MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2018 MATH CONTEST
TEAM 9-10

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

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1. Solve for *n*: $\frac{x^5 x^{2n}}{(x^{4n})^2} = x^{17}$

A) -17 **B)** -3 **C)** -2 **D)** 8.5 **E)** none of these

2. The growth in a population of a certain rodent at a dump site fits the exponential function $A(t) = 157e^{0.012t}$, where *t* is the number of years since 1993. Estimate the population in the year 2020. Round your answer to the nearest whole rodent.

A) 217 **B)** 4009 **C)** 4290 **D)** 4779 **E)** none of these

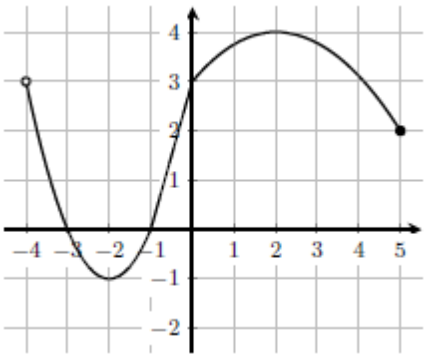
3. Which of the following would translate the graph of a function *f* (*x*) right 5 units?

A) *f* (*x*) - 5 **B)** *f* (*x*) + 5 **C)** *f* (*x* - 5) **D)** *f* (*x* + 5) **E)** none of these

4. Which of the following would vertically stretch the graph of a function *f* (*x*) by a factor of 5?

A) *f* (*x*) - 5 **B)** *f* (*x*) + 5 **C)** *f* (*x* - 5) **D)** *f* (*x* + 5) **E)** none of these

For questions 5-7, use the graph of function *g* at right.



5. What is the domain of *g* ?

A) (-1, 4) **B)** [-1, 4] **C)** (-4, 5] **D)** [-4, 5) **E)** none of these

6. What is the range of *g* ?

A) (-1, 4) **B)** [-1, 4] **C)** (-4, 5] **D)** [-4, 5) **E)** none of these

7. What is *g* (5) – *g* (-1)?

A) 2 **B)** 3 **C)** 5 **D)** 6 **E)** none of these

8. The menu at Le Steak Bar & Grille has 11 appetizers, 15 entrees, 10 desserts, and 8 beverages. Le Steak offers a dinner special that includes 1 appetizer, 1 entrée, 1 dessert, and 1 beverage. In how many ways can a person order a dinner special at this restaurant?

A) 44 **B)** 870 **C)** 13,200 **D)** 45,644 **E)** none of these

9. What is the volume of a regular square pyramid with base 6 cm and height 7 cm?

A) 56 cm^3 **B)** 84 cm^3 **C)** 98 cm^3 **D)** 252 cm^3 **E)** none of these

10. Which could be the side lengths of a triangle?

A) 4, 12, 17 **B)** 7, 14, 20 **C)** 11, 11, 22 **D)** 17, 18, 36 **E)** none of these

11. Three percent of the caterpillars in a science lab metamorphosed into butterflies. If Taylor accurately counted 120 butterflies, how many caterpillars were in the original population?

A) 1250 **B)** 2850 **C)** 4000 **D)** 4500 **E)** none of these

12. Which of the following equations does not represent a function?

A) $y = 3x + 7$ **B)** $y = -2x^2 - 3x + 0.5$ **C)** $x = y$ **D)** $x = 2y^2 - 3y + 2$ **E)** none of these

13. Western Saddlery gives a 15% discount off the list price of all saddles. The store will also take an additional 30% off the discounted price for the purchase of a floor model. How much would a saddle sell for if it has a list price of $1200 and if it is also a floor model?

A) $540 **B)** $660 **C)** $714 **D)** $1146 **E)** none of these

14. Which of the following figures does not have point symmetry?

A) circle **B)** rectangle **C)** square **D)** 5-pointed star **E)** none of these

15. Determine the next number in the following pattern: 17, 8, 9, -1, __

A) -10 **B)** -8 **C)** 8 **D)** 10 **E)** none of these

16. Find the slope of a line perpendicular to $-4x + 5y = 23$.

A) -4 **B)** $-\frac{5}{4}$ **C)** $\frac{4}{5}$ **D)** 4 **E)** none of these

For 17-19, use the following information. Forty students took a statistics test having a maximum of 50 points. The score distribution is given in the stem and leaf plot at right.

0	2	8								
1	2	2	4	5						
2	0	1	3	3	3	3	5	8	8	8	9
3	0	0	1	3	5	6	6	7	9		
4	2	2	4	4	4	4	6	6	7	8	8
5	0	0	0								

Key 2|3 = 23

17. Which point value(s) represents the mode?

A) 23, 28 **B)** 23, 44 **C)** 32
D) 50 **E)** none of these

18. Which point value represents the median?

A) 30 **B)** 32 **C)** 36 **D)** 48 **E)** none of these

19. Which point value represents the third quartile?

A) 23 **B)** 28 **C)** 44 **D)** 50 **E)** none of these

20. Evaluate: $(6.28 \times 10^6)(7.62 \times 10^{-3})$. Give your answer in scientific notation.

A) 4.78536×10^{-18} **B)** 4.78536×10^4 **C)** 47.8536×10^{-2} **D)** 47.8536×10^3 **E)** none of these

TEAM 9-10 2018 Answer Key

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