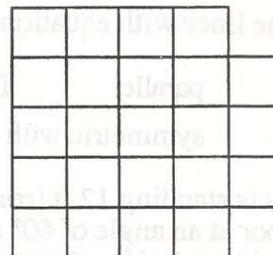


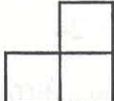
1. Find the area of the figure in the first quadrant bounded by $y - 2x = 1$, $y - 4x = 1$, and $x = 3$.
A. 6 B. 9 C. 12 D. 15 E. 18
2. Sue has 40 dimes, nickels, and quarters worth \$5.90. If the quarters were dimes, the dimes nickels, and the nickels quarters, the coins would be worth \$5.45. How many nickels does Sue have?
A. 9 B. 11 C. 13 D. 15 E. 17
3. The lines with equations $x = \frac{2}{3}y + 2$ and $y = 3 - \frac{3}{2}x$ are
A. parallel B. perpendicular C. symmetric with respect to the y-axis
D. symmetric with respect to the x-axis E. none of these
4. Cy is standing 12 ft from an office building. Looking directly at the building, he sees Al on the second floor at an angle of 60° above the horizontal, and Bob on the fourth floor at an angle of 75° above the horizontal. How far apart are Al and Bob to the nearest foot?
A. 18 B. 20 C. 22 D. 24 E. 26
5. If each of the letters A, M, T, Y, and C is replaced by a different decimal digit, then the largest possible value of the six-digit number AMATYC is divisible by how many of the prime numbers less than 10?
A. 0 B. 1 C. 2 D. 3 E. 4
6. A trapezoid has three sides of length 4 cm and one side of length 8 cm. Its area in square centimeters is
A. $12\sqrt{2}$ B. $15\sqrt{2}$ C. $16\sqrt{3}$ D. $12\sqrt{3}$ E. 21
7. A drawer contains 24 socks which are identical except for color: 6 black, 8 blue, and 10 charcoal. If you reach into the drawer without looking, how many socks must you take out to ensure having a pair of the same color?
A. 2 B. 4 C. 6 D. 8 E. 10
8. Which of the following is the equation of a line which passes through the point of intersection of the lines with equations $2x - 5y = 17$ and $3x + 2y = 11$?
A. $7x - 8y = 45$ B. $8x - 7y = 45$ C. $3x - 2y = 11$ D. $3y - 2x = 11$ E. $7y - 8x = 45$
9. An arithmetic sequence is a sequence with the property that any two consecutive terms have a constant difference. If an arithmetic sequence a_n has $a_{12} = 26$ and $a_{16} = 14$, then $a_{10} =$
A. 20 B. 23 C. 29 D. 32 E. 35
10. The solution of the equation $2^{3x-1} = 3^{2-x}$ can be expressed in the form $\log_a b$. Then $a + b$ equals
A. 30 B. 36 C. 42 D. 48 E. 56
11. The equation $x^3 + 2x^2 - 50x - 100 = 0$ has how many irrational roots?
A. 0 B. 1 C. 2 D. 3 E. 4
12. For an ordered set of $2n$ elements, let a *shuffle* of the set consist of reordering the set by putting the first n elements in order into the odd positions and the last n elements into the even positions. For example, a shuffle of $\{1,2,3,4,5,6\}$ produces $\{1,4,2,5,3,6\}$, and a second shuffle produces $\{1,5,4,3,2,6\}$. If the set $\{1,2,3,4,5,6,7,8,9,10\}$ is shuffled successively 2000 times, what number will be in the fifth position in that final arrangement?
A. 2 B. 3 C. 5 D. 6 E. 8

13. A triangle has sides of lengths 29, 35, and 48. To the nearest whole number, the perpendicular distance from the side of length 48 to the opposite vertex (the altitude) is
- A. 19 B. 20 C. 21 D. 22 E. 23

14. $1 - \sin 2x \tan x =$
- A. $\cos 2x$ B. $\cos^2 x$ C. $\sin x \cos x$ D. $2 \cos x$ E. $\sin^2 x - \cos^2 x$

15. Which of the collections of tiles below can completely cover the figure at the right without overlapping?



- A. 8 of  B. 8 of  C. 6 of  D. 6 of 
- E. none of these

16. Let $f(x) = x^2 - 9 \cdot 10^{499}x - 10^{999}$. Which of the following is a factor of $f(11)$?
- A. 3 B. 4 C. 5 D. 6 E. 11

17. Twenty squares 1 inch by 1 inch are chosen from a standard 8 inch by 8 inch checkerboard (64 squares) so as to form a region which is connected (all one piece) without any interior holes. The ratio of the maximum possible perimeter of the region to the minimum possible perimeter is
- A. $\frac{14}{9}$ B. $\frac{21}{11}$ C. $\frac{21}{10}$ D. $\frac{7}{5}$ E. $\frac{7}{3}$

18. The mean, median, (unique) mode, and range of a set of 8 integers all equal 8. The largest integer which could be an element of this set is
- A. 11 B. 12 C. 13 D. 14 E. 15

19. Two goats are tied to opposite ends of a straight 50 ft long fence by ropes of length 40 ft and 30 ft. What is the area (to the nearest 5 ft) of the region which they both can reach?
- A. 320 B. 330 C. 345 D. 650 E. 665

20. Let $F_1 = 1$, $F_2 = 1$, and $F_k = F_{k-1} + F_{k-2}$ ($k \geq 3$). Then the sum of all values from F_1 to F_{2000} equals
- A. $F_{2003} + 1$ B. $F_{2003} - 1$ C. $F_{2002} + 1$ D. F_{2002} E. $F_{2002} - 1$