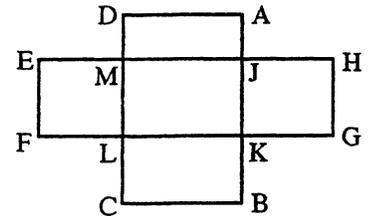


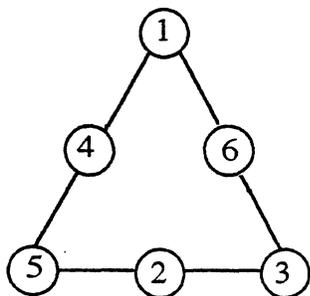
- Let M be the line with equation $3x - 2y = 9$, and let L be the line perpendicular to M and having the same x -intercept as M . Then the y -intercept of L is
 A. -2 B. 2 C. 4 D. 4.5 E. 6
- Which of the following points is closest to the point $(4, -5)$?
 A. $(-9, 3)$ B. $(-11, -2)$ C. $(-4, 8)$ D. $(-10, 1)$ E. $(1, 10)$
- What value of b will make 2 a solution of the equation $2(x - b) + (x + b) = 3(b - x)$?
 A. 3 B. 1 C. -1 D. -3 E. any value of b
- If $f(x) = x^2 - 2$, $g(x) = 2x + 1$, and $h(x) = x - 1$, then which of the following equals 4?
 A. $f(g(h(2)))$ B. $f(h(g(2)))$ C. $g(f(h(2)))$ D. $g(h(f(2)))$ E. $h(g(f(2)))$
- For t measured in radians, $\cos\left(\frac{3\pi}{2} - t\right) =$
 A. $\cos t$ B. $-\cos t$ C. $\sin t$ D. $-\sin t$ E. none of these
- The sum of $\log_4 8$ and $\log_4 32$ is closest to
 A. 2.66 B. 3 C. 3.75 D. 4 E. undefined
- The domain of the function $f(x) = \frac{x - \frac{3}{x-2}}{\frac{x+1}{x-1}}$ is all real numbers x except
 A. 2 only B. 1 only C. -1 only D. 1 and 2 only E. -1, 1, and 2 only
- In the accompanying diagram, $ABCD$ and $EFGH$ are both rectangles, with $AB = 10$, $BC = 6$, $EF = 4$ and $FG = 15$. If $\overline{EF} \parallel \overline{AB}$, then the area enclosed by the polygon $AJHGKBLFEMD$ is
 A. 72 B. 96 C. 100 D. 120
 E. dependent on the choice of J, K, L , and M



- For how many values of k does the system $\begin{cases} x + ky = 3 \\ kx + 2y = 2 \\ x + y = 1 \end{cases}$ have at least one solution?
 A. none B. 1 C. 2 D. 3 E. 4
- Call a date *lucky* if the number of the month is a factor of the number of the day. For example, Valentine's Day, February 14, is lucky (2 is a factor of 14), but Christmas Day, December 25, is not (12 is not a factor of 25). If a day is randomly selected from the year, which of the following is closest to the probability that the day is lucky?
 A. 0.16 B. 0.20 C. 0.24 D. 0.25 E. 0.30
- The equation $\frac{x^4 - 2x^3 + 2x^2 - 2x + 1}{x - 1} = 0$ has how many different solutions, real or imaginary?
 A. 0 B. 1 C. 2 D. 3 E. 4

12. Let S be the set of all points in the plane which are twice as far from the point $(3, -1)$ as from the point $(4, 2)$. The points of S lie on what curve?
 A. a straight line B. a circle C. a parabola D. a hyperbola E. an ellipse which is not a circle
13. Al and Bo are each either a knight, who always tells the truth, a knave, who always lies, or an alternator, who lies and tells the truth in strict alternation. Al says, "I am an alternator," Bo says, "Al is a knave," and then Al says, "Bo is not an alternator." Which of the following must be true?
 A. Al is a knave B. Al is an alternator C. Bo is a knight
 D. Bo is a knave E. Bo is an alternator
14. Let AMA and TYC be three-digit numbers (a leading digit cannot be zero) such that each different letter represents a different decimal digit 0 to 9. If $AMA - TYC$ is 22, what is the value of $T - C$?
 A. -1 B. 0 C. 1 D. 2 E. it depends on the choices of A and M
15. In how many ways can the expression $a + a + b + b + b + c + c + c$ be written (including the expression itself) using the Commutative Property of Addition without combining any like terms?
 A. 108 B. 560 C. 1120 D. 3360 E. 40320
16. If \overline{CM} is the median to side \overline{AB} in $\triangle ABC$, with $AB = 9$, $AC = 11$, and $BC = 8$, then $CM =$
 A. 8.5 B. 9 C. 9.5 D. 10 E. 10.5
17. Define a sequence a_n by $a_1 = 1$ and for $n \geq 1$, $a_{2n} = 2a_{2n-1}$, $a_{2n+1} = a_{2n} + 1$. Which of the following is closest to $\sqrt[2001]{a_{2001}}$?
 A. 1 B. $\sqrt{2}$ C. 2 D. $2\sqrt{2}$ E. 3
18. A collection of seven positive integers has median 3 and unique mode 4. If the collection is increased to nine values by adding two 2's to it, the median and unique mode both are 2. What is the mean of the new collection?
 A. $\frac{23}{9}$ B. $\frac{8}{3}$ C. $\frac{25}{9}$ D. $\frac{26}{9}$ E. 3
19. How many pairs (r, s) of positive integers satisfy the equation $r^2 - s^2 = 2001$?
 A. 0 B. 1 C. 2 D. 3 E. 4

20.



The numbers 1, 2, 3, 4, 5, and 6 are each placed at a different point on an equilateral triangle, either a vertex or a midpoint of a side, in such a way that the sums of the three numbers on each side are all equal (An example with a common sum of 10 is shown at the left). How many different sums are possible?

- A. 1 B. 2 C. 3 D. 4 E. 5