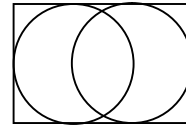


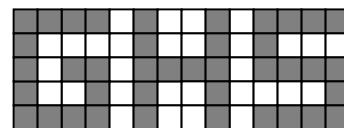
GRISSOM MATH TOURNAMENT
APRIL 17, 2010
ALGEBRA I TEST

1. Evaluate: $-4[5 - 8 + 2(6 + 4 \cdot 3)]$
A. -228 B. -132 C. 132 D. 252 E. 700
2. Find the slope of the line through the points (1, -7) and (-3, 19).
A. -13 B. $-\frac{13}{2}$ C. $-\frac{3}{2}$ D. -3 E. -6
3. Find the median of the set: 3, 6, 8, 7, 4, 7, 3, 9, 1, 10.
A. 4 B. 5 C. 6 D. 6.5 E. 7
4. Which of the following is one of the factors of the expression: $x^2 - 17x + 60$?
A. $(x - 3)$ B. $(x + 4)$ C. $(x - 12)$ D. $(x - 15)$ E. $(x - 20)$
5. If the x- and y- intercepts of the line $y = \frac{5}{3}x - 15$ are (a, 0) and (0, b) respectively, find the value of 7ab.
A. -945 B. -735 C. -135 D. 135 E. 735
6. Hyun Su spends one fifth of the money in her wallet to buy ice cream. She then spends one fourth of the money that remains in her wallet to buy candy. If she spent \$60 altogether, how much money did she have in her wallet to start with?
A. \$75 B. \$100 C. \$120 D. \$150 E. \$180
7. Solve for x: $7x + 4(2 + 3x) = 3(6x + 7) - 2$.
A. 9 B. 10 C. 11 D. 12 E. 13
8. Raisa and Nick went to a concert 567 miles away. If Raisa drove for 6 hours at 42 miles per hour, and Nick drove for 5 hours at 46 miles per hour, how many miles do they have left to go?
A. 81 B. 85 C. 94 D. 123 E. 125
9. How many integral values of x satisfy the inequality: $x - 4 \leq 5x + 3 \leq x + 30$?
A. 5 B. 6 C. 7 D. 8 E. 9
10. Find the distance from (5, 7) to the line $7x + y = 12$.
A. $\frac{15\sqrt{2}}{2}$ B. $\frac{27\sqrt{2}}{5}$ C. $\frac{3}{5}$ D. $3\sqrt{2}$ E. $\frac{15}{4}$

11. If 87 knuts equal three sickles, 68 sickles equal four galleons, then how many knuts equal seven galleons?
- A. 155 B. 158 C. 162 D. 3451 E. 5961
12. Jim can run a mile in 9 minutes. Dwight can run a mile in 5 minutes. If they are running on a track that is $\frac{1}{4}$ miles long, how many complete laps would Dwight have finished when Jim has finished 8 laps?
- A. 4 B. $4\frac{1}{4}$ C. 5 D. 14 E. $14\frac{2}{5}$
13. If 4 students can sell 15 cookies in 12 minutes, how many minutes will it take for 6 students to sell 45 cookies (assuming they all sell cookies at the same rate)?
- A. 24 B. 20 C. 54 D. 46 E. 32
14. Find the sum of the reciprocals of the solutions to the equation: $|2x - 5| = 10$.
- A. $-\frac{4}{15}$ B. $\frac{15}{4}$ C. $\frac{2}{5}$ D. $-\frac{5}{2}$ E. -5
15. If each circle passes through the center of the other circle, and each circle has a circumference of 18, what is the perimeter of the rectangle?



- A. 45 B. 60 C. 90 D. 243 E. 486
16. The distance between the points $(-13, 2)$ and $(7, x)$ is $4\sqrt{34}$. Find the sum of all of the possible values of x .
- A. -4 B. -2 C. 2 D. 4 E. 6
17. A small box of candy costs \$2, and a large box costs \$5. If 150 boxes were sold for \$444, how many small boxes were sold?
- A. 48 B. 72 C. 98 D. 102 E. 106
18. What is the maximum value of $\frac{x}{y}$ if $0.005 \leq x \leq 0.5$ and $0.25 \leq y \leq 25$?
- A. 1 B. 2 C. 3 D. 4 E. none of these
19. If the sum of the squares of two positive numbers is 205. If the product of the two numbers is 78, find the absolute value of the difference between the numbers.
- A. 5 B. 6 C. 7 D. 8 E. 9
20. If a dart is thrown randomly and hits the board shown, find the probability it hits the shaded region. The figure is made up of squares with unit length.



- A. $\frac{3}{7}$ B. $\frac{2}{5}$ C. $\frac{4}{7}$ D. $\frac{3}{5}$ E. $\frac{5}{7}$

21. How many distinct 4-letter arrangements can be made from the letters in LINUX (without repetition)?

- A. 24 B. 80 C. 120 D. 180 E. 320

22. Simplify completely: $\frac{3\sqrt{150} - 3\sqrt{24} + 2\sqrt{54}}{\sqrt{90}}$.

- A. $\frac{\sqrt{15}}{6}$ B. $\frac{\sqrt{15}}{3}$ C. $\frac{\sqrt{30}}{10}$ D. $\sqrt{15}$ E. $\frac{\sqrt{6}}{3}$

23. If two of the edges of a rectangular box have lengths 3 and 4 and the diagonals of two of the faces have lengths $3\sqrt{5}$ and $2\sqrt{13}$, find the volume of the box.

- A. $60\sqrt{3}$ B. 72 C. $72\sqrt{3}$ D. 84 E. $84\sqrt{3}$

24. If a, b, and c are positive integers and $a + b + c = \frac{b+c}{a} - \frac{a+c}{b} - \frac{a+b}{c}$, then find $2^a + 4^b + 6^c$.

- A. 2 B. 3 C. 4 D. 6 E. 8

25. What is the sum of all numbers formed by the following rules?

- the number has three digits or less
- the number is formed only with the digits 8, 6, and 5
- no digits appear more than once

- A. 4, 218 B. 4, 219 C. 4, 236 D. 4, 655 E. 4, 673

TB1: Find the sum of the first eight odd perfect squares.

TB2: How many prime numbers less than 200 have unit's digit equal to 7?

TB3: A $4 \times 4 \times 1$ layer of unit cubes is placed with the 4×4 side on a table, then a $3 \times 3 \times 1$ layer is placed on top of the center of the previous layer. Next, a $2 \times 2 \times 1$ layer and a $1 \times 1 \times 1$ layer are placed similarly. Find the total surface area of the figure.