What are the values of  $d(x)$ ,  $s(x)$ , and  $f(x)$  if the original price of the phone before the discount is \$150?

Part D. If the store gives an extra discount of 10%, after the first discount is taken, for every 100th customer, write a function,  $c$ , to represent the final price of the phone to a 100th customer. Show your work.

Use words and/or numbers to show your work.