

CAT 2017 QA Slot 1 Answer Key

QNo:- 67 ,Correct Answer:- 20

Explanation:- Let Barun's age be $10x$. Arun's age is $4x$. The difference of these ages is $6x$, a constant. When Arun's age is 50% of Barun's age, this difference also would be 50% ie Barun's age, at that stage would be $12x$. It would be increase by 20%.

QNo:- 68 ,Correct Answer:- 15

Explanation:- Let the number of days required to complete the job be n .
1 person works on day 1, 2 on day 2, 3 on day 3, n on day n .
Each person has the same efficiency.

$$\text{Work} = 1\left(\frac{1}{120}\right) + 2\left(\frac{1}{120}\right) + 3\left(\frac{1}{120}\right) + \dots + n\left(\frac{1}{120}\right).$$

This is also equal to 1.

$$\frac{1}{120} + \frac{2}{120} + \frac{3}{120} + \dots + \frac{n}{120} = 1$$

$$\Sigma n = 120$$

$$n = 15.$$

QNo:- 69 ,Correct Answer:- 11

Explanation:- Number of people in the group cannot exceed $\frac{630}{53}$ i.e., 11.8.
Maximum possible number of people in the group = 11.

QNo:- 70 ,Correct Answer:- 20

Explanation:- The speed in the second case is $\frac{5}{4}$ times the speed in the first case. Therefore, the time would be $\frac{4}{5}$ times the time, i.e., $\frac{1}{5}$ less. This one fifth is 20 min. Therefore, the time taken in the first case is 100 min.

$$\text{The distance} = (12) \left(\frac{5}{3}\right) \text{ km} = 20 \text{ km}$$

QNo:- 71 ,Correct Answer:- 70000

Explanation:- Let the total monthly savings be S.

$$\text{Investment in FD} = \frac{50}{100}S.$$

$$\text{Investment in stocks} = \frac{30}{100} \left(S - \frac{50}{100}S \right) = \frac{15}{100}S$$

$$\text{Investment in savings bank account} = \frac{35}{100}S$$

$$\frac{35}{100}S + \frac{50}{100}S = 59500$$

$$S = 70000$$

QNo:- 72 ,Correct Answer:- D

Explanation:- Let the retail price be 100.

$$\text{Discount} = 15$$

$$\text{Selling price} = 85$$

$$\text{Cost price} = \frac{85}{1.02} = \frac{500}{6}$$

In order to make a profit of 20%, the selling price

$$= \frac{500}{6}(1.2) = 100$$

The seller must sell at the retail price

QNo:- 73 ,Correct Answer:- B

Explanation:- Let the speed of the boat in still water and the speed of the river be u and v respectively.

$$\frac{d}{2x+y} + \frac{d}{2x-y} = \frac{1}{4} \left(\frac{d}{x+y} + \frac{d}{x-y} \right)$$

$$\frac{d(4x)}{4x^2 - y^2} = \frac{1}{4} \left(\frac{d(2x)}{x^2 - y^2} \right)$$

$$8(x^2 - y^2) = 4x^2 - y^2$$

$$\frac{x^2}{y^2} = \frac{7}{4}$$

$$\frac{x}{y} = \frac{\sqrt{7}}{2}$$

QNo:- 74 ,Correct Answer:- A

Explanation:- The data is given below

C1	C2	C3	C4	C5
9	10	8		
	18		19	
81	90	72	95	100

$C5 - C1 = 19$. The numbers above are the actual profits (and not just the ratio). The total profit = 438 crore.

QNo:- 75 ,Correct Answer:- D

Explanation:- Let the number of boys appearing for the admission test be b .

Percentage of candidates who get admission =

$$\frac{\frac{30}{100}(2b) + \frac{45}{100}b}{2b + b} (100)\% = 35\%$$

65% of the candidates do not get admission.

QNo:- 76 ,Correct Answer:- A

Explanation:- Let the total number of popcorn packets in stock be T .

Total number of chips packets in stock = T

$$\text{Required ratio} = \frac{16}{40}T : \frac{14}{35}T = 1 : 1$$

QNo:- 77 ,Correct Answer:- B

Explanation:- Let the price of each good mango be g .

Price of each medium quality mango = $\frac{g}{2}$.

$$\text{Total cost price} = 80g + 40\left(\frac{g}{2}\right) = 100g$$

$$\text{Total selling price} = 120(0.9g) = 108g$$

Overall profit = 8%

QNo:- 78 ,Correct Answer:- D

Explanation:- Let the printed price be p .

If 40% discount is given, selling price = $0.6(60p) = 36p$

In order to make a profit of 20%, the selling price

Total cost price

$$\Rightarrow 36p / 1.2 = 30p$$

Ten toys are destroyed in the fire.

The remaining toys are sold at a price such that the same amount of profit is made as in the conditional case.

Profit made on remaining toys = $6p$

Total selling price of remaining toys = $36p$

Discount that should be given = $50p - 36p = 14p$

Discount% = 28%

QNo:- 79 ,Correct Answer:- D

Explanation:- $\left(\frac{a+3}{b}\right)^2 = 9$ and $\left(\frac{a-1}{b-1}\right)^2 = 4$.

We get 4 cases

$a + 3 = 3b$	$a + 3 = 3b$
$a - 1 = 2b - 2$	$a - 1 = -2b + 2$
$a + 3 = -3b$	$a + 3 = -3b$
$a - 1 = 2b - 2$	$a - 1 = -2b + 2$

Subtracting the second equation from the first we get,

I	II	III	IV
4	$b+2$	$5b-2$	$-5b+2$
			$-b-2$

$I \Rightarrow b = 2, a = 3$ Rejected

$II, III \Rightarrow b$ is not an integer. Rejected

$IV \Rightarrow b = -6, a = 15$

$$\therefore \frac{a^2}{b^2} = \left(\frac{15}{-6}\right)^2 = \frac{25}{4}$$

QNo:- 80 ,Correct Answer:- A

Explanation:- Let the average score of the boys in the midsemester examination be b .

Average score of the girls = $b + 5$

In the final exam, average score of the girls = $b + 5 - 3 = b + 2$.

Average score of the entire class increased by 2

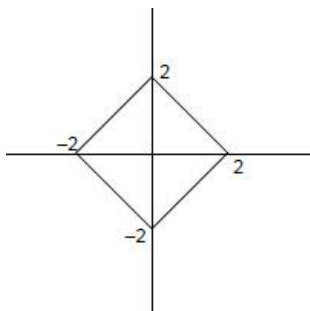
and is hence $\frac{20b + 30(b+5)}{50} + 2$ i.e. $b + 5$

Average score of the boys

$$\frac{50(b+5) - 30(b+2)}{20} = b + 9.5$$

Increases in the average of boys is 9.5.

QNo:- 81 ,Correct Answer:- C



Explanation:-

The closed region bounded by $|ax| + |by| = c$ in the two-dimensional plane has x-intercepts of

$$\pm \frac{c}{|a|} \text{ and y- intercepts of } \pm \frac{c}{|b|}.$$

This is in general a rhombus. In the given question, we have a square which has each of its diagonals as 4.

$$\text{Area} = \frac{1}{2}(4)(4) = 8$$

QNo:- 82 ,Correct Answer:- B

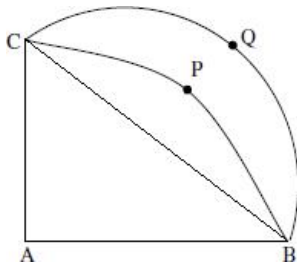
Explanation:- The medians of a triangle divide the triangle into six parts of equal area.

$$\text{Area of } \triangle GBC = \frac{1}{3} (\text{Area of the triangle})$$

$$= \frac{1}{3} \sqrt{5(5-a)(s-b)(s-c)} = \frac{250}{\sqrt{3}}$$

$$\text{Area of the remaining portion} = 2 \left(\frac{250}{\sqrt{3}} \right) = \frac{500}{\sqrt{3}}$$

QNo:- 83 ,Correct Answer:- B



Explanation:-

Let $AB = a$ ($a = 6$)

CQB is a semicircle of radius $\frac{a}{\sqrt{2}}$

CPB is a quarter circle (quadrant) of radius a

$$\therefore \text{Area of semicircle} = \frac{\pi a^2}{4}$$

$$\text{Area of quadrant} = \frac{\pi a^2}{4}$$

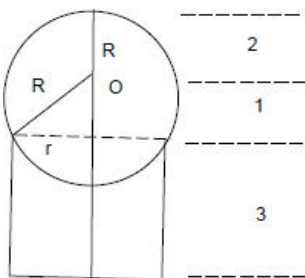
\therefore Area of region enclosed by $BPC, BQC = \text{Area of } \triangle ABC = 18$.

QNo:- 84 ,Correct Answer:- B

Explanation:-

The volumes of the 5 smaller cubes and the original big one are in the ratio $1 : 1 : 8 : 27 : 27 : 64$. Therefore, the sides are in the ratio $1 : 1 : 2 : 3 : 3 : 4$ while the areas are in the ratio $1 : 1 : 4 : 9 : 9 : 16$. The sum of the areas of the 5 smaller cubes is 24 parts while that of the big cube is 16 parts. The sum is 50% greater.

QNo:- 85 ,Correct Answer:- 6



Explanation:-

The height of the cylinder (h) = 3

The volume = 9π

$$\pi r^2 h = 9\pi \Rightarrow r = \sqrt{3}$$

The radius of the ball (R) = 2

The height of O , the centre of the ball, above the line representing the top of the cylinder is say a .

($a = 1$)

\therefore The height of the topmost point of the ball from the base of the cylinder is $h + a + R = 3 + 1 + 2 = 6$

QNo:- 86 ,Correct Answer:- 24

Explanation:- In a 3, 4, 5 triangle, the length of the altitude to the hypotenuse = $3(4)/5 = 2.4$. Therefore, in a 15, 20, 25 triangle, it is 12. This is the shortest distance from A to BC. At 60 km/hr, i.e., 1 km/min, it would take 24 min to cover 24 km.

QNo:- 87 ,Correct Answer:- D

Explanation:- $\log_3 x = a \Rightarrow x = 3^a$

$\log_{12} y = a \Rightarrow y = 12^a$

$\therefore xy = 36^a$ and $xy = G = 6^a$

$\therefore \log_6 G = a$

QNo:- 88 ,Correct Answer:- D

Explanation:- $x + 1 = x^2 \Rightarrow x^2 - x - 1 = 0 \Rightarrow x = \frac{1 + \sqrt{5}}{2} (\because x > 0)$

Also, $x^2 = x + 1 \Rightarrow x^4 = x^2 + 2x + 1 = 3x + 2$

$\Rightarrow 2x^4 = 6x + 4 = 3 + 3\sqrt{5} + 4 = 7 + 3\sqrt{5}$

QNo:- 89 ,Correct Answer:- C

Explanation:- $0.008 = \frac{8}{1000} = 5^{-3}$

$\therefore \log_{0.008} \sqrt{5} = \frac{1/2}{-3} = \frac{-1}{6}$ and $\log_{\sqrt{3}} 81 = \frac{4}{1/2} = 8$

\therefore The given expression is $\frac{5}{6}$

QNo:- 90 ,Correct Answer:- B

Explanation:- $9^{2x-1} - 9^{2x-2} = 9^{2x-2}(9-1) = 1944 = 8(243) = 8(9^{2.5})$

$\therefore 2x-2 = 2.5 \Rightarrow x = \frac{4.5}{2} = \frac{9}{4}$

QNo:- 91 ,Correct Answer:- B

Explanation:- $x = 25 + y + z$. The possible values of x, y, z and the corresponding number of values of y, z are tabulated below(x, y, z are positive integers). We see that $27 \leq x \leq 40$

x	y	z	No of values of (x, y)
27	1	1	1
28	1,2	2,1	2
-	-	-	-
38	1, ..., 2	12, ... 1	12
39	2, ..., 12,	12, ... 2	11
40	3, ..., 12	12, ..., 3	10

The number of solutions is $1 + 2 + \dots + 12 + 11 + 10 = 78 + 21 = 99$

QNo:- 92 ,Correct Answer:- 11

Explanation:- $(n - 5)(n - 10) - 3(n - 2) \leq 0$

$$\Rightarrow n^2 - 18n + 56 \leq 0$$

$$\Rightarrow (n - 4)(n - 14) \leq 0$$

As n is an integer, n can be 4, 5, 614, i.e. it can have 11 values.

QNo:- 93 ,Correct Answer:- 24

Explanation:- $x^2 + 11x + n = x \Rightarrow x^2 + 10x + n = 0$

$x^2 + 10x + 25 = 0$ has real and equal roots

$x^2 + 10x + n = 0$ where $n > 25$ has complex roots.

The maximum value of n for which the equation has two distinct real roots is 24.

QNo:- 94 ,Correct Answer:- 2

Explanation:- $a + b + c + d = 30$, a, b, c, d are integers.

$(a - b)^2 + (a - c)^2 + (a - d)^2$ would have its maximum value when each bracket has the least possible value.

Let $(a, b, c, d) = (8, 8, 7, 7)$

The given expression would be 2. It cannot have a smaller value.

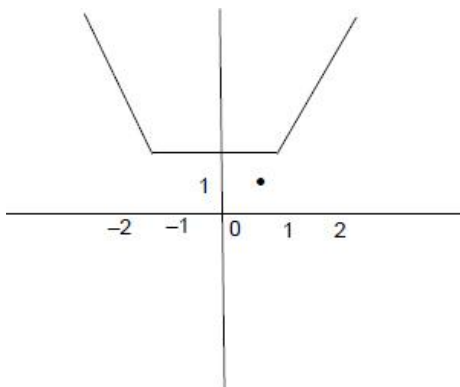
QNo:- 95 ,Correct Answer:- 160

Explanation:- There are 5 pairs of diametrically opposite points and the centre O .

If O is not selected, the number of triangles = ${}^{10}C_3 = 120$.

If O is selected, the other two points can be selected in $10(8)/2$, i.e., 40 ways. The number of triangles is 160.

QNo:- 96 ,Correct Answer:- A



Explanation:-

The graph of $y = |x - 1| + |x + 1|$ is shown above.

The shortest distance of $\left(\frac{1}{2}, 1\right)$ from the graph is 1.

QNo:- 97 ,Correct Answer:- A

Explanation:- Let the first term be a and the common difference be d .

$$(a + 6d)^2 = (a + 2d)(a + 16d)$$

$$\Rightarrow a^2 + 12ad + 36d^2 = a^2 + 18ad + 32d^2$$

$$\Rightarrow 4d^2 = 6ad$$

$$\Rightarrow \frac{a}{d} = \frac{2}{3}$$

QNo:- 98 ,Correct Answer:- A

Explanation:- After giving one eraser to each of the 4 kids, there are 3 left.

They can split 2, 1 or 1, 1, 1. (No kid can get 4)

There are ${}^4P_2 + {}^4C_3$, i.e., 16 ways of distributing the erasers.

QNo:- 99 ,Correct Answer:- A

Explanation:- $f(x) = \frac{5x + 2}{3x - 5}$, $g(x) = x^2 - 2x - 1$

$$f(3) = \frac{5(3) + 2}{3(3) - 5} = \frac{17}{4}$$

$$f(17) = \frac{5\left(\frac{17}{4}\right) + 2}{3\left(\frac{17}{4}\right) - 5} = \frac{85 + 8}{51 - 20} = \frac{93}{31} = 3$$

$$g(3) = 3^2 - 2(3) - 1 = 2.$$

QNo:- 100 ,Correct Answer:- B

Explanation:- $a_1 = 3$, $a_2 = 7$, ..., $a_n = 4n - 1$, ..., $a_{3n} = 4(3n) - 1$

$$a_1 + a_2 + \dots + a_{3n} = \frac{3n(12n + 2)}{2} = 1830$$

$$\Rightarrow n(6n + 1) = 610$$

$$\Rightarrow 6n^2 + n - 610 = 0$$

$$\Rightarrow (6n + 61)(n - 10) = 0$$

$$\Rightarrow n = 10 \quad (\because n \text{ is an integer})$$

$$\therefore a_1, a_2 + \dots + a_n = 3 + 7 + \dots + [4(10) - 1]$$

$$= \frac{4(10)(11)}{2} - 10 = 210$$

$$210 m > 1830 = n > \frac{1830}{210} = 8.7$$

The minimum integral value of m is 9
