2022 Grissom Math Tournament

PreAlgebra Test

1. Evaluate the following, if $a = 2$ and $b = -3$: $2a - 4b^2 - ab$

   A. 46 B. –26 C. –38 D. – 134 E. – 146

2. The ratio of two numbers is 2:5 and the sum of the two numbers is 84. Find the value of the larger minus half the smaller.

   A. 12 B. 24 C. 36 D. 48 E. 54

3. The base of a triangle is (x), the height of the triangle is $(3x + 2)$, and the area of the triangle is 60. Find the value of *x*.

   A. 6 B. 7 C. 8 D. 18 E. NOTA

4. Find the value of two-thirds of 60% of 125% of one tenth of 240?

   A. 2.4 B. 12 C. 20 D. 120 E. NOTA

5. Evaluate: $1 + 2 - 3 + 4 + 5 - 6 + 7 + 8 - 9 + \cdots + 28 + 29 - 30 =$?

   A. 15 B. 17 C. 133 D. 135 E. NOTA

6. Find the digit in the unit's place of *m* if: $m = 2^3 + 3^4 + 4^5 + 5^6 + 6^7$.

   A. 0 B. 1 C. 2 D. 3 E. 4

7. Evaluate: $8 - 6(12 - (-3)^2) + 18$

   A. 8 B. 24 C. 60 D. 440 E. NOTA

8. Pablo the porcupine, and Polly the parrot start at their favorite tree and travel to the park. Pablo the porcupine travels 5 miles East, 2 miles North, 7 miles East, and 6 miles North. Polly the parrot flies directly to the park. If Polly flies at a rate of $2\sqrt{13}$ miles per hour and Pablo travels at 8 miles per hour. How long in minutes does the first one wait for the second to arrive?

   A. $\frac{1}{2}$ B. 1 C. 30 D. 45 E. NOTA

9. Solve for x: $\frac{2}{x} - \frac{3}{2} = \frac{5}{x} + \frac{7}{2}$

A. $-\frac{3}{5}$ B. $-\frac{5}{3}$ C. -10 D. -15 E. -30

10. Rodgers is grading tests from a group of Algebra II students. The first six papers she graded earned scores of 68, 77, 83, 89, 90, and 92. After grading an additional test, the mean of the students' test scores was 85. What grade did the last student earn?

A. 85 B. 87 C. 96 D. 97 E. NOTA

11. Which of the following points are solutions to the inequality: $3x - 4y < 11$?

I. $(-2, -4)$ II. $(1, -3)$ III. $(7, 3)$

A. I only B. I and II C. I and III D. II and III E. NOTA

12. What is the value of *m* if the slope of the line through $(3, m)$ and $(m, -7)$ is -3?

A. 1 B. 2 C. 4 D. 8 E. NOTA

13. Find the smallest possible perimeter (in inches) of a rectangle with integer side lengths and area equal 48 square inches?

A. 14 B. 28 C. 32 D. 38 E. 52

14. Find the measure of the largest angle of a triangle if the ratio of its angles is 3 :5 :7.

A. 84° B. 72° C. 60° D. 48° E. 36°

15. What is the sum of the mean and median of the following set of numbers?

$\{17, 25, 31, 17, 33, 30, 24, 23, 34\}$

A. 50.5 B. 51 C. 53 D. 53.5 E. NOTA

16. In Ginny's school, there are 30 4th graders, 40 5th graders, and 20 6th graders. The average math grade in the 4th grade class is 72%. The average grade of the 5th graders is 83%. The average math grade in all three groups combined is 80%, what is the math average of the 6th graders?

A. 85 B. 88 C. 95 D. 98 E. NOTA

17. What is the volume of a square pyramid with base edge lengths equal 6 and altitude equal 8?

A. 72 B. 96 C. 108 D. 144 E. NOTA

18. Dexter and Detrick are planning to go to the zoo to check out the lions and tigers. Dexter starts at (-8, 7) and travels toward Detrick at a slope of $-\frac{5}{7}$. Detrick starts at (6, 8) and travels toward Dexter at a slope of $\frac{6}{7}$. They meet at the point where their paths intersect and walk the rest of the way to the zoo at the point (0, 0). At what point did their paths intersect?

A. (-1, 2) B. (-1, -2) C. (1, 2) D. (1, -2) E. NOTA

19. Money Maker Mark was counting his money. He had a total of $5.35 in dimes, nickels, and quarters. The number of quarters is one more than twice the number of dimes. The number of nickels is 75% of the number of dimes. How much money does Mark have in dimes?

A. 50¢ B. 60¢ C. 70¢ D. 80¢ E. NOTA

20. What is the remainder when 2022 is divided by 16?

A. 8 B. 9 C. 10 D. 11 E. NOTA

21. Sandy has some cool slimy and scary pets. Her pets are snakes, salamanders, and spiders. In her collection there are 74 heads, 58 tails, and 216 legs. If she trades her snakes for snapping turtles at a rate of 3 snakes are equal to 2 snapping turtles, how many snapping turtles will she have?

A. 24 B. 36 C. 48 D. 54 E. NOTA

22. If $1,000 is invested at 6% annual interest compounded monthly, which formula gives the amount in the account at the end of 2 years?

A. $A = 1000(1.06)^{24}$ B. $A = 1000(1.02)^2$ C. $A = 1000(1.06)^2$
D. $A = 1000\left(1 + \frac{.06}{12}\right)^2$ E. $A = 1000(1.005)^{24}$

23. Mai Li and Miguel are studying endangered species. They decide their class can sell lemonade, cookies, and t-shirts to raise money for a new monkey exhibit at the zoo. They sell lemonade for 75¢ a glass, a package of cookies for $2, and t-shirts for $15. At the end of the week, their class had sold three times as many glasses of lemonade as packages of cookies. The number of t-shirts sold was five more than twice the number of packages of cookies. They collected $1342.25, and noticed they sold more glasses of lemonade than they sold cookies and t-shirts combined. How many more lemonades did they sell than t-shirts?

A. 22 B. 28 C. 32 D. 38 E. NOTA

24. Zoher takes a tournament test with 25 multiple choice questions. The scoring on the test is 4 times the number right, minus the number incorrect and zero points for each question omitted. If his score on the test is 62, how many distinct combinations of number right/ number wrong/ and number omitted could result in this score?

A. 0 B. 1 C. 2 D. 3 E. NOTA

25. Find the value of xy if (x, y) is the solution to the system of equations below:
$\frac{2}{x} + \frac{3}{y} = 17$ and $\frac{4}{x} - \frac{3}{y} = 1$.

A. $\frac{1}{11}$ B. $\frac{3}{11}$ C. $\frac{11}{3}$ D. 11 E. NOTA

Tie Breaker 1: How many odd integers between 100 and 200 are divisible by 3?

Tie Breaker 2: Find the sum of the two largest three-digit prime numbers.

Tie Breaker 3: In quadrilateral MATH, the measures of the angles at M, A, T, and H are $(27 + x)°$, $(16 + 2x)°$, $(14 + 4x)°$, and $(33 + 3x)°$ respectively. Find the measure of angle H.