

CDC 01 2022 QA

Scorecard (procreview.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Accuracy (AccSelectGraph.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Qs Analysis (QsAnalysis.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Video Attempt / Solution (VideoAnalysis.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Solutions (Solution.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Bookmarks (Bookmarks.jsp?sid=aaaN5tjtX0b7WgArBjowyMon Jan 09 00:02:29 IST 2023&qsetId=QzWHwg1CII=&qsetName=CDC 01 2022 QA)

Section-1

Sec 1

Q.1 [11831809]

The number of girls in a class was 15 more than the number of boys. The number of toffees distributed among boys and girls in the class were 135 and 126 respectively. If the average number of toffees distributed among the girls was 2 less than the average number of toffees distributed among the boys, then what was the number of boys in the class?

Solution:

Correct Answer : 27

 Answer key/Solution

Let the number of boys in the class be x .

Then, number of girls = $x + 15$

According to the question,

$$135/x = 126/(x + 15) + 2$$

$$\Rightarrow 2x^2 + 21x - 135 \times 15 = 0$$

$$\Rightarrow (2x + 75)(x - 27) = 0$$

So $x = 27$ (Since x cannot be negative.)

Hence, the number of boys in the class was 27.

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Q.2 [11831809]

Surekha went to the vegetable market with enough money to purchase either 6 kg tomatoes or 5 kg potatoes. At the market she decided to spend only 80% of the money and purchased 3 kg potatoes and some tomatoes. What is the weight of tomatoes purchased by Surekha?

1 ☐ 2 kg

2 ☐ 1.8 kg

3 ☐ 0.8 kg

4 ☐ 1.2 kg

Solution:

Correct Answer : 4

 Answer key/Solution

Amount spent on buying 3 kg of potatoes = $3/5 \times 100 = 60\%$

Amount left = $80 - 60 = 20\%$

Weight of tomatoes that Surekha purchased with 20% of the money = $20/100 \times 6 = 1.2$ kg.

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Q.3 [11831809]

Points A, B, C and D lie on the same straight line such that B, C and D are 200 m, 300 m and 500 m away from A respectively. Anshu and Ravi leave A at the same time and run towards D. Simultaneously; Sindhu leaves D and runs towards A. Sindhu meet Anshu at C, and Ravi at B. If each person is running in uniform speed, then the speed of the fastest person is what percent more than that of the slowest person?

1 ☐ 50%

2 ☐ 100%

3 ☐ 125%

4 ☐ 150%

Solution:

Correct Answer : 3

[🔍 Answer key/Solution](#)



Sindhu meets Anshu at C. At the same time, Anshu runs 300 m and Sindhu runs 200 m. Hence, ratio of speed of Anshu and Sindhu = 3 : 2.

Sindhu meets Ravi at B. At the same time, Ravi runs 200 m and Sindhu runs 300 m. Hence, ratio of speed of Ravi and Sindhu = 2 : 3.

So the ratio of the speeds of the Anshu, Ravi and Sindhu = 9 : 4 : 6

Hence, required percentage = $(9 - 4)/4 \times 100 = 125\%$ more.

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Q.4 [11831809]

Let a_1, a_2, a_3, \dots be a decreasing AP such that $a_2 + a_3 + \dots + a_n = -36$ and $a_1 + a_2 + \dots + a_{n-1} = 0$. If $a_9 - a_5 = -16$, then what is the value of a_1 ?

Solution:

Correct Answer : 16

[🔍 Answer key/Solution](#)

$$a_2 + a_3 + \dots + a_n = -36 \text{ and } a_1 + a_2 + \dots + a_{n-1} = 0$$

Add a_n to both sides of the equation $a_1 + a_2 + \dots + a_{n-1} = 0$ and we get,

$$a_1 + a_2 + \dots + a_{n-1} + a_n = a_n$$

$$\Rightarrow a_1 - 36 = a_n$$

$$\Rightarrow (n-1)d = -36$$

$$\text{And, } a_9 - a_5 = -16$$

$$\Rightarrow a_1 + 8d - a_1 - 4d = -16$$

$$\Rightarrow 4d = -16$$

$$\Rightarrow d = -4$$

$$\text{Hence, } n = 10 \text{ and } a_1 = 16.$$

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Q.5 [11831809]

Let A be a triangle formed by a straight line $5x + 12y - 60 = 0$ and the co-ordinate axes. Then, find the area (in sq. units) of the circumcircle of triangle A.

1 ☐ $169\pi/4$

 $2 \bigcirc 49\pi$

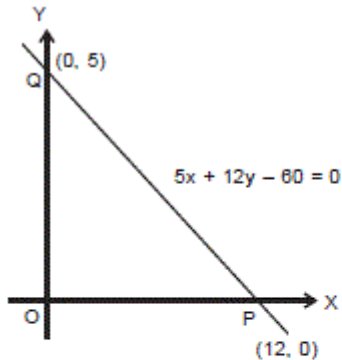
$3 \bigcirc 36\pi$

$4 \bigcirc 225\pi/4$

Solution:

Correct Answer : 1

[🔍 Answer key/Solution](#)



$$5x + 12y - 60 = 0 \Rightarrow x/12 + y/5 = 1$$

The intercepts are P (12, 0) and Q (0, 5) respectively.

Since it is a right angled triangle. Therefore, circum-radius (R)

$$= \frac{\sqrt{12^2 + 5^2}}{2} = 13/2 \text{ units}$$

$$\text{Hence, area of circumcircle of triangle A} = \pi \times \left(\frac{13}{2}\right)^2 = \frac{169}{4} \pi \text{ sq. units.}$$

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Q.6 [11831809]

P, Q, and R are 3 salesmen. In 1st month, they receive a commission of Rs. x and divide it in the ratio of 2 : 3 : 4. In 2nd month, they receive a commission of Rs. 2x and divide it in the ratio of 3 : 5 : 2. In the 3rd month, they receive a commission of Rs. $3x/4$ and divide it in the ratio of 4 : 3 : 5. If the average commission earned by Q over 3 months is Rs. 4,380, then how much share (in Rs.) did R get in 3rd month?

Solution:

Correct Answer : 2700

 Answer key/Solution

	P	Q	R
First month	$2x/9$	$3x/9$	$4x/9$
Second month	$6x/10$	x	$4x/10$
Third month	$x/4$	$3x/16$	$5x/16$

$$\frac{\frac{3x}{9} + x + \frac{3x}{16}}{3} = 4380$$

$$\Rightarrow \frac{48x + 144x + 27x}{432} = 4380$$

$$\Rightarrow x = 8640$$

Hence, share that R got in 3rd month = $5x/16$ = Rs. 2,700.

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Q.7 [11831809]

If a milkman adds 8 liters of water to a mixture of milk and water, then the ratio of milk to water in the new mixture becomes 2 : 3. Again, if he adds 7 liters of pure milk to the new mixture then the ratio of milk to water becomes 5 : 4. What was the ratio of milk to water in the original mixture?

1 ☐ 8 : 5

2 ☐ 2 : 1

3 ☐ 4 : 1

4 ☐ 5 : 2

Solution:

Correct Answer : 2

 Answer key/Solution

Let the original mixture have x liters milk and y liters water.

First he adds 8 liters of water to the mixture.

According to the question, $x/(y + 8) = 2/3 \Rightarrow 3x - 2y = 16$... (i)

Next he adds 7 liters of pure milk to the new mixture.

Then the ratio of milk to water becomes 5 : 4.

$(x + 7)/(y + 8) = 5/4 \Rightarrow 4x - 5y = 12$... (ii)

Solving (i) and (ii) we get $x = 8$ and $y = 4$

Hence, the required ratio = 2 : 1.

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Q.8 [11831809]

If x satisfies the equation $|x^2 - 5x + 3| + |x - 3| = x - 4$, then the number of integer values of ' x ' is/ are

Solution:**Correct Answer : 0**

The given equation is $|x^2 - 5x + 3| + |x - 3| = x - 4$.
 $x - 4 \geq 0$ or, $x \geq 4$
So $x^2 - 5x + 3 + x - 3 = x - 4$
 $\Rightarrow x^2 - 5x + 4 = 0$
 $\Rightarrow (x - 4)(x - 1) = 0$
 $\Rightarrow x = 4$ or $x = 1$
No integer will satisfy the equation.

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[Answer key/Solution](#)**Q.9 [11831809]**

A and B play a game. An integer between 0 and 50 is selected and given to A. Whenever A receives a number, he doubles it and passes the result to B. Whenever B receives a number, he adds 25 to it and passes the result to A. The winner is the last person who gets a number less than 500. Let N be the initial number that results in a win for A. How many values of N are possible?

1 ☐ 12 ☐ 23 ☐ 34 ☐ More than 3**Solution:****Correct Answer : 4****For $N = 1$,****A will get 1, and double it.****B will get 2, and add 25.****Similarly, A will get 27, B will get 54, A will get 79, B will get 158, A will get 183, B will get 366, A will get 391, and B will get 782. Since, A gets last number less than 500, therefore, A wins.****For $N = 2$,****A will get 2, and double it.****B will get 4, and add 25.****Similarly, A will get 29, B will get 58, A will get 83, B will get 164, A will get 189, B will get 378, A will get 403, and B will get 806. Since, A gets last number less than 500, therefore, A wins.****Similarly, for $N = 3$, A will get 423 and B will then get 846.****Similarly, for $N = 4$, A will get 439 and B will then get 878.****Therefore, there are more than 3 initial numbers wherein A will win.**

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[Answer key/Solution](#)

Q.10 [11831809]

Two trains X and Y have lengths of 350 m and 250 m. When they run in the same direction, the faster train takes 150 seconds to cross the slower train. When they run in opposite directions, they take 25 seconds to cross each other. Find the ratio of the speeds of the trains X and Y respectively.

1 ☐ 7 : 5


2 ☐ 6 : 7

3 ☐ 8 : 7

4 ☐ 3 : 1

Solution:

Correct Answer : 1

 [Answer key/Solution](#)

Let the speeds of the trains be x m/sec and y m/sec where $x > y$.

$$(350 + 250)/(x - y) = 150 \Rightarrow 4 = x - y \quad \dots (i)$$

$$(350 + 250)/(x + y) = 25 \Rightarrow 24 = x + y \quad \dots (ii)$$

Solving (i) and (ii) $x = 14$ and $y = 10$

Hence, required ratio = $14 : 10 = 7 : 5$.

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Q.11 [11831809]

A circle of diameter QR is drawn on a triangle PQR, which intersects PQ and PR at points S and T respectively. If $PQ = 24$ cm and $PR = 18$ cm, then the ratio of $QT : RS$ is

1 ☐ 3 : 4

2 ☐ 2 : 3

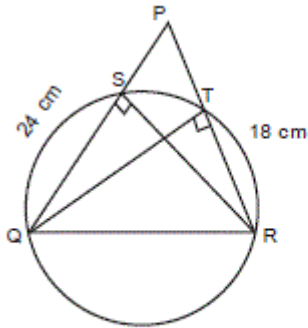
3 ☐ 3 : 2

4 ☐ 4 : 3

Solution:

Correct Answer : 4

[Answer key/Solution](#)



Area of $\triangle PQR = \frac{1}{2} \times PQ \times RS = \frac{1}{2} \times PR \times QT$
 $\Rightarrow \frac{1}{2} \times 24 \times RS = \frac{1}{2} \times 18 \times QT$
 $\Rightarrow QT/RS = 24/18 = 4/3$ i.e., $QT : RS = 4 : 3$.

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Q.12 [11831809]

A real valued function $f(x)$ is such that $f(x + y) = f(x) + f(y) + 6xy + 3$ for all real values of x and y . Find the value of $f(3)$ if $f(-1) = 6$.

1 ☐ 0

2 ☐ -6

3 ☐ 6

4 ☐ -3

Solution:

Correct Answer : 3

[Answer key/Solution](#)

$f(x + y) = f(x) + f(y) + 6xy + 3$
 $f(-1) = f(-1 + 0) = f(-1) + f(0) + 0 + 3$
 $\Rightarrow f(0) = -3$
 $f(-2) = f(-1) + f(-1) + 6 + 3 = 21$
 $f(-3) = f(-2-1) = f(-2) + f(-1) + 12 + 3 = 21 + 6 + 15 = 42$
 $f(0) = f(3 + (-3)) = f(3) + f(-3) - 54 + 3$
 $\Rightarrow -3 = f(3) + 42 - 54 + 3$
 $\Rightarrow f(3) = 6$.

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Q.13 [11831809]

Three friends A, B and C work together to complete a piece of work. The time it takes for them to do the work together is 7 hours less than what A would have taken working alone, 10 hours less than what C would have taken working alone and one-fourth the time B would have taken working alone. How long (in hours) does it take for them to complete the work working together?

Solution:**Correct Answer : 5**[🔍 Answer key/Solution](#)

Let the time taken by A, B and C working alone to complete the work be x , y and z hours respectively.
And let the time taken by them working together be t hours.

According to the question,

$$t = x - 7 \Rightarrow x = t + 7 \quad \dots (i)$$

$$t = z - 10 \Rightarrow z = t + 10 \quad \dots (ii)$$

$$t = y/4 \quad \dots (iii)$$

The work done by A, B and C in one hour is : $1/x + 1/y + 1/z = 1/t$

$$1/(t + 7) + 1/4t + 1/(t + 10) = 1/t$$

$$\Rightarrow 5t^2 + 17t - 210 = 0 \Rightarrow t = 5 \text{ or } -42/5$$

Hence, time taken by A, B and C to do the work together = 5 hours.

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Q.14 [11831809]

If $\frac{\log_{25} x + \log_{18} x}{(\log_{25} x)(\log_{18} x)} = 3$, where x is a real number, then which of the following is correct?

1 ☐ $x > 8$

2 ☐ $4 < x < 5$

3 ☐ $6 < x < 7$

4 ☐ $7 < x < 8$

Solution:**Correct Answer : 4**[🔍 Answer key/Solution](#)

$$\frac{\log_{25} x + \log_{18} x}{(\log_{25} x)(\log_{18} x)} = 3 \Rightarrow \frac{1}{\log_{18} x} + \frac{1}{\log_{25} x} = 3$$

$$\Rightarrow \log_x 18 + \log_x 25 = 3 \Rightarrow \log_x 18 \times 25 = 3$$

$$\text{So } x^3 = 18 \times 25 = 450$$

$$\text{We know that } 7^3 = 343 \text{ and } 8^3 = 512$$

$$343 < 450 < 512 \text{ or, } 7^3 < x^3 < 8^3$$

$$\text{Hence, } 7 < x < 8.$$

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Q.15 [11831809]

A group of students prepared 3000 soft toys as a group activity at a cost of Rs. 2,400. They gave away 500 soft toys to a charity free of cost. They allowed a discount of 20% on the marked price and gave one free soft toy for every soft toy bought at a time. They were able to sell all the soft toys. If marked price of a soft toy is Rs. 3.50, then what is their overall gain/loss percentage in the whole transaction?

1 ☐ 36.67%

2 ☐ 50.33%

3 ☐ 45.83%

4 ☐ 54%

Solution:

Correct Answer : 3

 Answer key/Solution

Cost price of 3000 soft toys is Rs. 2,400.

Free toys = $500 + 2500/2 = 1750$

The marked price of other 1250 toys = Rs. 3.50

After discount selling price = $3.50 \times 0.8 = \text{Rs. } 2.80$

Total selling cost of 1250 toys = Rs. 3,500.

Hence, profit% = $\frac{3500 - 2400}{2400} \times 100 \approx 45.833\%$.

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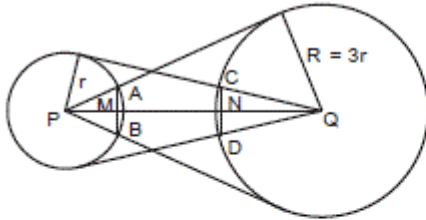
Q.16 [11831809]

Two circles have their centers at P and Q. The radius of the first circle is r , while that of the second is $3r$ and PQ is more than $4r$. The tangents from P to the second circle intersect the first circle at A and B, respectively, while the tangents from Q to the first circle intersect the second circle at C and D, respectively. If $AB = 7$ cm, find the length (in cm) of CD.

Solution:

Correct Answer : 7

[Answer key/Solution](#)



The radius of the first circle is r and the radius of the second circle is $R = 3r$.

Let the line PQ intersect AB and CD at M and N , respectively.

It can be seen that M is the midpoint of AB and N is the midpoint of CD .

$$AB = 2 AM = 2r \sin \angle APQ = 2rR/PQ$$

$$CD = 2 CN = 2R \sin \angle CQP = 2R r/PQ$$

We see that $AB = CD$, no matter how R and r are related.

$$\therefore CD = AB = 7 \text{ cm.}$$

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Q.17 [11831809]

How many even numbers with different digits less than 100000 can be formed using the digits 1, 2, 3, 4, 5, 6, 7 and 8?

1 ☐ 4396

2 ☐ 4424

3 ☐ 4604

4 ☐ 4400

Solution:

Correct Answer : 4

Single digit numbers: 2, 4, 6 or 8 i.e., 4 numbers

Two digit numbers: There will be $= 4 \times 7 = 28$ numbers

Three digit numbers: There will be $= 4 \times 7 \times 6 = 168$ numbers

Four digit numbers: There will be $= 4 \times 7 \times 6 \times 5 = 840$ numbers

Five digit numbers: There will be $= 4 \times 7 \times 6 \times 5 \times 4 = 3360$ numbers

Since the numbers are less than 100000, therefore total numbers $= 4 + 28 + 168 + 840 + 3360 = 4400$.

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[Answer key/Solution](#)

Q.18 [11831809]

Two positive integers a, and b are 60% and 40% of a third integer, c, respectively. When two more positive integers d and e are added to the first three integers the sum is 41. Finally, when two more integers f, and g are added to the sum of the previous 5 integers the sum is 57. What is the maximum sum possible of all odd integers among the 7 integers?

Solution:**Correct Answer : 53****Given: $a = 0.6c = 3/5c$ and $b = 0.4c = 2/5c$.****Since a, b, and c are all integers therefore, c must divide 5.****Case 1: $c = 5, a = 3, b = 2$** **Here, $d + e = 31$ (One out of d and e is an odd number. Maximum possible odd number is 29.)****Finally, $f + g = 16$ (Both f and g can be odd.)****Hence, possible sum of all odd integers among the 7 integers = $5 + 3 + 29 + 16 = 53$.****Case 2: $c = 10, a = 6, b = 4$ (Not possible)****Case 3: $c = 15, a = 9, b = 6$** **Here, $d + e = 11$ (One out of d and e is an odd number. Maximum possible odd number is 9.)****Finally, $f + g = 16$ (Both f and g can be odd.)****Hence, possible sum of all odd integers among the 7 integers = $15 + 9 + 9 + 16 = 49$.****Case 4: $c = 20, a = 12, b = 8$ (Not possible, since one out of d and e will be 0.)****Therefore, the maximum sum possible of all odd integers among the 7 integers is 53.**

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 Answer key/Solution**Q.19 [11831809]**

A tank has a leak at its bottom which empties it at 8 liters/minute. It also has a filling tap which can fill the tank in 8 hours. If the tank takes 20 hours to become full, then find the capacity of the tank (in liters).

Solution:**Correct Answer : 6400****Let the time that would be taken by the leak to empty the full tank be x hours.**

$$1/8 - 1/x = 1/20$$

$$\Rightarrow x = 40/3 \text{ hours}$$

Hence, capacity of the tank = $(8) \times (40/3) \times (60) = 6400$ liters.

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 Answer key/Solution**Q.20 [11831809]**

If the diagonals of a rhombus of side 20 cm are in the ratio 4 : 3, then what is the area (in sq.cm) of the rhombus?

1 ☐ 962 ☐ 384

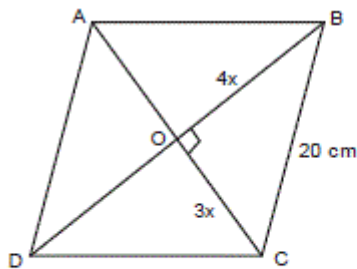
3 ○ 192

4 ○ 768

Solution:

Correct Answer : 2

[🔍 Answer key/Solution](#)



$$(4x)^2 + (3x)^2 = 20^2 \Rightarrow 25x^2 = 400$$

$$\Rightarrow x^2 = 16 \Rightarrow x = 4$$

So diagonals of the rhombus are $2 \times 4x = 32$ cm and $2 \times 3x = 24$ cm

Hence, area of the rhombus = $\frac{1}{2} \times 32 \times 24 = 384$ sq. cm.

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Q.21 [11831809]

For a natural number N, 3N has 28 factors and 5N has 30 factors. How many factors does 15N have?

1 ○ 35

2 ○ 40

3 ○ 45

4 ○ 48

Solution:

Correct Answer : 1

[🔍 Answer key/Solution](#)

The number 3N has 28 factors = 7×4 or $7 \times 2 \times 2$ factors but 5N does not have total number of factors which is divisible by 7.

So, first part of the number N will be 3^5 .

Similarly, 5N has 30 factors but 3N does not have total number of factor which is divisible by 3.

So, 2nd part of the number N will be 5^3 .

So, $N = 3^5 \times 5^3$

$\Rightarrow 15N = 3^6 \times 5^4$

Hence, total factors = $7 \times 5 = 35$.

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Q.22 [11831809]

If $a + b + c + d + e = 18$, where a, b, c, d and e are positive numbers and $x = (a + b)(c + d + e)$, then which of the following is true?

1 ☐ $0 \leq x \leq 9$

2 ☐ $9 \leq x \leq 36$

3 ☐ $0 < x \leq 81$

4 ☐ $9 < x \leq 36$

Solution:

Correct Answer : 3

[🔗 Answer key/Solution](#)

Let $j = a + b$ and $k = c + d + e$

$$j + k = (a + b) + (c + d + e) = 18$$

$$jk = (a + b) \times (c + d + e)$$

We know that when the sum of two positive quantities is constant the product of these quantities is maximum when they are equal.

$\therefore jk$ is maximum when $j = k = 9$.

\therefore Maximum $jk = 81$

Hence, $0 < x \leq 81$.

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