

**MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2014 MATH CONTEST
FINITE TEST**

DIRECTIONS: DO NOT WRITE ON THIS TEST. Place the best answer for each question on the separate answer sheet.

1. What would be the area of the shaded region if the pattern were continued to figure 10?

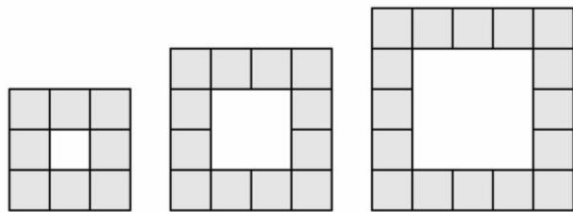


Figure 1 Figure 2 Figure 3

- (A) 100 (B) 64 (C) 48 (D) 44 (E) none of these
2. Find the next term in the sequence: 2, 3, 7, 13, 27, _____.
 (A) 45 (B) 48 (C) 53 (D) 56 (E) none of these
3. Rimrock Bus Lines sells deluxe and economy seats for each tour it conducts. In order to complete a tour, at least 21 economy seats must be sold and at least 8 deluxe seats must be sold. The maximum number of passengers allowed on each bus is 42. Rimrock Bus Lines makes \$30 profit for each economy seat sold and \$25 profit for each deluxe seat sold. What is the maximum profit from one tour?
 (A) \$1,260 (B) \$1,220 (C) \$1,090 (D) \$830 (E) none of these
4. Solve the following system of equations:

$$2x - y = -8$$

$$y = 4x + 2$$
 (A) $x = 5$ (B) $x = -3$ (C) $x = 3$ (D) $x = -3.5$ (E) none of these
 $y = 22$ $y = 2$ $y = 14$ $y = -12$
5. The local grocery store has gourmet jelly beans that sell for \$5.50 a pound and regular jelly beans that sell for \$3.00 a pound. John, the grocer, creates a 100 pound mixture that he can sell for \$4.00 per pound. How many pounds of gourmet jelly beans are in his mixture?
 (A) 37.5 (B) 40 (C) 58.7 (D) 60 (E) none of these
6. Suppose Jacob has eight different plants. How many ways can three of these plants be arranged on his window sill?
 (A) 512 (B) 336 (C) 24 (D) 21 (E) none of these
7. Three students are selected from a class of 125 to be on a special committee. However, Marissa and Chris cannot be together on that committee. How many different groups of three could be chosen?
 (A) 1,906,477 (B) 317,750 (C) 317,627 (D) 317, 625 (E) none of these
8. If nine wood tiles stamped with the letters K, A, L, I, S, P, E, L, L are randomly drawn from a container and arranged left to right as they are drawn, what is the probability that they will spell the word KALISPELL?
 (A) $\frac{1}{362,880}$ (B) $\frac{1}{181,440}$ (C) $\frac{1}{120,960}$ (D) $\frac{1}{60,480}$ (E) none of these
9. When $(2x+1)^6$ is written in expanded form and simplified, what is the coefficient of the x^2 term?
 (A) 15 (B) 30 (C) 40 (D) 60 (E) none of these

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10. Use the quadratic regression model for the data below and predict the value of $f(20)$ to the nearest integer.

x	1	3	5	7	9	11	13
f(x)	62	44	37	32	30	31	38

- (A) 91 (B) 93 (C) 96 (D) 97 (E) none of these

11. If a linear regression was used to model the data below, which data point could be removed to make the strongest linear correlation for the remaining data?

x	2	4	5	8	10
y	8	11.1	12.4	16.2	20.1

- (A) (2, 8) (B) (4, 11.1) (C) (5, 12.4) (D) (8, 16.2) (E) (10, 20.1)

12. Given $\begin{bmatrix} a & 3 \\ 6 & b \end{bmatrix} \begin{bmatrix} 4 \\ -1 \end{bmatrix} = \begin{bmatrix} 13 \\ 18 \end{bmatrix}$, what is the product of a and b?

- (A) 6 (B) 10 (C) 18 (D) 24 (E) none of these

13. Find the value of the determinant:

$$\begin{vmatrix} 3 & 0 & 0 & 0 \\ a & 3 & 0 & 0 \\ 1 & 1 & 3 & 0 \\ 2 & 2 & b & 3 \end{vmatrix}$$

- (A) $27a + 3b$ (B) $9b - 9a$ (C) 81 (D) 0 (E) none of these

14. The distribution of heights of the US population of men is normally distributed with a mean of 69.1 inches and a standard deviation of 2.8 inches. Approximately what percent of males have heights that lie between 66.3 and 74.7 inches?

- (A) 47.5 (B) 68 (C) 95 (D) 81.5 (E) 34

15. The test scores for a class of 20 are shown below. Find the interquartile range for the data set.

54 58 61 62 65 68 69 74 75 75 76 81 87 90 91 91 93 95 95 102

- (A) 26.5 (B) 48 (C) 21.5 (D) 24.5 (E) none of these

16. The test scores for two classes are shown below. Find the difference in median scores.

Class A: 51 51 54 55 56 59 60 60 61 62 63 63 65 67 69 69 73 80 80 86

Class B: 59 62 63 66 67 68 69 70 72 75 77 77 78 79 81 82 82 83 85

- (A) 12.5 (B) 9.2211 (C) 9 (D) 25 (E) none of these

17. In Euler island, there are 57 cities and 8 roads lead out from each city. If every road connects two cities, how many roads are there in all?

- (A) 228 (B) 456 (C) 114 (D) 65 (E) 49

18. Luke has applied to both Gonzaga and University of Washington. He thinks the probability that Gonzaga will accept him is 0.35. The probability that the University of Washington will accept him is 0.45, and the probability that both will accept him is 0.1. What is the probability that he is NOT accepted by either university?

- (A) 0.9 (B) 0.8 (C) 0.2 (D) 0.3 (E) none of these

19. Phillip decides to invest money into an account that earns 0.5% interest per month. Phillip invests \$200 at the beginning of each month. How much is in the account at the start of the sixth month?

- (A) \$1215.10 (B) \$1,206.00 (C) \$1,203.00 (D) \$1,218.90 (E) \$1,200

FINITE TEST 2014 Answer Key

- 1. D**
- 2. C**
- 3. B**
- 4. C**
- 5. B**
- 6. B**
- 7. C**
- 8. D**
- 9. D**
- 10. B**
- 11. D**
- 12. D**
- 13. C**
- 14. D**
- 15. D**
- 16. A**
- 17. A**
- 18. D**
- 19. A**