Math Contest: Practice Test

Solve each problem. No calculator. Show your work and circle your final answer.

1. A bag contains 5 red marbles, 3 blue marbles and 2 green marbles. Two marbles are drawn at random without replacement. What is the probability that at least one of them is green? Express your answer as a common fraction.

2. In a class of 30 students, 18 play soccer, 14 play basketball, and 5 play both sports. How many students play neither sport?

3. What is the value of $1 + 2 + 3 + ... + 30$?

4. A coffee shop mixes beans that cost \$6 per pound with beans that cost \$9 per pound to make 30 pounds of a blend that costs \$7 per pound. How many pounds of the \$9 beans are used?

5. The sum of four consecutive even integers is 236. What is the least of the four integers?

6. What is the number of degrees in each interior angle of a regular dodecagon?

7. Five fair coins are flipped. What is the probability that exactly three of them show heads? Express your answer as a common fraction.

8. Mr. Diaz drives 120 miles at 60 mph and then another 120 miles at 40 mph. What is his average speed, in miles per hour, for the whole 240-mile trip?

9. What is the sum of the interior angles of a convex heptagon?

10. Ms. Lee has 48 pencils and 72 erasers. She wants to make identical supply kits that use all of the pencils and erasers with none left over. What is the greatest number of kits she can make?

(11) What is the value of 5 + 10 + 15 + ... + 100?

(12) Three fair coins are flipped. What is the probability that all three show the same face? Express your answer as a common fraction.

(13) How many milliliters of a 50% alcohol solution must be mixed with a 20% alcohol solution to make 60 milliliters of a 30% alcohol solution?

(14) In an isosceles triangle, the angle between the two equal sides measures 40°. What is the number of degrees in each of the other two angles?

(15) In an election with three candidates, Candidate A received 45% of the votes, Candidate B received 35%, and Candidate C received the remaining 340 votes. How many votes did Candidate A receive?

(16) Of 100 students, 45 are in the music club, 38 are in the art club, and 30 are in the drama club. Also, 15 are in both music and art, 12 are in both art and drama, 10 are in both music and drama, and 5 are in all three clubs. How many students are in at least one of the three clubs?

(17) The sequence 100, 97, 94, 91, ... continues forever. What is the first negative term?

(18) Two cards are drawn at random, without replacement, from a standard 52-card deck. What is the probability that both are aces? Express your answer as a common fraction.

(19) A car drives up a hill at 30 mph and then drives back down the same road at 60 mph. What is the car's average speed for the round trip?

(20) How many different arrangements of the letters in the word BANANA are possible?

(21) How many different triangles can be formed by choosing three vertices of a regular hexagon?

(22) The sum of 100 consecutive positive integers is 7,050. What is the largest of these integers?

(23) The 30 students in a class averaged 86 on a test. The boys averaged 80 and the girls averaged 90. How many girls are in the class?

(24) A path from (0, 0) to (3, 3) on a grid consists of 6 steps, each one unit right or one unit up. If one of the possible paths is chosen at random, what is the probability that it passes through the point (1, 1)? Express your answer as a common fraction.

(25) A triangle with sides 3, 4 and 5 is similar to a larger triangle with perimeter 60. What is the length of the longest side of the larger triangle?

(26) A positive factor of 36 is chosen at random. What is the probability that it is a perfect square? Express your answer as a common fraction.

(27) The first term of an arithmetic sequence is 2, and the 5th term is 3 times the 2nd term. What is the sum of the first 10 terms?

(28) Of the 100 campers at a camp, 55 swim, 45 hike, and 40 canoe. Also, 20 campers swim and hike, 15 hike and canoe, and 18 swim and canoe, while 10 campers do none of the three activities. How many campers do all three activities?

(29) A train 100 meters long and a train 150 meters long travel toward each other on parallel tracks at 20 meters per second and 30 meters per second. How many seconds pass from the moment the fronts of the two trains meet until the backs of the two trains have passed each other?

(30) What is the least positive integer that has exactly 10 positive factors?