

Apollonius has five wooden sticks of lengths 7, 13, 11, 5 and 9. He selects three sticks out of them. What is the probability that when he forms triangle with these sticks, he gets an obtuse angled triangle?

- ☐ $\frac{2}{3}$
- ☐ $\frac{3}{5}$
- ☐ $\frac{7}{9}$
- ☒ $\frac{7}{10}$ ✖



Oops, you got it wrong!

Question 104

Explanation:

Apollonius can select three sticks out of five in ${}^5C_3 = 10$ ways

Thus, the various possibilities can be listed as under;

(7, 13, 11), (7, 13, 5), (7, 13, 9), (7, 11, 5), (7, 11, 9), (7, 5, 9), (13, 11, 5), (13, 11, 9), (13, 5, 9), (11, 5, 9)

However, a triangle with sides 7, 13, and 5 is not possible as $13 > 7 + 5$. Therefore, total 9 triangles can be formed.

For an obtuse-angled triangle, $(\text{greatest side})^2 > (\text{sum of squares of two smaller sides})$

The following satisfy the condition;

(7, 13, 9), (7, 11, 5), (7, 5, 9), (13, 11, 5), (13, 5, 9), (11, 5, 9).

Thus, only 6 possibilities exist for a triangle to be obtuse.

Thus, the required probability = $\frac{6}{9} = \frac{2}{3}$.

Hence, [1].

Correct Answer:

Time taken by you: **93 secs**

Avg Time taken by all students: **41 secs**

Your Attempt: **Wrong**

% Students got it correct: **16 %**

The number of toys with Dhrumil and Soham are in the ratio 5 : 6. One day, both of them left equal number of toys at home and carried the remaining toys with them to the garden. If the number of toys carried by Dhrumil and Soham to the garden were in the ratio 9 : 14, what is the ratio of the number of toys with Dhrumil (before taking to the garden) to the number of toys carried by Soham to the garden?

- ☐ 5 : 14
- ☒ 25 : 14 ✓
- ☐ 25 : 21
- ☐ 35 : 27



Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let total number of toys with Dhrumil and Soham be $5x$ and $6x$ respectively.

Assume that each of them left 'a' toys at home.

Using the given condition,

$$\frac{5x - a}{6x - a} = \frac{9}{14}$$

$$\therefore \frac{(5x - a) - (6x - a)}{6x - a} = \frac{9 - 14}{14} \quad \dots \text{(by Dividendo)}$$

$$\therefore \frac{-x}{6x - a} = \frac{-5}{14}$$

$$\therefore \frac{5x}{6x - a} = \frac{25}{14}$$

Hence, [2].

Correct Answer:

Time taken by you: **116 secs**

Avg Time taken by all students: **189 secs**

Your Attempt: **Correct**

% Students got it correct: **86 %**

Mrunmayee and Natasha start working on a piece of work. They take turns working, with Mrunmayee working for 2 days, Natasha for the next 3 days, Mrunmayee for the next 2 days, Natasha for the next 3 days and so on. Accordingly, the work gets completed in 65 days. Had they instead planned so that Natasha would work for 2 days, Mrunmayee for the next 3 days, Natasha for the next 2 days, Mrunmayee for the next 3 days and so on, the work would have been completed in 60 days. How long would Natasha alone take to complete the entire work?

Enter your response (as an integer) using the virtual keyboard in the box provided below.



Congratulations, you solved the question correctly and took less than average time!

Explanation:

In the first case, out of five days, Mrunmayee worked for two days and Natasha worked for three days. This cycle of five days continued. If the work was completed in 65 days, Mrumayee worked for 26 days and Natasha worked for 39 days. Similarly, in the second case, Mrunmayee worked for 36 days and Natasha worked for 24 days.

$$\therefore 26M + 39N = 36M + 24N$$

$$\therefore 10M = 15N$$

If M = 3 units, N = 2 units and the total quantum of work to be completed = $26(3) + 39(2) = 156$ units.

$$\therefore \text{The number of days taken by Natasha alone to completed the work} = \frac{156}{2} = 78.$$

Therefore, the required answer is 78.

Correct Answer:

Time taken by you: **192 secs**

Avg Time taken by all students: **192 secs**

Your Attempt: **Correct**

% Students got it correct: **44 %**

At the start of a trading session, Prakash bought a few shares of a company at Rs. 532 per share. After some time, he again bought a few more shares of the same company at Rs. 504 per share. Again at the end of the session, he bought still more shares of the same company at Rs. 486 per share. The next day, he sold all the shares at Rs. 556.6 and earned a profit of 10%. If he bought 37 shares in all, how many shares were purchased at Rs. 532?

- ☐ 11
- ☐ 12
- ☐ 13
- ☐ 14

Question 4 of 4

Explanation:

Let the average price of the shares purchased = $\frac{556.6}{1.1} = 506$

Now,

$$\frac{\text{Shares of Rs. 532}}{\text{Shares of Rs. 504}} = \frac{506 - 504}{532 - 506} = \frac{2}{26}$$

$$\frac{\text{Shares of Rs. 532}}{\text{Shares of Rs. 486}} = \frac{506 - 486}{532 - 506} = \frac{20}{26}$$

Therefore, Shares of Rs. 532 : Shares of Rs. 504 : Shares of Rs. 486 = $(2 + 20) : 26 : 26 = 11 : 13 : 13$

Total number of shares purchased = 37 and $11 + 13 + 13 = 37$

Thus, he must have purchased 11 shares at Rs. 532.

Hence, [1].

Correct Answer:

Time taken by you: 20 secs

Avg Time taken by all students: 199 secs

Your Attempt: Skipped

% Students got it correct: 58 %

For non-zero real numbers, functions 'f' and 'g' are defined as follows:

$$f(x) = \frac{x^2 + 1}{2x}, x \geq -\frac{1}{2}$$

$$= -\left|\frac{x}{2}\right|, \text{ otherwise}$$

$$g(x) = 3x - \frac{1}{x}, x > 0$$

$$= -|x|, \text{ otherwise.}$$

For how many values of 'x' is $f(x) = g(x)$?

- ☐ 1
- ☐ 2
- ☐ 0
- ☐ Infinite

Explanation:

$$\text{For } x > 0, \frac{x^2 + 1}{2x} = 3x - \frac{1}{x}$$

$$\Rightarrow x^2 + 1 = 6x^2 - 2 \Rightarrow 5x^2 = 3$$

$$\Rightarrow x = \pm \sqrt{\frac{3}{5}}$$

$$\because x > 0 \quad \therefore x = \sqrt{\frac{3}{5}}$$

$$\text{For } -\frac{1}{2} \leq x < 0, f(x) = \frac{x^2 + 1}{2x} \text{ and } g(x) = x$$

$$\Rightarrow \frac{x^2 + 1}{2x} = x$$

$$\Rightarrow x^2 + 1 = 2x^2 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$$

$$\because -\frac{1}{2} \leq x < 0 \quad \therefore x \text{ cannot be } 1 \text{ or } -1$$

$$\text{For } x < -\frac{1}{2}, f(x) = \frac{x}{2} \text{ and } g(x) = x$$

Correct Answer:

Time taken by you: 1 secs

Avg Time taken by all students: 93 secs

Your Attempt: Skipped

% Students got it correct: 45 %

During a one-day cricket match between India and England, England batted first. At the start of India's innings there was a large crowd of fans at the ground, 70% of whom were Indian (and the rest English). But as the game progressed, when it became clear that England was going to win, the Indian fans started leaving. By the end of 40 overs of India's innings, there were still a few fans left, out of whom just 10% were Indian fans. If none of the English fans left, and no new fans entered the stadium, what was the percentage reduction in the total number of fans over these 40 overs?

- ☐ 66.67%
- ☐ 85.71%
- ☐ 60%
- ☐ 71.42%

**Explanation:**

Since the number of English fans remains the same, let's take that as our base for calculation.
Suppose the number of fans initially was M, the English fans were 30% of M = $0.3 M$.

After 40 overs:

Suppose the number of fans reduced to N, the English fans numbered 90% of N = $0.9 N$.

Since the number of English fans did not change, we can say that $0.3 M = 0.9 N$ or $M = 3N$. Thus

the final number was $\frac{1}{3}$ rd of the original, resulting in a percentage reduction of $\frac{2}{3} \times 100 = 66.67\%$.

Hence, [1].

Correct Answer:

Time taken by you: **2 secs**

Avg Time taken by all students: **176 secs**

Your Attempt: **Skipped**

% Students got it correct: **75 %**

A tank has 6 identical inlet pipes, each of which individually fills the tank in 6 hours. The tank also has 4 identical outlet pipes, each of which individually empties the completely filled tank in 8 hours. If all the inlet and outlet pipes are simultaneously opened when the tank is initially empty, after how much time will the tank be completely full?

- ☐ 1 hour
- ☒ 2 hours ✓
- ☐ 1.5 hours
- ☐ 3 hours



Congratulations, you solved the question correctly and took less than average time!

Explanation:

Given: Each inlet pipe individually completely fills the tank in 6 hours. Therefore each pipe individually fills $\frac{1}{6}$ th part of the tank per hour. Therefore, six such inlet pipes will fill $6 \times \frac{1}{6} = 1$ or six identical inlet pipes will completely fill the tank in one hour.

Given: Each outlet pipe individually completely empties the tank in 8 hours. Therefore each pipe individually empties $\frac{1}{8}$ th part of the tank per hour. Therefore, four such outlet pipes will empty $4 \times \frac{1}{8} = \frac{1}{2}$ part of the tank per hour or four identical outlet pipes will completely empty the tank in two hours.

If the volume of the tank = 2 litres, the inlet pipes fill in 2 litres per hour, while the outlet pipes empty $\frac{2}{2} = 1$ litre per hour. Therefore, if all the pipes are operated, together they fill $2 - 1 = 1$ litre per hour.

Therefore, the time taken by the pipes to fill the tank completely = $\frac{2}{1} = 2$ hours.

Hence, [2].

Correct Answer:

Time taken by you: **84 secs**

Avg Time taken by all students: **129 secs**

Your Attempt: **Correct**

% Students got it correct: **85 %**

The sum and the product of the first 5 terms of a decreasing infinite GP are 121 and 59049 respectively. Find the sum of the GP.

- ☐ 1.5
- ☒ 121.5 ✓
- ☐ 122
- ☐ Cannot be determined



Congratulations, you got it correct!

Question 34

Explanation:

Let the terms are $\frac{a}{r^2}$, $\frac{a}{r}$, a , ar , ar^2

Hence $\frac{a}{r^2} \times \frac{a}{r} \times a \times ar \times ar^2 = a^5 = 59049$

Now, $59049 = 9^5$.

$\therefore a = 9$.

Hence middle term is 9.

$9^5 = 3^{10} = 3^4 \times 3^3 \times 3^2 \times 3^1 \times 3^0$

$= (81) \times (27) \times (9) \times (3) \times (1)$

and the sum of 81, 27, 9, 3 & 1 = 121

Hence the GP is 81, 27, 9, 3, 1, $\frac{1}{3}$, $\frac{1}{9}$ and so on

$\therefore \text{sum} = \frac{81}{1 - \frac{1}{3}} = \frac{81}{\frac{2}{3}} = \frac{81 \times 3}{2} = 121.5$.

Hence, [2].

Correct Answer:

Time taken by you: 203 secs

Avg Time taken by all students: 122 secs

Your Attempt: Correct

% Students got it correct: 48 %

How many sets of the form $S_n = \{n - 3, n - 2, n - 1, n, n + 1, n + 2, n + 3\}$, where 'n' is a natural number such that $4 \leq n \leq 100$, do not contain 8 or any integral multiple of 8?

- ☐ 15
- ☐ 14
- ☐ 12
- ☒ 13 ✓



Congratulations, you got it correct!

**Explanation:**

A set of seven consecutive natural numbers will not contain 8 or its multiple if and only if the smallest number in this set is one more than a multiple of 8.

The smallest such value of $(n - 3)$ is 1. Thereafter, $(n - 3)$ can take values 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89 and 97 (as $n \leq 100$, $n - 3 \leq 97$)

\therefore There are 13 such sets.

Hence, [4].

Correct Answer:

Time taken by you: **117 secs**

Avg Time taken by all students: **111 secs**

Your Attempt: **Correct**

% Students got it correct: **56 %**

Find the ratio of the sum of the first 43 terms of an AP to the common difference if the sum of the first 15 terms and that of the first 27 terms of this AP is equal.

- ☐ 1 : 1
- ☐ 3 : 4
- ☐ 21 : 1
- ☒ 43 : 2 ✓



Congratulations, you solved the question correctly and took less than average time!

Question 10034

Explanation:

Let the first term of the AP be 'a' and the common difference be 'd'.

$$\frac{15}{2} [2a + 14d] = \frac{27}{2} [2a + 26d]$$

$$\therefore 2a + 41d = 0$$

$$\text{Sum of the first 43 terms} = \frac{43}{2} [2a + 42d] = \frac{43}{2} [0 + d] = \frac{43}{2}d$$

$$\therefore \text{The required ratio} = 43 : 2$$

Hence, [4].

Correct Answer:

Time taken by you: **110 secs**

Avg Time taken by all students: **196 secs**

Your Attempt: **Correct**

% Students got it correct: **81 %**

Find sum of all the numbers which have 9 divisors and lie in the range 200 to 1000 (including both numbers).

Enter your response (as an integer) using the virtual keyboard in the box provided below.



Oops, you got it wrong!

**Explanation:**

The numbers we are concerned about are either in the form a^8 or a^2b^2 where a, b are different prime numbers.

The squares that lies in the range 200 to 1000 are the squares of numbers from 15 to 31. Of these numbers 15, 21, 22 and 26 have 2 different prime factors. Therefore, numbers 15^2 , 21^2 , 22^2 and 26^2 have 9 factors. Also 2^8 i.e., 256 lies in the given range.

$$225 + 441 + 484 + 676 + 256 = 2082.$$

Therefore, the required answer is 2082.

Correct Answer:

Time taken by you: **111 secs**

Avg Time taken by all students: **15 secs**

Your Attempt: **Wrong**

% Students got it correct: **6 %**

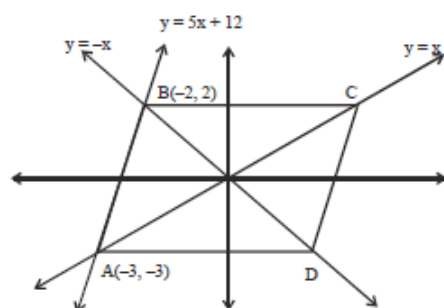
Diagonals of a rhombus are along lines $y = x$ and $y = -x$. If one of the sides is along $y = 5x + 12$, along which of the following lines does the adjoining side lie?

- ☐ $y = 5x - 12$
- ☐ $y = 5x - 10$
- ☒ $x = 5y + 12$ ✓
- ☐ $x = 5y + 10$



Congratulations, you got it correct!

Explanation:



$y = x$ and $y = 5x + 12$ intersect at $(-3, -3)$.

$y = -x$ and $y = 5x + 12$ intersect at $(-2, 2)$.

Since diagonals bisect each other, the other two vertices of the rhombus are $C(3, 3)$ and $D(2, -2)$.

\therefore Equations of adjoining sides are:

$$BC : y - 3 = \frac{3 - 2}{3 - (-2)}(x - 3)$$

$$\Rightarrow y - 3 = \frac{1}{5}(x - 3)$$

Correct Answer:

Time taken by you: 154 secs

Avg Time taken by all students: 112 secs

Your Attempt: Correct

% Students got it correct: 58 %

One worker starts working on a project on the first day. One more worker joins him on the second day and both the workers work at twice the efficiency of the first worker on the first day. One more worker joins the two workers on the third day and all the three workers work at thrice the efficiency of the first worker on the first day. This process continues such that on each subsequent day, one more worker joins and all the workers working on n th day work at efficiency ' n ' times that of the first worker on the first day. The work is eventually completed in 30 days. If 61 workers start working on the project and work at constant efficiency equal to that of the first worker on the first day (as given above), in how many days will they complete the project?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

Explanation:

Suppose the first worker completes one unit of work on the first day.

Therefore, 2 workers complete two units on day 2, 3 workers complete three units on day 3 and so on.

$$\therefore \text{Total quantum of work to be completed} = 1^2 + 2^2 + 3^2 + \dots + 30^2 = \frac{30 \times 31 \times 61}{6} = 5 \times 31 \times 61$$

If 61 workers complete one unit of work every day, the number of days needed to complete the

$$\text{project} = \frac{5 \times 31 \times 61}{61} = 155.$$

Therefore, the required answer is 155.

Correct Answer:

Time taken by you: 2 secs

Avg Time taken by all students: 91 secs

Your Attempt: Skipped

% Students got it correct: 53 %

There are 'n' children standing in a circle. A teacher has three types of chalk (pink, green and blue) and marks a triangle joining every set of three children, using only one colour of chalk for a given triangle. Once he has finished all the triangles, he notices that there are an equal number of triangles of all three colours. Which of the following could not be the number of children?

- ☐ 18
- ☐ 19
- ☐ 20
- ☐ 21

Explanation:

If there are 'n' children, there would be nC_3 triangles. Hence, nC_3 must be divisible by 3.

Hence, $\frac{n(n-1)(n-2)}{6}$ is divisible by 3 or $n(n-1)(n-2)$ is divisible by 18, i.e., by 9 and 2 both.

Now, when 3 consecutive numbers are multiplied, the product will always be divisible by 2. Also when three consecutive numbers are taken, exactly one of them will be divisible by 3 and in this case that number must be divisible by 9 also. So, either (n) or (n-1) or (n-2) must be divisible by 9. Hence, [4].

Correct Answer:

Time taken by you: **58 secs**

Avg Time taken by all students: **77 secs**

Your Attempt: **Skipped**

% Students got it correct: **52 %**

A certain sum 'K', invested at a fixed rate of Simple Interest, becomes (9K) in 20 years. Approximately how much must it have become in 5 years?

- ☐ 2K
- ☐ 2.25K
- ☐ 2.5K
- ☒ 3K ✓



Congratulations, you solved the question correctly and took less than average time!

**Explanation:**

Total interest in 20 years = 8K.

Since Simple Interest (SI) is directly proportional to time, in every 5 years the interest earned must have been 2K.

So the amount after 5 years would be $P + SI = K + 2K = 3K$.

Hence, [4].

Correct Answer:

Time taken by you: **58 secs**

Avg Time taken by all students: **71 secs**

Your Attempt: **Correct**

% Students got it correct: **55 %**

A number is said to be a 'self-content number' if sum of the factorials of its digits is the number itself. Find the middle digit of a three-digit self-content number with all distinct digits.

Enter your response (as an integer) using the virtual keyboard in the box provided below.



Oops, you got it wrong!

05:43

Explanation:

It is given that ABC is a three-digit number and also $ABC = A! + B! + C!$

∴ One of the digits has to be either 5 or 6 as these are the only numbers whose factorial is 3-digit number. Here again, 6 cannot be a possible digit, because, $6! = 720$ and therefore the number ABC would have to be greater than 720, but then $A > 7$ and $7! = 5040$, which is a 4-digit number.

∴ 5 has to be one of the digits.

Now, $5! = 120$

Even if we add $3!$ and $4!$ to $5!$, the number we get is 150, hence A has to be 1. Now, if we check for the third digit, we get that the only possible number is 145.

Therefore, the required answer is 4.

Correct Answer:

Time taken by you: **40 secs**

Avg Time taken by all students: **74 secs**

Your Attempt: **Wrong**

% Students got it correct: **61 %**

A trader sold a children study table and a chair for Rs. 162. By doing so, he made a profit of 20% on the table and 10% on the chair. By selling them together for a rupee more, he could have made a profit of 10% on the table and 25% on the chair. What is the cost of the table?

- ☐ Rs. 60
- ☐ Rs. 70
- ☒ Rs. 80 ✓
- ☐ Rs. 40



Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let cost of table = t, cost of chair = c

$$1.2t + 1.1c = 162 \dots (i)$$

$$1.1t + 1.25c = 163 \dots (ii)$$

Solving equations (i) and (ii), we get,

$$t = \text{Rs. } 80$$

Hence, [3].

Correct Answer:

Time taken by you: **83 secs**

Avg Time taken by all students: **221 secs**

Your Attempt: **Correct**

% Students got it correct: **81 %**

A milk vendor sells 10 litres of milk from a can of 40 litres to a customer. He then fills the can with 10 litres of water and again sells 10 litres of the mixture to the second customer. He again fills 10 litres of water in the can and sells 10 litres of mixture to the third customer and so on. What is the amount of pure milk that the fifth customer will receive?

- ☐ $\frac{510}{128}$ litres
- ☒ $\frac{410}{128}$ litres ✖
- ☐ $\frac{405}{128}$ litres
- ☐ $\frac{505}{128}$ litres



Oops, you got it wrong!

Explanation:

Let a be the initial amount of milk initially and b be the amount of water replaced.

$$\therefore \frac{\text{Milk left in vessel after } n^{\text{th}} \text{ operation}}{\text{Initial quantity of milk in vessel}} = \left(\frac{a - b}{a} \right)^n$$

$$\frac{\text{Milk left in vessel after } 4^{\text{th}} \text{ operation}}{\text{Initial quantity of milk in vessel}} = \left(\frac{40 - 10}{40} \right)^4$$

$$= \left(\frac{3}{4} \right)^4 = \frac{81}{256}$$

In a mixture of 256 litres, 81 litres is pure milk. So, in a mixture of 10 litres,

$$\frac{10 \times 81}{256} = \frac{810}{256} = \frac{405}{128} \text{ is pure milk. Hence, [3].}$$

Correct Answer:

Time taken by you: 250 secs

Avg Time taken by all students: 200 secs

Your Attempt: **Wrong**

% Students got it correct: 77 %

$$2x = \frac{1}{4 + \frac{1}{9 + \frac{1}{4 + \frac{1}{9 + \frac{1}{4 + \dots}}}}} \quad \text{Find } x.$$

- ☐ $\frac{3\sqrt{10} + 9}{4}$
- ☒ $\frac{3\sqrt{10} - 9}{4}$ ✓
- ☐ $\frac{9\sqrt{3} + 10}{2}$
- ☐ $\frac{10\sqrt{3} - 9}{2}$



Congratulations, you solved the question correctly and took less than average time!

Explanation:

$$2x = \frac{1}{4 + \frac{1}{9 + \frac{1}{4 + \frac{1}{9 + \frac{1}{4 + \dots}}}}}$$

$$\therefore 2x = \frac{1}{4 + \frac{1}{9 + 2x}}$$

$$\therefore 2x = \frac{9 + 2x}{36 + 8x + 1}$$

$$\therefore 72x + 16x^2 + 2x = 9 + 2x$$

$$\therefore 16x^2 + 72x - 9 = 0$$

$$\therefore x = \frac{-72 \pm \sqrt{5184 + 576}}{32}$$

$$\frac{-72 \pm \sqrt{5760}}{32} = \frac{-72 \pm 24\sqrt{10}}{32} = \frac{-9 \pm 3\sqrt{10}}{4}$$

But $x > 0$ $\therefore x = \frac{3\sqrt{10} - 9}{4}$

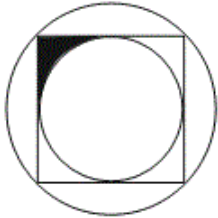
Correct Answer:

Time taken by you: 45 secs

Avg Time taken by all students: 191 secs

Your Attempt: Correct

% Students got it correct: 73 %



A square is inscribed in a circle and then another circle is inscribed in the square as shown in the figure. If the area of the inner circle is 44 sq. cm, find the area (in sq. cm) of the shaded region.

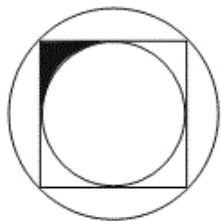
(Given: $\pi = \frac{22}{7}$)

Enter your response (as an integer) using the virtual keyboard in the box provided below.



Oops, you got it wrong!

Explanation:



We can notice that the diameter of the inner circle is the side of the square. Let the radius of the innermost circle be r .

The area of innermost circle = $\pi r^2 = 44$

The area of the square = $4r^2 = \frac{44}{\pi} \times 4 = \frac{44}{22} \times 7 \times 4 = 56$

Area of shaded region

$= \frac{1}{4}$ (The difference between area of square and the area of circle) $= \frac{1}{4} \times (56 - 44) = \frac{1}{4} \times 12 = 3$

Therefore, the required answer is 3.

Correct Answer:

Time taken by you: 121 secs

Avg Time taken by all students: 129 secs

Your Attempt: Wrong

% Students got it correct: 76 %

If $A \equiv \{1, 2, 3, \dots, 100\}$ and $B \equiv \{7, 14, 21, \dots, 98\}$, then how many arithmetic series starting with 1 and ending with 100 and having at least three elements, can be formed from the set of elements of $A \cap B$?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3

Explanation:

The n^{th} element of an arithmetic series is given by,

$T_n = a + (n - 1)d$, where a = the first element, d = the common difference

For $a = 1$, $T_n = 100$, we get $100 = 1 + (n - 1)d$ i.e., $(n - 1)d = 99$

The following table gives the possible values of 'n' and 'd' and the corresponding arithmetic series.

n	d	Arithmetic Series
2	99	{1, 100}
4	33	{1, 34, 67, 100}
10	11	{1, 12, 23, 34, 45, 56, 67, ..., 100}
12	9	{1, 10, 19, 28, 37, ..., 100}
34	3	{1, 4, 7, 10, ..., 100}
100	1	{1, 2, 3, ..., 100}

As the arithmetic series is formed from the elements of $A \cap B'$, it cannot contain any multiple of 7. Also, it should have at least three elements.

\therefore From the above only one arithmetic series with $n = 4$ and $d = 33$ satisfies both the given conditions.

Hence, [2].

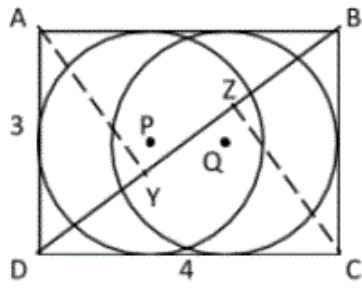
Correct Answer:

Time taken by you: 22 secs

Avg Time taken by all students: 32 secs

Your Attempt: Skipped

% Students got it correct: 19 %

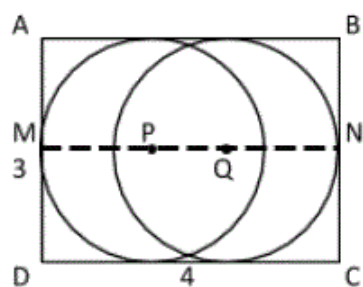


In the above figure, ABCD is a rectangle with $\ell(AD) = 3$ and $\ell(CD) = 4$. A circle is drawn with centre P such that AB, AD and CD are tangent to it. Another circle is drawn with centre Q such that AB, BC and CD are tangent to it. Perpendiculars AY and CZ are dropped from A and C to BD. Find the ratio of $\ell(PQ) : \ell(YZ)$.

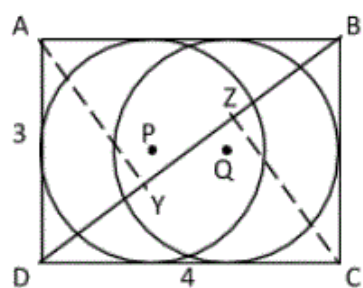
- ☐ 4 : 5
- ☐ 7 : 5
- ☐ 5 : 7
- ☐ 4 : 3

Explanation:

Clearly, by Pythagoras theorem, $\ell(BD)$ will be 5.



Let us find the length of PQ. Drop perpendiculars PM and QN. Now, M, P, Q and N will lie on a straight (horizontal) line. Clearly $\ell(MN)$ will be 4. Also, $\ell(PM)$ and $\ell(QN)$ will be 1.5 each (the radius of the circle). So, $\ell(PQ)$ will be 1.



Correct Answer:

Time taken by you: 2 secs

Avg Time taken by all students: 126 secs

Your Attempt: Skipped

% Students got it correct: 61 %

Omkar scored more than 27 marks, Pramath scored more than 24 marks, Prathmesh scored more than 22 marks. If Advika scored 20 marks, how many distinct possibilities are there in which Omkar, Pramath, Prathmesh and Advika together scored 96 marks?

Enter your response (as an integer) using the virtual keyboard in the box provided below.



Oops, you got it wrong!

01:52

Explanation:

Marks scored by Omkar, Pramath, Prathmesh and Advika scored a, b, c and 20 marks respectively.

Also, $a > 27$, $b > 24$ and $c > 22$

Let $a = A + 27$, $b = B + 24$, $c = C + 22$, where A, B and C are natural numbers.

$$(A + 27) + (B + 24) + (C + 22) = 76$$

Therefore, $A + B + C = 3$

Number of integer solutions to this equation = ${}^{(3-1)}C_{(3-1)} = {}^2C_2$

Therefore, the required answer is 1.

Correct Answer:

Time taken by you: **126 secs**

Avg Time taken by all students: **88 secs**

Your Attempt: **Wrong**

% Students got it correct: **62 %**

How many integer values of 'x' less than or equal to 100 satisfy the inequality $(x-1)^1 (x-2)^2 (x-3)^3 \dots (x-10)^{10} > 0$?

Enter your response (as an integer) using the virtual keyboard in the box provided below.



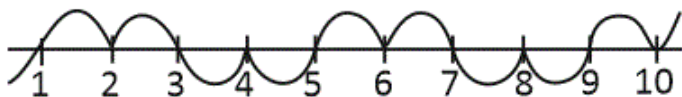
Congratulations, you solved the question correctly and took less than average time!

Explanation:

For $x = 1, 2, 3, 4, \dots, 10$, $(x-1)^1 (x-2)^2 (x-3)^3 \dots (x-10)^{10} = 0$

At $x = 2, 4, 6, 8$ and 10 the curve just touches the x-axis, while at points $x = 1, 3, 5, 7$ and 9 it intersects the x-axis. At $x = 0$, the value of the function $(x-1)^1 (x-2)^2 (x-3)^3 \dots (x-10)^{10}$ is negative.

The nature of the curve is as follows:



Thus, it can be seen that the inequality is satisfied for all integer values of x greater than 10 . Therefore, the inequality is satisfied for $x = 11, 12, 13, \dots, 100$ (total 90).

Therefore, the required answer is 90.

Correct Answer:

Time taken by you: **76 secs**

Avg Time taken by all students: **80 secs**

Your Attempt: **Correct**

% Students got it correct: **63 %**

Deepak invested a certain sum of money, Rs. P, in a scheme A. After a year, it realised only 10% interest. Disappointed, Deepak withdrew the entire amount (including the interest) and invested it in Scheme B. Over the next three years, the compounded average yield of scheme B was 20%. At the end of this period, Deepak received a final amount of Rs. 15,20,640. Find the value of P.

Enter your response (as an integer) using the virtual keyboard in the box provided.



Congratulations, you solved the question correctly and took less than average time!

Explanation:

A growth of 10% corresponds to a multiplier of 1.1. Similarly a growth of 20% corresponds to a multiplier of 1.2.

Thus, $P \times 1.1 \times (1.2)^3 = 1520640$. Solving, we get $P = 8,00,000$.

Therefore, the required answer is 800000.

Correct Answer:

Time taken by you: **81 secs**

Avg Time taken by all students: **102 secs**

Your Attempt: **Correct**

% Students got it correct: **59 %**

The cruise liner 'Queen Alice' is 380 m long and travels at a speed of 32 kmph in still water. The frigate 'Lord Harry' is 180 m long and travels at 40 kmph in still water. The two ships pass each other in the Atlantic ocean, traveling in opposite directions, in a region where there is current of 8 m/s. How long (in seconds) will it take them to pass each other?

Enter your response (as an integer) using the virtual keyboard in the box provided



Congratulations, you got it correct!

Explanation:

The speed of the current has no effect on their speed relative to each other.

Therefore, the relative speed at which the two ships = $32 + 40 = 72$ kmph = 20 m/s.

The distance to be covered = $380 + 180 = 560$ m

Hence, the time will be $\frac{560}{20} = 28$ seconds.

Therefore, the required answer is 28.

Correct Answer:

Time taken by you: **124 secs**

Avg Time taken by all students: **89 secs**

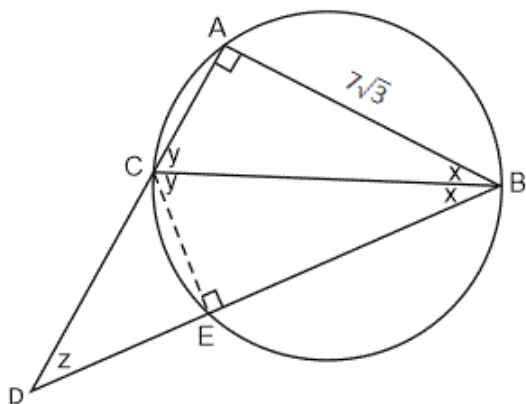
Your Attempt: **Correct**

% Students got it correct: **53 %**

A circumcircle of $\triangle ABC$ is drawn with centre on BC. D, a point on ray AC such that BC bisects $\angle ABD$. E is on DB such that $\angle DEC$ is a right angle and $CE = 7$. If $AB = 7\sqrt{3}$ cm, find the difference between area of the circle and $\triangle ABD$.

- ☐ $49(\pi - \sqrt{3})$ sq.cm
- ☐ $49(\pi - \frac{3}{2}\sqrt{3})$ sq.cm
- ☐ $7(\pi - \sqrt{3})$ sq.cm
- ☐ $49(\pi - \frac{1}{2}\sqrt{3})$ sq.cm

Explanation:



Correct Answer:

Time taken by you: 765 secs

Avg Time taken by all students: 92 secs

Your Attempt: Skipped

% Students got it correct: 49 %

A large tank can be completely filled using one large and four small pumps in 20 hours. It is known that two large pumps can completely fill the tank in 'm' hours. Similarly 12 small pumps can completely fill the tank in 'm+5' hours. By what percent is the capacity of each large pump greater than that of a small pump?

- ☐ 400%
- ☒ 800% ❌
- ☐ 600%
- ☐ 700%



Oops, you got it wrong!

Explanation:

Given: Two large pumps can fill the tank in 'm' hours. Therefore, each large pump can fill the tank in '2m' hours. Therefore, each large pump fills $\frac{1}{2m}$ part of the tank per hour.

Given: 12 small pumps can fill the tank in 'm + 5' hours. Therefore, each small pump can fill the tank in $12(m + 5) = 12m + 60$ hours. Therefore, each small pump fills $\frac{1}{12m + 60}$ part of the tank per hour.

Given: One large and four small pumps fill the tank in 20 hours.

The part of the tank filled by one large and four small pipes together = $\frac{1}{2m} + \frac{4}{12m + 60} = \frac{1}{2m} + \frac{1}{3m + 15}$

$$\therefore \frac{1}{2m} + \frac{1}{3m + 15} = \frac{1}{20}$$

$$\therefore \frac{5m + 15}{6m^2 + 30m} = \frac{1}{20}$$

$$\therefore 6m^2 + 30m = 100m + 300$$

$$\therefore 6m^2 - 70m - 300 = 0$$

$$\therefore 3m^2 - 35m - 150 = 0$$

Solving for 'm', we get

$$m = \frac{35 \pm \sqrt{35^2 + 4 \times 3 \times 150}}{6} = \frac{35 \pm 55}{6} = 15 \text{ or } -\frac{10}{3}$$

Correct Answer:

Time taken by you: 118 secs

Avg Time taken by all students: 108 secs

Your Attempt: Wrong

% Students got it correct: 38 %

$\triangle ABC$ is right-angled at B with $AB = 6$ cm and $BC = 8$ cm. A square PQRS is inscribed in $\triangle ABC$ such that the point P and Q lie on AC, point S on AB and point R on BC. Find the approximate length of the sides of the square PQRS.

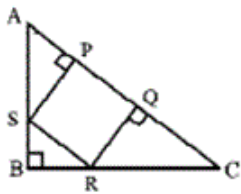
- ☐ 4.6 cm
- ☒ 3.2 cm ✓
- ☐ 4.2 cm
- ☐ 3.8 cm



Congratulations, you got it correct!

Explanation:

Based on the given information, we get the following figure:



$$AB = 6 \text{ cm and } BC = 8 \text{ cm} \Rightarrow AC = \sqrt{6^2 + 8^2} = 10 \text{ cm}$$

Since, $SP \perp AP$

$$\triangle APS \sim \triangle ABC \text{ (by AA test)} \Rightarrow \frac{AP}{PS} = \frac{AB}{BC} = \frac{6}{8} \Rightarrow AP = \frac{3}{4} PS$$

Now, $RQ \perp QC$

$\therefore \triangle CQR \sim \triangle CBA$ (by AA test)

$$\Rightarrow \frac{CQ}{RQ} = \frac{CB}{AB} = \frac{8}{6} \Rightarrow CQ = \frac{4}{3} RQ$$

Let the side of square PQRS be x cm.

$$\text{Now, } AC = AP + PQ + QC \Rightarrow 10 = \frac{3}{4}x + x + \frac{4}{3}x$$

Correct Answer:

Time taken by you: **185 secs**

Avg Time taken by all students: **120 secs**

Your Attempt: **Correct**

% Students got it correct: **53 %**

Find the sum of the first 100 terms of the following series.

$$\log\left(\frac{a^{50}b^{-50}}{1}\right) + \log\left(\frac{a^{49}b^{-49}}{2}\right) + \log\left(\frac{a^{48}b^{-48}}{4}\right) + \log\left(\frac{a^{47}b^{-47}}{8}\right) + \dots$$

☐ $-4950 \log(2)$

☐ $50\log\left(\frac{a}{(2^{99})b}\right)$

☐ $50\log\left(\frac{a}{(2^{101})b}\right)$

☐ $-5050 \log(2)$

03:04

Explanation:

Required sum

$$= \log\left(\frac{a^{50}b^{-50}}{1}\right) + \log\left(\frac{a^{49}b^{-49}}{2}\right) + \log\left(\frac{a^{48}b^{-48}}{4}\right) + \log\left(\frac{a^{47}b^{-47}}{8}\right) + \dots + \log\left(\frac{a^{-49}b^{49}}{2^{99}}\right)$$

$$= \log\left[\frac{a^{50}b^{-50}}{2^0} \times \frac{a^{49}b^{-49}}{2^1} \times \frac{a^{48}b^{-48}}{2^2} \times \dots \times \frac{a^{-49}b^{49}}{2^{99}}\right]$$

$$= \log\left[\frac{a^{50}b^{-50}}{2^{0+1+\dots+99}}\right] = \log\left[\frac{a^{50}b^{-50}}{2^{50 \times 99}}\right] = 50\log\left(\frac{a}{2^{99}b}\right)$$

Hence, [2].

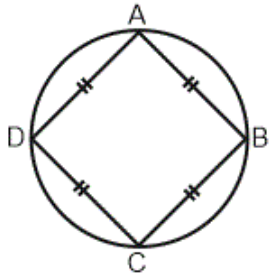
Correct Answer:

Time taken by you: 95 secs

Avg Time taken by all students: 98 secs

Your Attempt: Skipped

% Students got it correct: 46 %



Two men start running at the same time from point A along the route ABCDA, one along the linear path and the other along the circular path. At what speed should the person running along the circular path run, so that both men meet at each of the points, B, C and D and reach point A at the same time? The speed of the man running along the linear path is 28 units/sec. Both the men run at constant speeds.

(Take $\pi = \frac{22}{7}$)

- ☐ $8\sqrt{2}$ units/sec
- ☐ 7π units/sec
- ☐ $22\sqrt{2}$ units/sec
- ☐ $11\sqrt{2}\pi$ units/sec

Explanation:

Since, $AB = BC = CD = AD$, ABCD is a square inscribed in the circle and its diagonals pass through the centre of the circle.

Let r be the radius of the circle, then diameter $= AC = 2r =$ diagonal of the square ABCD

$$\Rightarrow \text{Side of square} = \frac{2r}{\sqrt{2}} = \sqrt{2}r$$

Both the men meet at B i.e., they take the same time to reach B from A.

Let the speed of the man running along the circular path be 'x' units/sec.

\therefore Their speeds will be in the same ratio as the distances travelled by them.

$$\therefore \frac{x}{28} = \frac{\ell(\text{arc AB})}{\ell(AB)} = \frac{\frac{90}{360} \times 2\pi r}{\sqrt{2}r}$$

$$\Rightarrow x = 7\pi\sqrt{2} = 22\sqrt{2} \text{ units/sec}$$

Hence, [3].

Alternatively;

Speed of the person running along the circular path should be > 28 . Option [3] is the only such option.

Correct Answer:

Time taken by you: **8 secs**

Avg Time taken by all students: **169 secs**

Your Attempt: **Skipped**

% Students got it correct: **86 %**

A shop in a mall offers a discount of 25% over the Marked Price for Diwali promotion yet it makes a profit of 25%. What would have been the percent profit made by the shop if no discount was offered on the Marked Price?

- ☐ 50%
- ☐ 62.5%
- ☒ $66\frac{2}{3}\%$ ✓
- ☐ 75%



Congratulations, you solved the question correctly and took less than average time!

Explanation:

If the Marked Price = 100, the Selling Price = 75.

If the shop still makes a profit of 25%, the Cost Price = $\frac{75}{1.25} = 60$.

If no discount was offered, SP = 100 and profit = $100 - 60 = 40$.

Therefore the required percent profit = $\frac{40}{60} \times 100 = 66\frac{2}{3}\%$

Hence, [3].

Correct Answer:

Time taken by you: **46 secs**

Avg Time taken by all students: **151 secs**

Your Attempt: **Correct**

% Students got it correct: **86 %**

In how many distinct points do the following curves (i.e., y_1 and y_2) intersect?

$$y_1 = x^3 + 2x^2 + 7x - 2$$

$$y_2 = 8x^2 - 4x + 4$$

Enter your response (as an integer) using the virtual keyboard in the box provided.



Oops, you got it wrong!

Explanation:

We have to find the number of common values for the sequences.

∴ We equate the two expressions.

$$\therefore x^3 + 2x^2 + 7x - 2 = 8x^2 - 4x + 4$$

$$\therefore x^3 - 6x^2 + 11x - 6 = 0$$

$$\therefore (x - 1)(x - 2)(x - 3) = 0$$

$$\therefore x = 1 \text{ or } 2 \text{ or } 3$$

The curves intersect only at $x = 1, 2$ and 3 .

Therefore, the required answer is 3 .

Correct Answer:

Time taken by you: **74 secs**

Avg Time taken by all students: **72 secs**

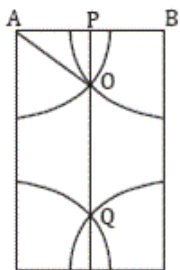
Your Attempt: **Wrong**

% Students got it correct: **50 %**

A lecturer uses a microphone while teaching. The $4.8 \text{ m} \times 7.2 \text{ m}$ classroom floor has speakers mounted at the four corners on the floor. Whenever the lecturer ventures within 3 m distance of the corners, there is a disturbance on the speakers. What is the maximum distance that he can walk in a single direction, parallel to the longer sides of the room floor, without any disturbance? (Assume that dimensions of the speakers are negligible)

- ☐ 6 m
- ☐ 4.2 m
- ☐ 3.6 m
- ☐ 1.2 m

Explanation:



$AB = 4.8$ m

$AP = \frac{1}{2} AB = 2.4$ m. $OA = 3$ m. So, $OP^2 = (3)^2 - (2.4)^2$.

So, $OP = 1.8$ m. So, the maximum distance he can walk in the same direction = $OQ = 7.2 - 2 (OP) = 3.6$ m.

Hence, [3].

Correct Answer:

Time taken by you: 18 secs

Avg Time taken by all students: 132 secs

Your Attempt: Skipped

% Students got it correct: 37 %

