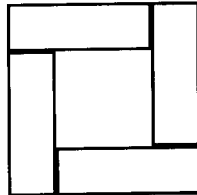



1. One can of frozen juice concentrate, when mixed with  $4\frac{1}{3}$  cans of water, makes 2 quarts (64 oz) of juice. Assuming no volume is gained or lost by mixing, how many oz does a can hold?
- A. 8    B. 10    C. 12    D. 15    E. 18
2. Define the operation  $\Delta$  by  $a \Delta b = ab + b$ . Find  $(3 \Delta 2) \Delta (2 \Delta 3)$ .
- A. 72    B. 73    C. 80    D. 81    E. 90
3. A square is covered by a design made up of four identical rectangles surrounding a central square, as shown at the right. If the area of the central square is  $\frac{4}{9}$  of the area of the entire design, find the ratio of the length of a rectangle to the side of the central square.
- A.  $\frac{5}{4}$     B.  $\frac{4}{3}$     C.  $\frac{7}{5}$     D.  $\frac{3}{2}$     E.  $\frac{8}{5}$
- 
4. A radio station advertises, "Traffic every 10 minutes, 24 hours a day; 1000 reports each week." What is the difference between the advertised number of reports and the exact number?
- A. 8    B. 12    C. 16    D. 20    E. 24
5. Trina has two dozen coins, all dimes and nickels, worth between \$1.72 and \$2.11. What is the least number of dimes she could have?
- A. 10    B. 11    C. 15    D. 18    E. 19
6. Square  $PQRS$  has sides of length 10. Points  $T$ ,  $U$ ,  $V$ , and  $W$  are chosen on sides  $PQ$ ,  $QR$ ,  $RS$ , and  $SP$  respectively so that  $PT = QU = RV = SW = 2$ . Find the area of quadrilateral  $TUVW$ .
- A. 48    B. 52    C. 56    D. 64    E. 68
7. A bicycle travels at  $s$  feet/min. When its speed is expressed in inches/sec, the numerical value decreases by 16. Find  $s$ . (1 foot = 12 inches)
- A. 12    B. 16    C. 18    D. 20    E. 24
8. The average of  $A$  and  $2B$  is 7, and the average of  $A$  and  $2C$  is 8. What is the average of  $A$ ,  $B$ , and  $C$ ?
- A. 3    B. 4    C. 5    D. 6    E. 9
9. Replace each letter of AMATYC with a digit 0 through 9 to form a six-digit number (identical letters are replaced by identical digits, different letters are replaced by different digits). If the resulting number is the largest such number which is a perfect square, find the sum of its digits (that is,  $A + M + A + T + Y + C$ ).
- A. 32    B. 33    C. 34    D. 35    E. 36
10. A door is 4 ft wide and 7 ft high. If the door is standing open at a  $90^\circ$  angle with the door frame, what is the greatest distance in feet from the outer top corner of the door to a point on the door frame?
- A. 8    B. 9    C. 9.5    D. 10    E. 11

11. A class is exactly 40% female. When 3 male students are replaced by female students, the class becomes exactly 44% female. How many more males than females are in the original class?
- A. 10    B. 12    C. 15    D. 18    E. 20
12. A piece has 2 saxophone parts, 3 trumpet parts, and 3 trombone parts. If a band has 2 saxophonists, 3 trumpeters, and 3 trombonists, in how many ways can different parts be assigned to each player?
- A. 18    B. 72    C. 324    D. 512    E. 2916
13. Add any integer  $N$  to the square of  $2N$  to produce an integer  $M$ . For how many values of  $N$  is  $M$  prime?
- A. 0    B. 1    C. 2    D. A finite number  $> 2$     E. An infinite number
14. Sixteen students in a dance contest have numbers 1 to 16. When they are paired up, they discover that each couple's numbers add to a perfect square. What is the largest difference between the two numbers for any couple?
- A. 5    B. 7    C. 10    D. 12    E. 14
15. In how many distinct ways can a  $4 \times 4$  square be covered exactly by four  tiles? Assume that rotations and reflections are different coverings.
- A. 5    B. 6    C. 8    D. 9    E. 10
16. What is the smallest positive integer that cannot be the degree measure of an exterior angle of a regular polygon?
- A. 1    B. 2    C. 3    D. 5    E. 7
17. When certain proper fractions in simplest terms are added, the result is in simplest terms:  $\frac{2}{15} + \frac{1}{21} = \frac{19}{105}$ ; in other cases, the result is not in simplest terms:  $\frac{2}{15} + \frac{5}{21} = \frac{39}{105} = \frac{13}{35}$ . Assume that  $\frac{m}{15}$  and  $\frac{n}{21}$  are positive proper fractions in simplest terms. For how many such fractions is  $\frac{m}{15} + \frac{n}{21}$  not in simplest terms?
- A. 35    B. 48    C. 70    C. 72    D. 140
18. Let  $r$ ,  $s$ , and  $t$  be nonnegative integers. How many such triples  $(r, s, t)$  satisfy the system  $\begin{cases} rs + t = 14 \\ r + st = 13 \end{cases}$ ?
- A. 2    B. 3    C. 4    D. 5    E. 6
19. The average of any 17 consecutive perfect square integers is always  $k$  greater than a perfect square. If  $k = 2^r m$ , where  $m$  is odd, find  $r$ .
- A. 0    B. 1    C. 2    D. 3    E. 4
20. In  $\triangle SML$ ,  $SM = 7$  and  $ML = 9$ . If  $\angle M$  is exactly twice as large as  $\angle S$ , find  $SL$ .
- A. 10    B. 11    C. 12    D. 13    E. 14