

MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2018 MATH CONTEST
INTERMEDIATE

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

- Bill is stacking bricks for his dad and he was putting 30 bricks on each layer. Which equation would represent the number of bricks in “n” layers.
A) $b = n + 30$ B) $b = 30n$ C) $b = 30n + 30$ D) $b = 29n + 1$ E) none of these
- If Sam is traveling at 30 miles per hour, how far is he traveling each second?
A) 44 feet B) 44 inches C) 2640 inches D) 1320 feet E) none of these
- If the city water reserves hold 3.5×10^6 gallons of water and they use 1.5×10^4 gallons of water per day without gaining water, about how long would the water last?
A) 33 days B) 33 weeks C) 233 weeks D) 2.0×10^2 days E) none of these
- Find the equation of the line that passes through the point (1, 3) and is perpendicular to the line $3x + 6y = 1$
A) $-2x + y = 1$ B) $2x + y = 1$ C) $2x - y = -2$ D) $-2x - y = 2$ E) none of these
- How many real solutions does this equation have? $8x^2 + 2x - 3 = 0$
A) 0 B) 1 C) 2 D) 3 E) none of these
- The theatre club sold 300 tickets for their play and collected \$1900. They charged \$7.50 for adults and \$5.50 for students. How many paid students did they have?
A) 100 B) 150 C) 200 D) 250 E) none of these
- If Billie has \$1000 and is saving 15 dollars per week. Janie started with \$10 and is saving \$25 per week. How long before they have \$2000 combined?
A) 24 weeks B) 25 weeks C) 28 weeks D) 29 weeks E) none of these
- How high does a baseball go, if it follows a parabolic path described by this equation (both x and y are measured in feet)? $y = -0.1x^2 + 2x + 12$.
A) 10 feet B) 12 feet C) 22 feet D) 24 feet E) none of these
- Find the 50th term of the following sequence: 1, 1.2, 1.4, 1.6, ...
A) 10.0 B) 10.2 C) 10.8 D) 50.2 E) none of these
- Find the 20th term of the following sequence: 1, 1.5, 2.25, 3.375, ...
A) 1662.628365 B) 2216.83782 C) 3325.25673 D) 6650.51346 E) none of these
- Bob is stacking cups for the class fundraising picnic. He noticed that each cup was 5 inches tall but each time he added a cup it only increased the height of the cups by $\frac{1}{4}$ inches. He was curious how tall the stack would be if he put all 1000 cups in one stack. What would be the height of the stack of 1000 cups?
A) 250 in. B) $250 \frac{3}{4}$ in. C) $254 \frac{3}{4}$ in. D) 5000 in. E) none of these

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12. The 8th grade bowling club is hiring a bus to take them to the bowling alley. The bus is going to cost \$200 and will be split between the students that go. Which equation represents the amount “c” each person will need to pay, if “n” represents the number of people that go?

- A) $c = 200n$ B) $p = 200c$ C) $p = 200/c$ D) $c = 200/n$ E) none of these

13. Find the mode, the median, and the mean, to the nearest whole number, of this set of data: 36, 50, 52, 52, 57, 70, 75

- A) 56; 52; 52 B) 52; 52; 56 C) 52; 56; 52 D) 52; 52; 52 E) none of these

14. What number is an outlier of this set (if any): 36, 50, 52, 52, 57, 70, 75

- A) 36 B) 75 C) 36 and 75 D) 70 and 75 E) none of these

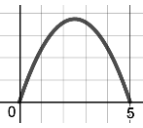
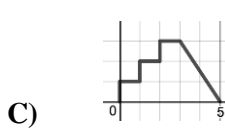
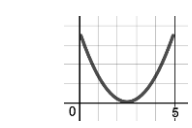
15. If each score in a set of test scores were increased by 2 points, which statement would be true?

- A) median stays the same B) mode stays the same
C) mean stays the same D) standard deviation stays the same E) none of these

16. The average height of 3-year-olds are at a day care averaged 35.5 inches, with a standard deviation of 1.5 inches. Assuming a normal distribution, estimate the probability that a randomly selected 3-year-old is between 34 and 37 inches in height.

- A) 0.18 B) 0.34 C) 0.68 D) 0.95 E) none of these

17. If Jim walked up a hill, rested and then rode his sled down the hill, which graph could represent his altitude graphed over time?

- A)  B)  C)  D)  E) none of these

18. What is the solution to this inequality? $4 - 2y \leq 8$

- A) $y \geq -2$ B) $y \leq -2$ C) $y \leq 2$ D) $y \geq 2$ E) none of these

19. If $-3 < a < -1$, which of the following inequalities is *false*?

- A) $1/a < a$ B) $1/a < a^2$ C) $1/a > a$ D) $a < a^2$ E) none of these

20. What is one of the factors of this trinomial? $4x^2 + 4x - 15$

- A) $(4x + 3)$ B) $(4x + 5)$ C) $(2x + 3)$ D) $(2x + 5)$ E) none of these

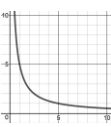
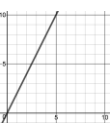
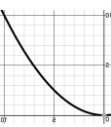
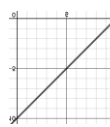
21. What are all the solutions to this equation? $0 = x^2 + 9$

- A) -3 B) 0 C) 3 D) ± 3 E) none of these

22. What value of “c” would make this a perfect square trinomial? $x^2 - 14x + c$

- A) -49 B) 7 C) 49 D) -196 E) none of these

23. Which graph is an example of inverse variation?

- A)  B)  C)  D)  E) none of these

INTERMEDIATE 2018 Answer Key

1. B
2. A
3. B
4. A
5. C
6. E 175
7. B
8. C
9. C
10. B
11. C
12. D
13. B
14. E
15. D
16. C
17. A
18. A
19. A
20. D
21. E No Solution
22. C
23. A