1 Sample questions

1.1

If x and y are positive numbers and the average of 4, 20 and x is equal to the average of y and 16, then the ratio $x : y$ is

(A) 3:2 (B) 2:3 (C) 1:1 (D) 2:5

(E) none of the other answers is correct

1.2

There are more than 25 students in a math class at LUMS. There are more than 2 but fewer than 10 boys and more than 14 but fewer than 23 girls in the class. How many different class sizes would satisfy these conditions?

(A) 5   (B) 6   (C) 7   (D) 3

(E) none of the other answers is correct

1.3

How many integers can be expressed as a sum of three distinct numbers chosen from the set {4, 7, 10, 13, ..., 46} ?

(A) 45 (B) 37 (C) 36 (D) 43

(E) none of the other answers is correct

1.4

Consider a circle. Ten distinct points are marked on the circle. How many different line segments can be drawn by joining any two of the points marked on the circle?

(A) 9   (B) 45   (C) 17   (D) 66

(E) none of the other answers is correct

1.5

The lengths of the three sides of a triangle are 7, $x + 4$ and $2x + 1$. The perimeter of the triangle is 36. What is the length of the longest side of the triangle?

(A) 7   (B) 12   (C) 17   (D) 15

(E) none of the other answers is correct

1.6

A rectangular building block has a square base. Its height is 9 units. If the block has a volume of 1089 cubic units, what is the side length of the base?

(A) 11 (B) 13 (C) 121 (D) 15

(E) none of the other answers is correct

1.7

There is one ship that is 200 metres in length. A second ship is 100 metres in length. The two ships travel at constant but different speeds. When travelling in opposite directions, it takes 10 seconds for them to completely pass each other. When travelling in the same direction, it takes 25 seconds for them to completely pass each other. The speed of the faster ship, in metres per second, is

(A) 12 (B) 14 (C) 18 (D) 21

(E) none of the other answers is correct

1.8

How many integer values of x satisfy $\frac{x-1}{3} < \frac{5}{7} < \frac{x+4}{5}$?

(A) 0   (B) 1   (C) 2   (D) 3

(E) none of the other answers is correct

1.9

On an island there are two types of inhabitants: Heroes who always tell the truth and Villains who always lie. Four inhabitants are seated around a table. When each is asked 'Are you a Hero or a Villain?', all four reply 'Hero'. When asked 'Is the person on your right a Hero or a Villain?', all four reply 'Villain'. How many Heroes are present?

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

1.10

If $f(x) = px + q$ and $f(f(f(x))) = 8x + 21$, and if p and q are real numbers, then $p + q$ equals

(A) 2   (B) 3   (C) 5   (D) 7

(E) none of the other answers is correct