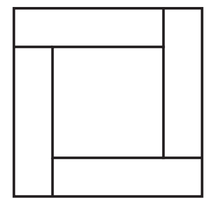
1. One can of frozen juice concentrate, when mixed with $4\frac{1}{3}$ cans of water, makes 2 quarts (64 oz.) of juice. Assuming no volume is gained or lost by mixing, how many oz. does a can hold?

   A. 8 B. 10 C. 12 D. 15 E. 18

2. Define the operation Δ 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 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/minute. When its speed is expressed in inches/second, 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 feet wide and 7 feet high. If the door is standing open at a 90° 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?

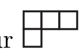
A. 18 B. 72 C. 324 D. 512 E. 2916

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 4x4 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 D. 72 E. 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 $m\angle M$ is exactly twice as large as $m\angle S$, find SL.

A. 10 B. 11 C. 12 D. 13 E. 14

1. C
2. D
3. A
4. A
5. B
6. E
7. D
8. C
9. E
10. B
11. C
12. B
13. C
14. B
15. E
16. E
17. B
18. A
19. D
20. C