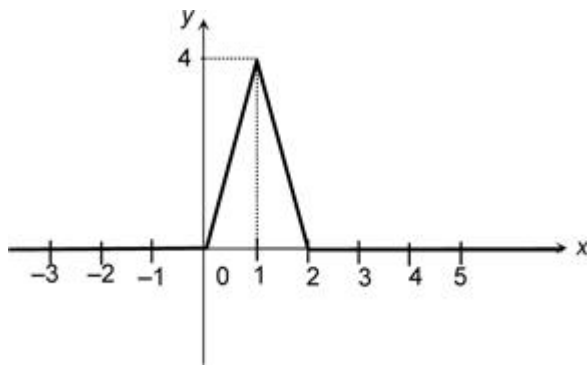


# CAT Mock Paper 5

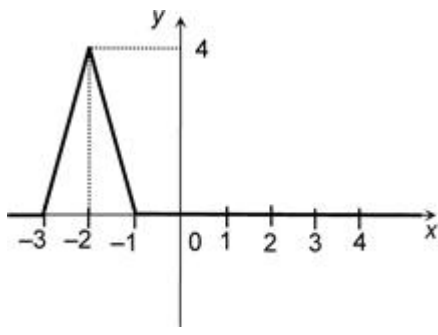
By [www.collegedunia.com](http://www.collegedunia.com)

## Quantitative Ability

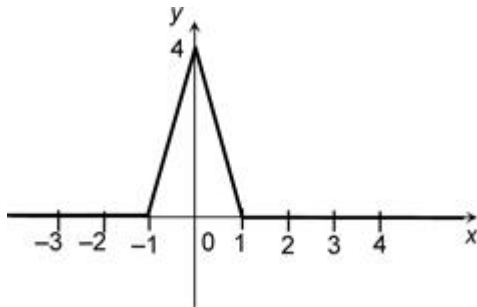
**DIRECTIONS** for questions 1 to 18: Answer the questions independently of each other.



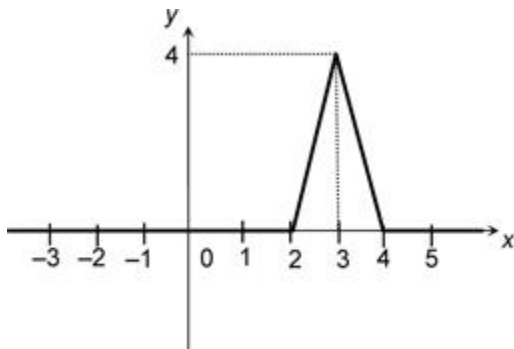
Q 1.



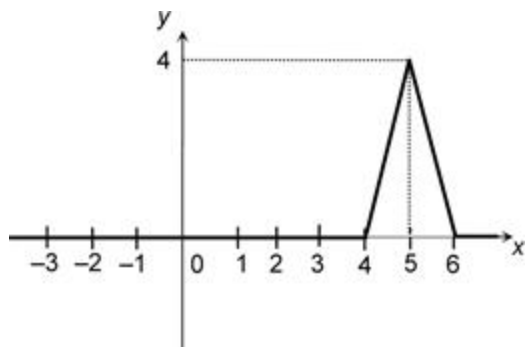
(1)



(2)



(3)



(4)

(5) None of these

**Q 2.** The perimeter of an equilateral triangle equals the perimeter of a rectangle. If one of the sides of the rectangle equals the side of the triangle, find the ratio of the areas of the triangle and the rectangle.

(1)  $\sqrt{3} : 1$

(2)  $\sqrt{3} : \sqrt{2}$

(3)  $2\sqrt{3} : 1$

(4)  $2 : \sqrt{3}$

(5)  $\sqrt{3} : 2$

**Q 3.** If  $a^m = a^n$ , where  $a$  is a real number, while  $m$  and  $n$  are integers, then which of the following must be true?

(1)  $M = N$

(2) If  $M \neq N$ ,  $A = 0$  or  $A = 1$

(3)  $M \neq N$

(4)  $A = M^N$

(5) None of these

**Q 4. A is a set of all those integers greater than 1 and less than 100 which are divisible either by 3 or by 4 but not by both. What is the index of the highest power of thousand that occurs in the product of all the elements of set A?**

- (1) 9
- (2) 7
- (3) 3
- (4) 4
- (5) 6

**Q 5. Chris and his wife invited a total of 10 families on their marriage anniversary. While the host family had just the two members, each family invited consisted of four members. If every person in the party shook hands with every other person belonging to a different family exactly once, then find the number of handshakes that took place in the party.**

- (1) 801
- (2) 800
- (3) 740
- (4) 729
- (5) None of these

**Q 6. If  $\frac{y+z-x}{x}$ ,  $\frac{x+z-y}{y}$  and  $\frac{x+y-z}{z}$  are in arithmetic progression, then which of the following are in arithmetic progression?**

- (1)  $x, y, z$
- (2)  $x+y, x+z, y+z$
- (3)  $\frac{1}{x}, \frac{1}{y}, \frac{1}{z}$
- (4)  $\frac{1}{x+y}, \frac{1}{x+z}, \frac{1}{y+x}$
- (5) None of these

**Q 7. Working together, two workers completed a job in 5 days. Had the first worker worked twice as fast and the second worker half as fast, it**

would have taken them 4 days to complete the job. In how many days will the first person working alone, complete the entire job?

- (1) 10 days
- (2) 20 days
- (3) 30 days
- (4) 60 days
- (5) 72 days

**Q 8.** A mathematics teacher asked each of her students to think of a natural number which was a perfect square and then convert it to a number system to the base of any natural number of their choice, where the base is not more than 9. The teacher later observed that though no two students took the same base, all the students in the class ended up with the same result of 12321. Find the maximum, possible number of students in the class.

- (1) 9
- (2) 8
- (3) 7
- (4) 6
- (5) 5

**Q 9.** A rectangle ABCD, when rolled such that the two lengths AB and CD coincide becomes a cylinder of volume  $C_1$ . Similarly, when it is rolled such that the two breadths AD and BC coincide, it becomes a cylinder of volume  $C_2$ . If a square of the same area is rolled in a similar manner along one of its sides, a cylinder of volume  $C_3$  is formed. Which of the following statements holds true?

- (1)  $C_3 > C_2 > C_1$
- (2)  $C_3 > C_1 > C_2$
- (3)  $C_2 > C_3 > C_1$
- (4)  $C_1 > C_3 > C_2$
- (5) None of these

**Q 10.** The marked price and the cost price of a watch are in the ratio 4 : 3. The discount percentage offered before it was sold and the profit/loss percentage made on it are in the ratio 3 : 4. Find the profit/loss percentage.

- (1)  $8\frac{1}{3}\%$  Loss
- (2)  $4\frac{1}{3}\%$  Profit
- (3)  $8\frac{1}{3}\%$  Profit
- (4)  $16\frac{2}{3}\%$  Profit
- (5) Cannot be determined

**Q 11.** What is the remainder when  $(2^{469} + 3^{268})$  is divided by 22?

- (1) 1
- (2) 11
- (3) 19
- (4) 0
- (5) 17

**Q 12.** Consider the expansion below:

$$(3 + a + a^2 + a^3)^5 = C_0 + C_1a + C_2a^2 + \dots + C_{15}a^{15}, \text{ where } C_0, C_1, C_2,$$

$\dots, C_{15}$  are all integers. Find the value of  $\sum_{i=1}^{15} C_i$ .

- (1) 7433
- (2) 7623
- (3) 7777
- (4) 7723
- (5) 7533

**Q 13.** AB is the diameter of a circle with centre O and C is a point on the circle different from A and B. D is a point on BC such that  $OD \perp BC$ . E is a point on BD such that OE bisects  $\angle BOD$  and  $BE : ED = 2 : 1$ . If F is the midpoint of DC, find the length (in cm) of AF, given that  $AB = 24$  cm.

- (1)  $\sqrt{161}$
- (2)  $\sqrt{171}$
- (3)  $\sqrt{181}$
- (4)  $\sqrt{191}$
- (5)  $\sqrt{201}$

**Q 14.** If  $y$  is an even natural number not less than 4 and  $x = y^2 - 2y$ , then the largest number that always divides  $x^2 - 8x$  is

- (1) 182
- (2) 144
- (3) 72
- (4) 384
- (5) 96

**Q 15.** Let  $S_n$  be defined as  $S_n = t_0 + t_1 + t_2 + \dots + t_{n-1} + t_n$ , where  $t_n = (-1)^{n+1}(t_{n-1} + 1)$  and  $t_0 = 1$ . Find  $S_{199}$ .

- (1) -100
- (2) 100
- (3) -99
- (4) -199
- (5) -198

**Q 16.** In how many distinguishably different ways can a cube be painted using at most two colours - White and Black - such that each face is coloured with exactly one of the two given colours?

- (1) 24
- (2) 16
- (3) 10
- (4) 12
- (5) 14

**Q 17.** Ron Weasley, an amateur wizard from, Hogwarts, tried to teleport his brother's pet spider by casting a magical spell upon it. However, the spell had a rather different effect than what Ron intended it to have. The spider was thoroughly disoriented and started from the point where it was and first crawled 8 m towards South, then it crawled 4 m towards West, 2 m South, 1 m East, 50 cm South, 25 cm West, 12.5 cm South, 6.25 cm East and so on indefinitely. If P is the point from which the spider started, what is the location of the point Q that it finally approaches, in relation to P?

- (1) Q is  $\frac{32}{3}$  m to the South and  $\frac{16}{5}$  m to the West of P.
- (2) Q is  $\frac{32}{17}$  m to the South and  $\frac{32}{3}$  m to the West of P.

- (3) Q is  $\frac{16}{3}$  m to the South and  $\frac{32}{17}$  m to the West of P.  
(4) Q is  $\frac{32}{3}$  m to the South and  $\frac{16}{17}$  m to the West of P.  
(5) None of these

**Q 18.** A cat, which is sitting inside a tunnel PQ, at a distance of 50 m from the end P, notices a train approaching the end P of the tunnel from the outside. Now, if the cat runs towards the end P, then the train would meet it exactly at P. If the cat runs towards the end Q instead, then the train would meet it exactly at Q. Which of the following is not a possible value of the length PQ (in m) of the tunnel?

- (1) 130  
(2) 120  
(3) 110  
(4) 100  
(5) 105

**DIRECTIONS for questions 19 and 20:** Answer the questions on the basis of the information given below.

A grid of horizontal and vertical lines forms  $m$  rows and  $n$  columns of rectangles, each of breadth  $a$  and length  $b$ , such that the breadth of the entire grid is  $ma$ , while its length is  $nb$ . A straight line is now drawn, passing through the top left corner vertex and the bottom right corner vertex of the grid.

**Q 19.** If  $(a, b) = (2, 3)$  and  $(m, n) = (5, 7)$ , at how many distinct points, including the top-left and the bottom-right corners, does the straight line intersect the grid lines?

- (1) 5  
(2) 12  
(3) 6  
(4) 13  
(5) 15

**Q 20.** If  $(a, b) = (3, 4)$  and  $(m, n) = (4, 6)$ , at how many distinct points, including the top-left and the bottom-right corners, does the straight line intersect the grid lines?

- (1) 13
- (2) 10
- (3) 11
- (4) 12

**Directions for questions 21 and 22:** Answer the question on the basis of the information given below.

Triplets consisting of three different numbers are formed from numbers 1 to 10.

**Q 21.** How many of these triplets are such that the sum of the numbers is divisible by 3?

- (2) 37
- (3) 42
- (4) 36
- (5) 48

**Q 22.** How many of the triplets formed are such that the sum of the numbers is divisible by 9 and they do not have a 9 in them?

- (1) 7
- (2) 6
- (3) 9
- (4) 10

**Directions for questions 23 to 26:** Answer the question independently of the other questions.

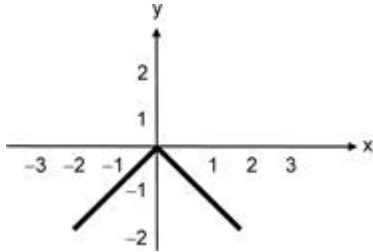
**Q 23.** What is the value of the expression given below?

$$\frac{1}{1^2 - \frac{1}{2^2 - \frac{1}{3^2 - \frac{1}{4^2 - \frac{1}{5^2}}}}} + \frac{1}{-3 + \frac{1}{3^2 - \frac{1}{4^2 - \frac{1}{5^2}}}}$$

- (1) 1.33
- (2) 1.25
- (3) 1
- (4) None of these



**Q 24.** The graph below gives a function  $f(x)$ , represented by thickened line segments. From among the choices given, choose the function that best describes  $f(x)$ .



- (1)  $f(x) = -f(-x)$
- (1)  $f(x) = f(-x)$
- (2)  $f(x) = f(-x) + 2$
- (3)  $f(x) = 1 - f(-x)$

**Q 25.** A square PQRS is constructed in an equilateral triangle ABC, such that P and S lie on the sides AB and AC respectively, while Q and R lie on side BC. If  $\angle BPC = \theta$ , then

- (1)  $\theta > 105^\circ$
- (2)  $90^\circ < \theta < 105^\circ$
- (3)  $\theta = 90^\circ$
- (4)  $75^\circ < \theta < 90^\circ$

**Q 26.** Twenty persons went on a picnic. Three out of every five in the group do not like pulav but two out of every four carried pulav with them. Then, we can conclude that

- (1) at least two persons who do not like pulav carried pulav with them.
- (2) at least eight persons who do not like pulav carried pulav with them.
- (3) at the most eight persons who do not like pulav carried pulav with them.
- (4) at the most two persons who do not like pulav carried pulav with them.

**Directions for questions 27 and 28:** Answer the question on the basis of the information given below.

Let  $E_n = 2 - 4 + 6 - 8 + 10 - \dots - (-1)^{n+1} \cdot (2n)$  and  $F_n = 4 + 1 - 2 + 12 + 3 - 6 + 36 + 9 - 18 - \dots - n$  terms.

**Q 27. What is the value of  $E_{110}$ ?**

- (1) 220
- (2) 202
- (3) 440
- (4) None of these

**Q 28. If  $2F_n + 3 = 81^6$  then what is the value of  $n$ ?**

- (1) 17
- (2) 23
- (3) 69
- (4) 42

***Directions for questions 29 to 34: Answer the question independently of the other questions.***

**Q 29. There are two concentric circles. The radius of the outer circle is 8.5 cm and the length of the longest chord of the outer circle that doesn't cut through the inner circle is 8 cm. What fraction of the bigger circle is not covered by the smaller circle?**

- (1)  $\frac{64}{289}$
- (2)  $\frac{8}{17}$
- (3)  $\frac{225}{289}$
- (4)  $\frac{89}{289}$

**Q 30. Three numbers in geometric progression are such that if 64 is decreased from the largest, then the three numbers thus obtained would be in arithmetic progression. Further if the middle number of the new set of numbers is reduced by 8, the numbers thus obtained would be in geometric progression. Find the middle term of the original sequence.**

- (1) 5
- (2) 20
- (3)  $\frac{52}{9}$
- (4) Cannot be determined

**Q 31. Find  $pqr : qsu$ , given that  $p : r = 2 : 3$ ,  $q : s = 4 : 3$ ,  $r : t = 8 : 9$ ,  $s : u = 3 : 2$  and  $t : q = 3 : 4$**

- (1)  $\frac{4}{27}$
- (2)  $\frac{8}{27}$
- (3)  $\frac{16}{27}$
- (4)  $\frac{10}{27}$

**Q 32. Find the number of five-digit multiples of 4, which can be formed using the digits from 1 to 7, using each digit at most once.**

- (1) 720
- (2) 84
- (3) 840
- (4) 600

**Q 33. In a company, the number of married employees is a prime number. Which of the following cannot be the ratio of the total number of employees and the number of unmarried employees?**

- (1) 173 : 90
- (2) 193 : 80
- (3) 181 : 32
- (4) 201 : 32

**Q 34. The speeds of Aniket, Brihat and Chatur are in the ratio of 4 : 3 : 2. If Chatur takes half an hour more than Brihat to travel from P to Q, what is the total time taken by Aniket to travel from P to Q and then back from Q to P?**

- (1) 120 minutes
- (2) 90 minutes
- (3) 60 minutes
- (4) 45 minutes