aspiration.ai

CDC 03 2022 QA

Scorecard (procreview.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Accuracy (AccSelectGraph.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Qs Analysis (QsAnalysis.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Video Attempt / Solution (VideoAnalysis.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Solutions (Solution.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Bookmarks (Bookmarks.jsp?sid=aaaN5tjtX0b7WgArBjowySun Jan 08 23:58:14 IST 2023&qsetId=TnDz3yJnKzY=&qsetName=CDC 03 2022 QA)

Section-1

Sec 1

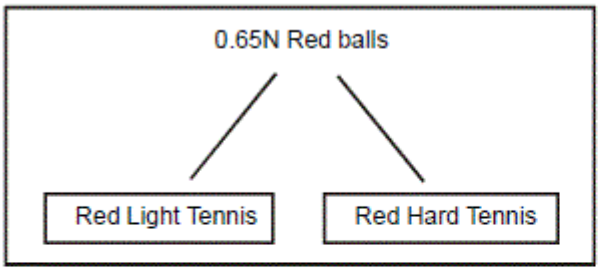
Q.1 [11831809]

A basket has N balls of either Red or Blue colour. These balls are either Hard Tennis or Light Tennis balls. The percentage of Red balls is 65% and the number of Blue Hard Tennis balls is 15% of the Blue balls. What is the minimum number of Red Light Tennis balls, given that the percentage of Red Hard Tennis balls is 85% of the Red balls?

Solution:
Correct Answer : 39

Answer key/Solution

Given that there are N balls, there will be 0.65N Red balls and 0.35N Blue balls.



Red Hard Tennis balls = 0.85 × 0.65N
Red Light Tennis balls = 0.15 × 0.65N

$$=\frac{15}{100}\times\frac{65}{100}\times N=\frac{39}{400}N$$

For Red Light Tennis balls to be minimum, N has to be minimum. Also, for the entire thing to be an integer, N has to take minimum value of 400. So $\frac{39}{400}\times 400=39$.

Hence, 39 is the minimum number of Red Light Tennis balls.

Bookmark FeedBack

Q.2 [11831809]

If $(c^{\log_d x})^3-8(c^{\log_d x})^2+17(c^{\log_d x})-8=2$ and c, d > 1, then which of the following can be the value of x?

1 ◯ d

2 ◯ $c^{\log_d 2}$

3 ◯ $5^{\log_c d}$

4 ◯ $c^{\log_d 3}$

Solution:
Correct Answer : 3

Answer key/Solution

Let $c^{\log_d x} = k$.
Then, $k^3 - 8k^2 + 17k - 10 = 0$ which can be factorized into
$(k-1)(k-2)(k-5) = 0$
So $k = 1, 2, 5$

$\Rightarrow c^{\log_d x} = 1, 2, 5 \Rightarrow x = 0, 2^{\log_c d}, 5^{\log_c d}$

Hence, from the given options only option (3), $5^{\log_c d}$, satisfies. Remaining options are distorted.

Bookmark FeedBack

Q.3 [11831809]

In a triangle ABC, if $\angle B = 90°$ and sides AB, BC and AC are in Geometric Progression in the same order, then which of the following is true?

1 ◯ $\frac{AC}{AB} = \frac{2}{\sqrt{5}-1}$

2 ◯ $\frac{AC}{AB} = \frac{2}{\sqrt{5}+1}$

3 ◯ $\frac{AC}{AB} = \frac{\sqrt{5}+1}{2}$

4 ◯ Both (1) & (3)

Solution:
Correct Answer : 4

Answer key/Solution

Let AB = a, BC = ar and AC = ar^2.
Given $\angle B = 90°$
$AB^2 + BC^2 = AC^2$
$\Rightarrow a^2 + (ar)^2 = (ar^2)^2 \Rightarrow r^4 - r^2 - 1 = 0$

Therefore, $r^2 = \frac{1 \pm \sqrt{1+4}}{2}$

Hence, $r^2 = \frac{2}{\sqrt{5}-1} = \frac{\sqrt{5}+1}{2}$.

Alternate solution:

Having a glance at the options we know that hypotenuse is the longest side of the triangle and hence, the ratio $\frac{AC}{AB}$ should be greater than 1, (which is only in option (1) and option (3)). We also know that option (1) and option (3) are identical in terms of numerical ratio.

Bookmark FeedBack

Q.4 [11831809]

Let f(x) be a real valued function for which $\frac{f(x)\times f(y)}{f(y)-x+4} = f(xy+3)$. If f(2) = 3, then what is |f(6)|?

Solution:

Correct Answer : 1

Answer key/Solution

$\frac{f(x)\times f(y)}{f(y)-x+4} = f(xy+3)$ ...(i)

In (i) replacing x with y and y with x, we get

$\frac{f(y)\times f(x)}{f(x)-y+4} = f(xy+3)$ ...(ii)

By comparing equations (i) and (ii), we get f(y) – x + 4 = f(x) – y + 4
By substituting y = 6 and x = 2, we get f(6) – 2 + 4 = f(2) – 6 + 4
⇒ f(6) = 2 – 6 + 3 = –1
Hence, |f(6)| = 1.

Bookmark FeedBack

Q.5 [11831809]

In a regular hexagon ABCDEF with side a, line joining the midpoints of AB which is X and DE which is Y is drawn. What is the area (in sq. units) of the triangle CXY?

1 ○ $\frac{3\sqrt{3}}{4}a^2$

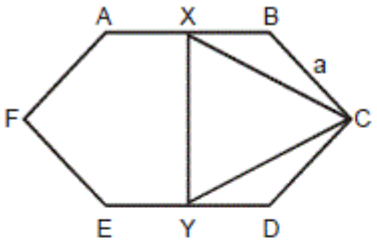
2 ○ $\frac{3\sqrt{3}}{2}a^2$

3 ○ $\frac{\sqrt{3}}{2}a^2$

4 ○ $\sqrt{3}a^2$

Solution:
Correct Answer : 3

Answer key/Solution



BX = $\frac{a}{2}$ and BC = a, also the angle between both is 120°.

So area of $\Delta BXC = \frac{1}{2} \times BX \times BC \times \sin 120° = \frac{\sqrt{3}}{8}a^2$ sq. units

Similarly, DY = $\frac{a}{2}$ and CD = a, also the angle between both is 120°.

So the area of $\Delta DCY = \frac{1}{2} \times DY \times DC \times \sin 120° = \frac{\sqrt{3}}{8}a^2$ sq. units

Hence, the area of ΔCXY is nothing but area of figure BCDXY – (area of ΔBXC + area of ΔDCY)

$= \frac{3\sqrt{3}}{4}a^2 - \left(\frac{\sqrt{3}}{8}a^2 + \frac{\sqrt{3}}{8}a^2\right) = \frac{\sqrt{3}}{2}a^2$ sq. units.

Alternate solution:
By having a glance at the options we know that XY divides the area of hexagon into half and hence, the area of ΔCXY should be less than half. The only option that satisfies this criteria is option (3).

Bookmark FeedBack

Q.6 [11831809]

A person mixes coffee of 3 different qualities at prices Rs. 40, Rs. 50, Rs. 60 per kg in the ratio of 2 : 3 : 5. If he offers a discount of 20% on the marked price and incurs a loss of 4%. What is the marked price (in Rs.) of the mixture?

1 ◯ 53

2 ◯ 52.40

3 ◯ 63.60

4 ◯ 45

Solution:
Correct Answer : 3

Answer key/Solution

Three different qualities costing Rs. 40, Rs. 50, Rs. 60 all numbered in the ratio of 2 : 3 : 5.

Then, the net cost price (CP) = $\frac{40\times2+50\times3+60\times5}{2+3+5} = \frac{530}{10} = \text{Rs. } 53$

According to the question,
SP = 0.8 MP and also SP = 0.96 CP
$\Rightarrow$ 0.8 MP = 0.96 CP
$\Rightarrow$ MP = 1.2 × 53 = Rs. 63.60.
Hence, marked price of the mixture is Rs. 63.60.

Bookmark FeedBack

Q.7 [11831809]

Sandeep and Ganesh can complete a piece of work in 30 days and 20 days respectively. Both of them work for 6 days and then Ganesh leaves. Now Tezas, who can complete the same work in 15 days joins Sandeep to complete the remaining work. In how many total days was the total work completed?

1 ◯ 10

2 ◯ 11

3 ◯ 12

4 ◯ 13

Solution:
Correct Answer : 2

Answer key/Solution

Work done by Sandeep and Ganesh in 6 days = 6[1/30 + 1/20] = 1/2
So half the work is remaining, which is completed by Sandeep and Tezas.
Work done by Sandeep and Tezas in one day = [1/30 + 1/15] = 1/10
So time taken by them to complete half the work is 5 days.
Hence, total time = 6 + 5 = 11 days.

Bookmark FeedBack

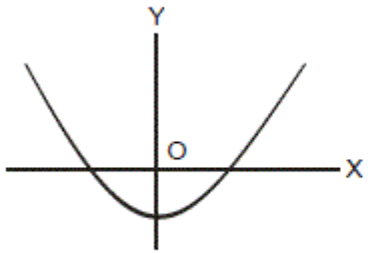
Q.8 [11831809]

A quadratic equation $f(x) = ax^2 + bx + c$ has its minimum value at x = 0 and the minimum value is −5, then what is the sum of roots for f(x) + 3?

Solution:
Correct Answer : 0

Answer key/Solution

Given quadratic equation is $f(x) = ax^2 + bx + c$.



Since the minimum value is at $x = 0$, the graph would be symmetric about the y-axis. So one root is negative of the other. Hence, sum of the roots is 0.

Bookmark FeedBack

Q.9 [11831809]

In a circle, a chord AB of length 48 cm is drawn. A line perpendicular from centre O to the circumference is drawn, meeting the chord and circumference at C and D respectively. If OC = 10 cm, then find the length (in cm) of AD.

1 ◯ $8\sqrt{13}$

2 ◯ $16\sqrt{13}$

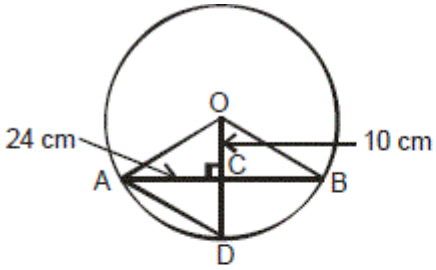
3 ◯ 24

4 ◯ 26

Solution:

Correct Answer : 1

Answer key/Solution



From the above figure given that AB = 48 cm which means AC = BC = 24 cm.
Also, it is given that OC = 10 cm
In right angled triangle OCA,
$AC^2 + OC^2 = OA^2$
$\Rightarrow 24^2 + 10^2 = OA^2$
$\Rightarrow OA = 26$ cm
Now, CD = OD – OC = 16 cm
Now, in right angled triangle ACD,
$AC^2 + CD^2 = AD^2$
$\Rightarrow 24^2 + 16^2 = 832 = AD^2$
$\Rightarrow AD = \sqrt{832} = 8\sqrt{13}$ cm.

Bookmark FeedBack

Q.10 [11831809]

A motorcycle moving with a speed of 70 kmph is chasing a train moving with a speed of 60 kmph in the same direction. Initially the rear end of the train is at a distance of 200 km from the motorcycle. If the motorcycle chases down the train within 20 hours and 6 minutes, find the time taken (in seconds) by the same train moving at 18 kmph to cross a pole.

1 ◯ 160

2 ◯ 240

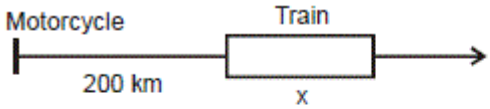
3 ◯ 200

4 ◯ 360

Solution:

Correct Answer : 3

Answer key/Solution



Let the length of the train be x km.
Relative speed = 70 – 60 = 10 km/h
Distance = (200 + x) km
Time = 20 hours and 6 minutes = 201/10 hours
So (200 + x)/10 = 201/10 $\Rightarrow$ x = 1 km
Hence, time taken by the train to cross a pole = (1/18 × 60 × 60) = 200 seconds.

Bookmark FeedBack

Q.11 [11831809]

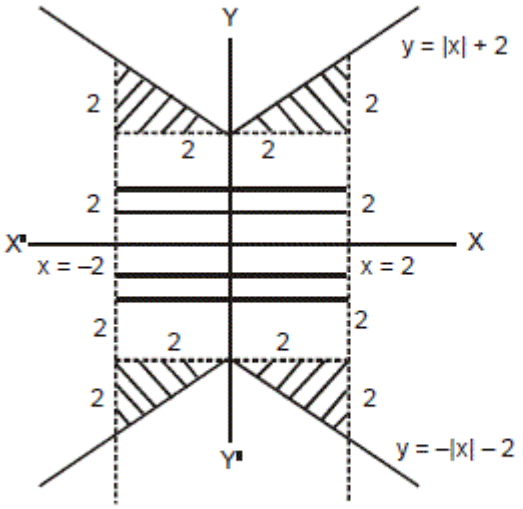
Find the area (in sq. units) enclosed by the figure formed by $y - |x| - 2 = 0$, $|x| + y + 2 = 0$, $x = 2$ and $x = -2$.

Solution:

Correct Answer : 24

Answer key/Solution

The given equations are $y = |x| + 2$, $y = -|x| - 2$, $x = 2$ and $x = -2$.



Hence, area of the enclosed figure $= 4 \times 4 + \frac{1}{2} \times 2 \times 2 \times 4 = 16 + 8 = 24$ sq. units.

Bookmark FeedBack

Q.12 [11831809]

A person purchases 22 movie tickets, which include both first-class and second-class tickets. The total expense on purchasing first-class tickets is Rs. 180 and the total amount spent on purchasing second-class tickets is Rs. 208. If the cost of one ticket of first-class is Rs. 4 more than the cost of one ticket of second-class, then find the cost (in Rs.) of purchasing all the first-class tickets with at the price of second-class ticket.

1 ◯ 320

2 ◯ 260

3 ◯ 144

4 ◯ 117

Solution:
Correct Answer : 3

Answer key/Solution

Money spent on first class tickets = 180 = 20 × 9.
Money spent on second class tickets = 208 = 16 × 13.
The price of first class tickets = Rs.20, second class will cost Rs.16, which satisfies the condition in the question as the total number of tickets = 9 + 13 = 22.
Hence, if first class tickets are bought at second class price, the amount spent = 9 × 16 = Rs.144.

Bookmark FeedBack

Q.13 [11831809]

There is a series of natural numbers which are grouped as (1), (2, 3), (4, 5, 6), (7, 8, 9, 10), …. Then what would be the average of the numbers in the 19th group?

1 ◯ 180

2 ◯ 179

3 ◯ 181

4 ◯ 183

Solution:
Correct Answer : 3

Answer key/Solution

The first group of numbers contains only 1 number i.e., (1). The second group contains only 2 numbers i.e., (2, 3) and so on.
nth group of numbers will have 'n' natural numbers. Hence, 19th group will have '19' natural numbers. To figure out what those numbers are, we have to find out how many number get exhauste in the first 18 groups.
No. of numbers in the first 18 groups

$= 1 + 2 + 3 + \ldots + 18 = \frac{18 \times 19}{2} = 171$

So the 19th group contains 19 numbers starting from 172.
172, 173, 174, …, 190

Hence, the average of numbers in this group will be = $\frac{\text{First number} + \text{Last number}}{2} = \frac{172 + 190}{2} = 181.$

Bookmark FeedBack

Q.14 [11831809]

How many pairs of integers exist such that the difference between their product and sum is 42?

Answer key/Solution

Solution:
Correct Answer : 4
Let a, b be two integers.
Then, |ab − (a + b)| = 42
Case 1: a + b − ab = 42
⇒ a − ab + b − 1 = 42 − 1
⇒(a − 1)(b − 1) = − 41
Therefore, a − 1 = 1, b − 1 = −41 or a − 1 = − 1, b − 1 = 41
⇒ a = 2, b = − 40 or a = 0, b = 42
So, 2 pairs of integers are possible.
Case 2: ab − a − b = 42
⇒ ab − a − b + 1 = 43
⇒ (a − 1)(b − 1) = 43
Therefore, a − 1 = 1, b − 1 = 43 or a - 1 = 43, b − 1 = 1
⇒ a = 2, b = 44 or a = 44, b = 2
So, 2 pairs of integers are possible.
Hence, in total 4 pairs of integers are possible.

Bookmark FeedBack

Q.15 [11831809]

The average of scores of 20 students is 57. If 7 students have failed the exam with the same score and rest score distinct integral marks with the highest being 91. What is the minimum possible score of the failed students?

Answer key/Solution

Solution:
Correct Answer : 5
Total score of 20 students = 20 × 57 = 1140
Students who passed have to pass with maximum scores to minimize the scores of students who failed.
∴ Passed students scores are 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91.
∴ Sum of scores = 85 × 13 = 1105
∴ Sum of scores of 7 failed students = 1140 − 1105 = 35
Hence, as there are 7 students with equal scores, the minimum score = 35/7 = 5.

Bookmark FeedBack

Q.16 [11831809]

In a ΔABC, D is a point on AB such that AD : DB = 2 : 3, E is a point on AC such that AE : EC = 3 : 5, F is a point on BC such that BF : FC = 5 : 7. If AB = AC, then what is the ratio of areas of ΔDBF to ΔECF?

1 ◯ 3 : 7

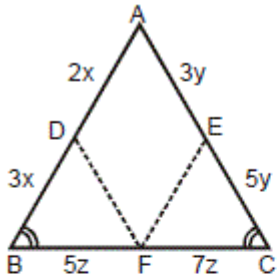
2 ◯ 24 : 35

3 ◯ 7 : 3

4 ◯ 35 : 24

Solution:
Correct Answer : 2

Answer key/Solution



Since AB = AC
Therefore, $\angle B = \angle C$
So AB = AC $\Rightarrow$ 5x = 8y

$\Rightarrow y = \frac{5x}{8}$ ... (i)

Area of $\Delta DBF = \frac{1}{2} \times 3x \times 5z \times \sin B$

Area of $\Delta EFC = \frac{1}{2} \times 5y \times 7z \times \sin C$

Hence, required ratio of areas $= \frac{\frac{1}{2} \times 3x \times 5z \times \sin B}{\frac{1}{2} \times 5 \times \frac{5x}{8} \times 7z \times \sin C}$ (using (i))

$= \frac{18 \times 8}{25 \times 7} = \frac{3 \times 8}{5 \times 7} = \frac{24}{35} = 24 : 35.$

Bookmark FeedBack

Q.17 [11831809]
Aman spends a fixed amount for 2 consecutive months purchasing bread, and then spends half the amount in third month, also spends half the amount of third month in the fourth month. If bread is sold at Rs. 10, Rs. 20, Rs. 40 and Rs. 40 per kg for the 4 consecutive months, then the average expense for bread in rupees per kg for Aman is closest to

1 ◯ 18

2 ◯ 20

3 ◯ 16

4 ◯ 19

Solution:
Correct Answer : 3

Answer key/Solution

Assume that Aman spends Rs.800 in the first month. (Common multiple of 40, 20, 10).

	Amount (in Rs.)	Quantity
Ist month	800	80 kg
2nd Month	800	40 kg
3rd month	400	10 kg
4th month	200	5 kg
Total	2200	135 kg

Hence, the average price $= \frac{2200}{135} =$ Rs.16.

Bookmark FeedBack

Q.18 [11831809]

If $8a^2 + \frac{1}{b} = 6$ and $6b^2 + \frac{1}{a} = 8$, then what can be the value of $(ab)^2$?

1 ◯ 2

2 ◯ 1

3 ◯ 4

4 ◯ 16

Solution:
Correct Answer : 2

Answer key/Solution

$8a^2 + \frac{1}{b} = 6$

$\Rightarrow 8a^2b + 1 = 6b$ ...(i)

$6b^2 + \frac{1}{a} = 8$

$\Rightarrow 6b^2a + 1 = 8a$ ...(ii)

Subtracting (ii) from (i), we get

$8a^2b - 6b^2a = 6b - 8a$

$\Rightarrow ab(8a - 6b) = 6b - 8a$

$\Rightarrow (ab + 1)(8a - 6b) = 0$

So $ab = -1$

Hence, $(ab)^2 = (-1)^2 = 1$.

Bookmark FeedBack

Q.19 [11831809]

If $x = l^{m^n}$ where l is an integer and m, n are whole numbers ($|l|$, m, n < 5), then in how many cases would x be equal to 1? (0^0 is undefined.)

1 ◯ 62

2 ◯ 60

3 ◯ 58

4 ◯ 64

Solution:

Correct Answer : 1

Answer key/Solution

Given that $x = l^{m^n}$ (l is an integer and m, n are whole numbers.)
Case 1: l = 1; m = 0, 1, 2, 3, 4 and n = 0, 1, 2, 3, 4
Possible cases = 5 × 5 – 1 = 24 (one case 0^0 is not defined)
Case 2: l = –1; m = 0, 2, 4 and n = 0, 1, 2, 3, 4
Possible cases = 3 × 5 – 1 = 14
Case 3: l = –4, –3, –2, 2, 3, 4; m = 0 and n = 1, 2, 3, 4
Possible cases = 6 × 4 = 24.
Hence, total possible cases = 24 + 14 + 24 = 62.

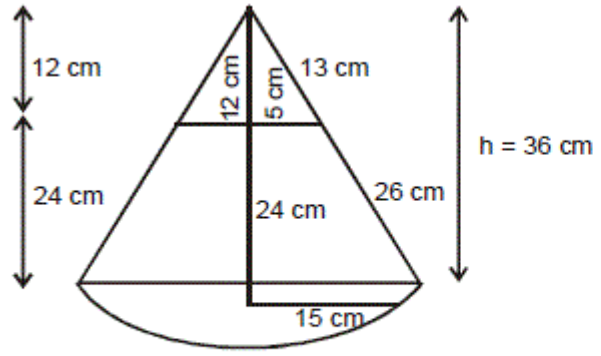
Bookmark FeedBack

Q.20 [11831809]

A cone of vertical height 36 cm and base radius 15 cm is sliced at two-thirds of height from the base to form a frustum. If the cost to wrap a cover along the curved surface area is Rs. 7 per cm^2, then find the total cost (in Rs.) incurred in wrapping the curved surface of the frustum.

Solution:
Correct Answer : 11440

Answer key/Solution



Curved surface area of a frustum = $\pi \times (R + r) \times s$ (where R and r are the radii and s is the slant height of the frustum)
$= 22/7 \times (15 + 5) \times 26\ cm^2$
Hence, required cost = $22/7 \times 20 \times 26 \times 7$ = Rs. 11,440.

Bookmark FeedBack

Q.21 [11831809]

Balu deposited some money in a bank at a rate of interest of 10% compounded annually. If the product of the interest accrued in the second year and the interest accrued in the third year is Rs. 1,197.90, then find the amount (in Rs.) invested by Balu.

Solution:
Correct Answer : 300

Answer key/Solution

Let the amount invested by Balu be P.

At the end of 1st year, the amount is $P\left(1+\frac{10}{100}\right)=1.1P$

At the end of 2nd year, the amount is $P\left(1+\frac{10}{100}\right)^2=1.21P$

$\therefore$ The interest accrued only is 2nd year is 0.11P.

At the end of 3rd year the amount is $P\left(1+\frac{10}{100}\right)^3=1.331P$

$\therefore$ The interest accrued only in 3rd year is 0.121P.
Hence, $0.11P \times 0.121P = 1197.90$

$\Rightarrow P^2=\frac{1197.90}{0.11\times 0.121} \Rightarrow$ P = Rs. 300.

Bookmark FeedBack

Q.22 [11831809]

A 2 digit number ab when reversed (is also a 2 digit number) and added resulted in 66. Now, a 3 digit number abc is formed (which when reversed is also a 3 digit number) is reversed and subtracted from original number resulted in 297. Find the difference between the largest possible value of abc and the smallest possible value of abc.

1 ◯ 388

2 ◯ 271

3 ◯ 269

4 ◯ 91

Answer key/Solution

Solution:
Correct Answer : 4
According to the question, (a, b) can take values (1, 5), (2, 4) and (3, 3) in any order.
Now, for the difference of abc and cba to be 297.
If (a, b) is (1, 5), then c takes value 2.
If (a, b) is (2, 4), then c takes value 1.
If (a, b) is (3, 3), then c takes value 0, which is not possible because cba will not be a three digit number.
Hence, the difference between the largest and the smallest possible values of abc will be = 512 – 421 = 91.

Bookmark FeedBack