

How many five digit numbers have sum of its digits equal to 43?

- ☐ 10
- ☐ 15
- ☐ 18
- ☐ more than 18

Explanation:

The required number will have digits 9, 9, 9, 9, 7 or 9, 9, 9, 8, 8.

The number of numbers having digits 9, 9, 9, 9, 7 = $\frac{5!}{4!} = 5$

The number of numbers having digits 9, 9, 9, 8, 8 = $\frac{5!}{3!2!} = 10$

∴ The required number of numbers = 5 + 10 = 15.

Hence, [2].

Correct Answer:

Time taken by you: **13 secs**

Avg Time taken by all students: **119 secs**

Your Attempt: **Skipped**

% Students got it correct: **67 %**

If 9 programmers working 8 hours a day can finish the coding of a project in 36 days, then how many days will be taken by 12 software engineers working 6 hours a day to finish the coding of the project? It is known that 2 software engineers code as much as 3 programmers in the same time.

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

 days

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

Explanation:

	Number	Hours	Days
Programmers (P)	9	8	36
Software Engineers (E)	12	6	X

Also, $2E = 3P$ i.e., $12E = 18P$

$$\therefore 9P \times 8 \times 36 = 12E \times 6 \times X$$

$$\therefore \text{Number of days} = x = 36 \times \left(\frac{9P}{12E} \right) \times \frac{8}{6}$$

$$= 36 \times \frac{9}{18} \times \frac{8}{6} = 24 \text{ days.}$$

Therefore, the required answer is 24.

Correct Answer:

Time taken by you: **64 secs**

Avg Time taken by all students: **106 secs**

Your Attempt: **Correct**

% Students got it correct: **73 %**

What is the area of the region (in square units) enclosed within the curve $|x| + |y| = 3$?

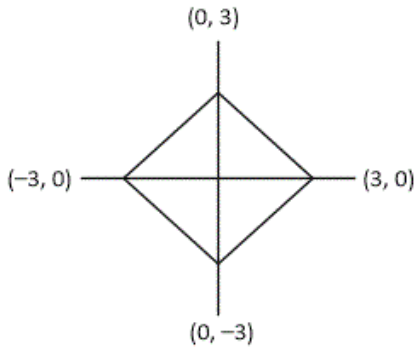
Enter your response (as an integer) using the virtual keyboard in the box provided.



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

Explanation:

The graph of $|x| + |y| = 3$ is a square with diagonals along x and y axis and length of the diagonals $= 2 \times 3 = 6$, as shown.



\therefore Area of the region $= \frac{1}{2} \times 6 \times 6 = 18$ square units.

Therefore, the required answer is 18.

Correct Answer:

Time taken by you: **28 secs**

Avg Time taken by all students: **55 secs**

Your Attempt: **Correct**

% Students got it correct: **73 %**

Given that $x^2 \leq 1$, $|y - 1| \geq 3$ and $-2 \leq z \leq -1$, which of the following statements is necessarily true?

- ☐ $|xy + 1| \geq 2$
- ☐ $|yz + 1| \geq 4$
- ☒ $|xz - 1| \leq 1$ ❌
- ☐ $|yz| + 1 \geq 3$



Oops, you got it wrong!

Explanation:

From the given information:

$$x^2 \leq 1 \Rightarrow -1 \leq x \leq 1;$$

$$|y - 1| \geq 3 \Rightarrow y \geq 4 \text{ or } y \leq -2 \text{ and}$$

$$-2 \leq z \leq -1$$

Evaluating the options,

For $x = 0$, $|xy + 1| = 1 < 2$. Thus, [1] is false.

$$yz \leq -4 \text{ or } yz \geq 2$$

$$\therefore (yz + 1) \leq -3 \text{ or } (yz + 1) \geq 3$$

$\therefore |yz + 1| \geq 3$. Thus, [2] is not necessarily true.

$$-2 \leq xz \leq 2$$

$$\therefore -3 \leq (xz - 1) \leq 1$$

Correct Answer:

Time taken by you: **237 secs**

Avg Time taken by all students: **121 secs**

Your Attempt: **Wrong**

% Students got it correct: **66 %**

The marked price of an article is Rs. 3,990. The shopkeeper offers some discount on the marked price and sells the article at a price so as to earn a profit of Rs. 540. If cost price of the article is Rs. 2,250, calculate the approximate discount offered on the article, as a percent of the marked price of the article.

- ☒ 30% ✓
- ☐ 36%
- ☐ 25%
- ☐ 23%



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

Explanation:

The cost price of the article is Rs. 2,250 and the profit earned by the shopkeeper is Rs. 540

∴ Selling price of the article = 2250 + 540 = Rs. 2,790

$$\therefore \text{Discount} = \frac{\text{MP} - \text{SP}}{\text{MP}} \times 100$$

$$= \frac{3990 - 2790}{3990} \times 100 \approx 30\%.$$

Hence, [1].

Correct Answer:

Time taken by you: **86 secs**

Avg Time taken by all students: **130 secs**

Your Attempt: **Correct**

% Students got it correct: **95 %**

Given $\log_{10} 2 = 0.3010$, how many digits does the number 5^{24} have?

- ☐ 15
- ☐ 16
- ☒ 17 ✓
- ☐ 18



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

Explanation:

Given : $\log_{10}2 = 0.3010$

$$\therefore \log_{10}5 = \log_{10}\left(\frac{10}{2}\right) = \log_{10}10 - \log_{10}2 = 1 - 0.3010 = 0.6990$$

$$\therefore \log_{10}5^{24} = 24 \times \log_{10}5 = 24 \times 0.6990 = 16.776$$

Now, $\log_{10}10 = 1$ and $\log_{10}100 = 2$.

Therefore, log to the base 10 of all two digit numbers is between 1 and 2.

On similar lines, if $\log_{10}5^{24} = 16.776$, it has 17 digits.

Hence, [3].

Correct Answer:

Time taken by you: **39 secs**

Avg Time taken by all students: **83 secs**

Your Attempt: **Correct**

% Students got it correct: **71 %**

Find the value of the following expression:

$$\frac{2 \times 4^{n+1} + 4^{2n-1}}{4 \times 2^{2n} - 8 \times 4^{n-1}} \times \frac{1}{4 + 2^{2(n-2)+1}}$$

☒ $2^{2n+1} + 2$ ✖

☐ 1

☐ -1

☐ 2^n



Oops, you got it wrong!

Explanation:

$$\begin{aligned} \frac{2 \times (2^2)^{n+1} + (2^2)^{2n-1}}{2^2 \times 2^{2n} - 2^3 \times (2^2)^{n-1}} \times \frac{1}{2^2 + 2^{2n-4+1}} &= \frac{2 \times 2^{2n+2} + 2^{4n-2}}{2^{2n+2} - 2^{2n-2} \times 2^3} \times \frac{1}{2^2 + 2^{2n-3}} \\ &= \frac{2^{2n}(2^3 + 2^{2n-2})}{2^{2n}(2^2 - 2^{-2+3})} \times \frac{1}{2^2 + 2^{2n-3}} = \frac{8 + 2^{2n-2}}{4 - 2} \times \frac{1}{2^2 + 2^{2n-3}} \\ &= (4 + 2^{2n-3}) \times \frac{1}{(4 + 2^{2n-3})} = 1 \end{aligned}$$

Hence, [2].

Correct Answer:

Time taken by you: **105 secs**

Avg Time taken by all students: **165 secs**

Your Attempt: **Wrong**

% Students got it correct: **88 %**

A school decides to distribute chocolates among 600 students. The chocolates are distributed in such a way that each student in row 1 receives 1 chocolate, each student in row 2 receives 2 chocolates and so on. The total number of chocolates distributed is 7500. What is the number of rows (if each row has an equal number of students)?

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



Congratulations, you got it correct!

Explanation:

Let x be the number of rows and y be the number of students in each row.

$$\therefore xy = 600 \quad \dots (i)$$

In the first row, the school distributes y chocolates; in 2nd row, $2y$ chocolates; in 3rd, $3y$ and so on.

In the last row, xy chocolates.

$$\therefore y + 2y + 3y + \dots + xy = 7500$$

$$\Rightarrow y(1 + 2 + 3 + \dots + x) = 7500$$

$$\Rightarrow \frac{yx(x+1)}{2} = 7500$$

Substituting from (i), we get,

$$x + 1 = \frac{7500 \times 2}{600}$$

$$\Rightarrow x + 1 = 25 \Rightarrow x = 24$$

Hence, number of rows is 24.

Therefore, the required answer is 24.

Correct Answer:

Time taken by you: **156 secs**

Avg Time taken by all students: **121 secs**

Your Attempt: **Correct**

% Students got it correct: **60 %**

If 'x' is a natural number such that $3(2^{4x+1}) + 5(2^{2x+6}) = 45056$, what is the value of 'x'?

- ☐ 1
- ☐ 2
- ☒ 3 ✓
- ☐ 4



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

Explanation:

Best way to solve this question is to substitute values.

$$\text{If } x = 1, 3(2^{4x+1}) + 5(2^{2x+6}) = 3(2^5) + 5(2^8) = 96 + 1280 = 1376$$

$$\text{If } x = 2, 3(2^{4x+1}) + 5(2^{2x+6}) = 3(2^9) + 5(2^{10}) = 1536 + 5120 = 6656$$

$$\text{If } x = 3, 3(2^{4x+1}) + 5(2^{2x+6}) = 3(2^{13}) + 5(2^{12}) = 24576 + 20480 = 45056$$

$$\text{If } x = 4, 3(2^{4x+1}) + 5(2^{2x+6}) = 3(2^{17}) + 5(2^{14}) = 393216 + 81920 \neq 45056$$

Hence, [3].

Correct Answer:

Time taken by you: **74 secs**

Avg Time taken by all students: **197 secs**

Your Attempt: **Correct**

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

Carol and her dog go for a walk around a circular track, Carol walks at a constant speed of 4 kmph and her dog playfully runs ahead at 7 kmph. They continue in this manner until they find themselves meeting at their starting point. At that time, her dog starts running in the opposite direction, but at the same speed of 7 kmph. They continue until they meet again at the starting point. By this time, at how many distinct points along the path (excluding the starting point) have the two of them met each other?

- ☐ 11
- ☐ 12
- ☐ 13
- ☒ 14 ❌



Oops, you got it wrong!

Explanation:

When walking in the same direction, at speeds of 4 and 7, they will meet at $7 - 4 = 3$ distinct points (including the starting point), equally spaced along the circumference. On the other hand, when walking in the opposite direction, they will meet at $7 + 4 = 11$ distinct equally spaced points (including the starting point). Since 3 and 11 are relatively prime, no point is a common meeting point when they move in the same or different directions. Thus, after excluding the starting point, we will get $2 + 10 = 12$ other distinct meeting points. Hence, [2].

Correct Answer:

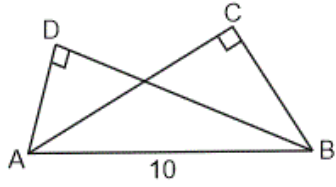
Time taken by you: **39 secs**

Avg Time taken by all students: **55 secs**

Your Attempt: **Wrong**

% Students got it correct: **39 %**

In the following diagram, $\ell(AB) = 10$ units and $m\angle ADB = m\angle ACB = 90^\circ$. What is the distance between point D and midpoint of segment AB?



- ☐ $\frac{15}{2}\sqrt{3}$ units
- ☐ $5\sqrt{3}$ units
- ☒ 5 units ✓
- ☐ Cannot be determined



Congratulations, you got it correct!



Explanation:



Points C and D lie on a circle with diameter AB. Therefore, the distance between point D and the midpoint of AB is the radius of the circle = 5 units. Hence, [3].

Correct Answer:



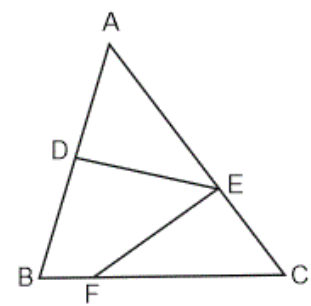
Time taken by you: **197 secs**

Avg Time taken by all students: **83 secs**

Your Attempt: **Correct**

% Students got it correct: **76 %**

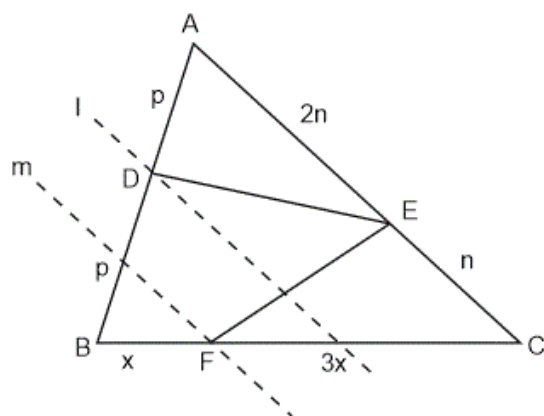
Consider $\triangle ABC$ shown in the following figure where $\ell(AD) = \ell(DB)$, $\ell(CE) = \frac{1}{3} \ell(AC)$ and $BF = \frac{1}{4} \ell(BC)$. What is the ratio of the area of $\triangle ADE$ to that of $\triangle CEF$?



- ☒ $\frac{4}{3}$ ✓
- ☐ $\frac{5}{3}$
- ☐ 2
- ☐ 1

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

Explanation:



If $AD = p$; $DB = p$,
If $EC = n$, $AE = 2n$,
If $BF = x$, $FC = 3x$, as shown

Construction:
Draw line $l \parallel AC$ and line $m \parallel AC$.

Let B is at a distance 'h' from AC.

Correct Answer:

Time taken by you: **117 secs**

Avg Time taken by all students: **126 secs**

Your Attempt: **Correct**

% Students got it correct: **67 %**

Suppose 'xyz' is a three digit number in base 5 (where x, y and z are its digits). When the same number is expressed in base 7, the number becomes 'zxy'. If the same number is expressed in base 6, the number becomes _____.

- ☐ 231
- ☐ 145
- ☐ 250
- ☐ 150

Explanation:

Let the three-digit number in base 5 be xyz.

$$\therefore [xyz]_5 = [zxy]_7$$

$$\therefore 25x + 5y + z = 49z + 7x + y$$

$$\therefore 18x + 4y = 48z$$

$$\therefore 9x + 2y = 24z$$

We know that x, y and z can lie only between 0-4. The only possible solution to the above equation is x = 2, y = 3 and z = 1.

$$\begin{aligned} \therefore \text{The required number} &= [231]_5 = (25 \times 2) + (5 \times 3) + (1 \times 1) = [66]_{10} \\ &= (36 \times 1) + (5 \times 6) + (0 \times 1) = [150]_6 \end{aligned}$$

Hence, [4].

Correct Answer:

Time taken by you: **410 secs**

Avg Time taken by all students: **128 secs**

Your Attempt: **Skipped**

% Students got it correct: **51 %**

A card is missing from a normal pack of 52 cards. It is found that two face cards can be selected in 66 ways and two red cards can be selected in 325 ways from this pack. Which of the following could be the missing card?

- ☐ Queen of Hearts
- ☐ Ace of Diamonds
- ☐ Ten of Hearts
- ☒ Ace of Spades ✓



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

Explanation:

In a normal pack of 52 cards, there are 12 face cards. Thus, two face cards can be selected in $^{12}C_2$ i.e., 66 ways. There are 26 red cards. Thus, two red cards can be selected in $^{26}C_2$ i.e., 325 ways.

Now, from the given data we can say that the missing card is neither a face card nor a red card. Thus, it has to be black number card. Hence, [4].

Correct Answer:

Time taken by you: **97 secs**

Avg Time taken by all students: **126 secs**

Your Attempt: **Correct**

% Students got it correct: **80 %**

A function $g(y)$ is defined as $\left[\frac{2}{3} + \frac{y}{100} \right]$ where $[x]$ is the greatest integer less than or equal to x .

Find the value of $g(0) + g(1) + g(2) + \dots + g(50)$

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



Congratulations, you got it correct!

Explanation:

$g(0) = \left[\frac{2}{3} + \frac{0}{100} \right] = 0$. In a similar manner, $g(1)$, $g(2)$ and so on up till $g(33)$ will be 0, as $\frac{33}{100} < \frac{1}{3}$.

But from $y = 34$ onwards till $y = 50$, $g(y)$ will be 1 as $\frac{34}{100} > \frac{1}{3}$. There will be 17 such values and so they will add up 17. Therefore, the required answer is 17.

Correct Answer:

Time taken by you: **99 secs**

Avg Time taken by all students: **84 secs**

Your Attempt: **Correct**

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

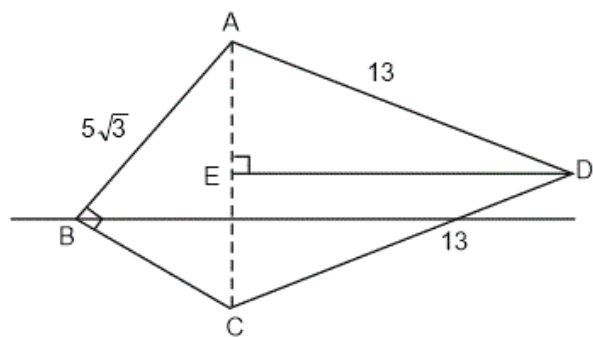
In $\square ABCD$, $AB = 5\sqrt{3}$, $BC = 5$, $AD = CD = 13$ and angle B is a right angle. Find the area of $\square ABCD$.

- ☒ $(60 + \frac{25}{2}\sqrt{3})$ sq. units ✓
- ☐ $(60 + 5\sqrt{3})$ sq. units
- ☐ $(120 + \frac{25}{2}\sqrt{3})$ sq. units
- ☐ $(12 + 25\sqrt{3})$ sq. units



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

Explanation:



ΔABC is right angle and $\angle B$ is right angle.

$$\therefore AC = \sqrt{AB^2 + BC^2} = \sqrt{(5\sqrt{3})^2 + (5)^2} = 10$$

$$\therefore A(\Delta ABC) = \frac{1}{2} \times 5 \times 5\sqrt{3} = \frac{25\sqrt{3}}{2}$$

E is midpoint of AC. Therefore, $AE = 5$

As $AE = 5$ and $AD = 13$, $ED = 12$

$$A(\Delta ADC) = \frac{1}{2} \times 10 \times 12 = 60$$

Correct Answer:

Time taken by you: **110 secs**

Avg Time taken by all students: **173 secs**

Your Attempt: **Correct**

% Students got it correct: **89 %**

Amar, Akbar and Anthony ran on a racetrack, with Amar finishing 160 m ahead of Akbar and 400 m ahead of Anthony. Akbar finished the race 300 m ahead of Anthony. The three of them ran the entire distance with their respective constant speeds. What was the length of the racetrack?

- ☐ 600 m
- ☒ 800 m ✓
- ☐ 1000 m
- ☐ 1200 m



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

Explanation:

Let the length of the racetrack be 'd' m.

When Amar finishes the race, he covers 'd' m, Akbar covers (d – 160) m and Anthony covers (d – 400) m.

After this moment, when Akbar finishes the race, i.e., when he covers 160 m, Anthony covers 400 – 300 = 100 m.

Since all of them ran the race at a constant speed,

$$\frac{d - 160}{d - 400} = \frac{160}{100}$$

$$\Rightarrow 10d - 1600 = 16d - 6400$$

$$\Rightarrow 6d = 4800 \Rightarrow d = 800 \text{ m.}$$

Hence, [2].

Correct Answer:

Time taken by you: **57 secs**

Avg Time taken by all students: **174 secs**

Your Attempt: **Correct**

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

If 'n' is a natural number, then what is the remainder when 11^{11n+4} is divided by 44?

- ☐ 11
- ☐ 33
- ☒ Either 11 or 33 ✓
- ☐ Neither 11 nor 33



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

Explanation:

$$\frac{11^{11n+4}}{44} = \frac{11^{11n+4}}{4 \times 11} = \frac{11^{11n+3}}{4} = \frac{(12-1)^{11n+3}}{4}$$

If 'n' is odd, then (11n + 3) is even and when 'n' is even, then (11n + 3) is odd.

If 'n' is odd, then the remainder when (12 - 1)¹¹ⁿ⁺³ is divided by 4 is 1.

Since, we cancelled 11 from the numerator and denominator, the actual remainder will be 11 × 1 = 11.

If 'n' is even, then the remainder when (12 - 1)¹¹ⁿ⁺³ is divided by 4 is 4 - 1 = 3.

Since, we cancelled 11 from the numerator and denominator, the actual remainder will be 11 × 3 = 33.

Hence, [3].

Correct Answer:

Time taken by you: 49 secs

Avg Time taken by all students: 84 secs

Your Attempt: Correct

% Students got it correct: 54 %

A certain sum K, invested at a fixed rate of Compound Interest(CI), becomes 9K in 20 years. Approximately how much percentage interest will it have earned in 5 years?

- ☐ 125%
- ☐ 73.2%
- ☒ 68.2% ❌
- ☐ None of the above



Oops, you got it wrong!

Explanation:

CI grows multiplicatively.

So, if the rate of interest for 5 years is R%, in 5 years the original amount K would become

$K\left(1 + \frac{R}{100}\right)$ while in 20 years, i.e. 4 periods of 5 years, it will become $K\left(1 + \frac{R}{100}\right)^4$.

So we can say $\left(1 + \frac{R}{100}\right)^4 = 9 \Rightarrow \left(1 + \frac{R}{100}\right) = \sqrt[4]{9} = \sqrt{3} \approx 1.732$. Thus $R \approx 73.2\%$.

Hence, [2].

Correct Answer:

Time taken by you: **86 secs**

Avg Time taken by all students: **90 secs**

Your Attempt: **Wrong**

% Students got it correct: **68 %**

In a room, there are 5 couples. Two men and two women are selected at random. What is the probability that exactly one couple is selected?

- ☐ 0.75
- ☐ 0.8
- ☒ 0.6 ✓
- ☐ 0.5



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

Explanation:

Total number of possible cases = ${}^5C_2 \times {}^5C_2 = 100$

Let us now find the total number of favourable ways.

A man can be selected in ${}^5C_1 = 5$ ways. His spouse can be only selected in 1 way.

The other man can be selected in ${}^4C_1 = 4$ ways.

The other woman can be selected in ${}^3C_1 = 3$ ways.

\therefore Total number of ways = $5 \times 4 \times 3 = 60$

\therefore Required probability = $\frac{60}{100} = 0.6$

Hence, [3].

Correct Answer:

Time taken by you: **50 secs**

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

Your Attempt: **Correct**

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

Car X consumes 1 litre of fuel travelling continuously for 2 hours at a speed of 50 kmph. At a 15 kmph speed, Car Y consumes 10 liters of fuel during 3 hours of travel. If Car Y travels 540 km at 15 kmph (consuming fuel at the same rate it usually does), then what is the distance that Car X will travel for the same quantity of fuel (i.e. used by car Y for the distance of 540 km) travelling at 50 kmph (at it's normal rate of consumption of fuel)?

- ☐ 60000 km
- ☐ 12000 km
- ☐ 2000 km
- ☐ 10000 km

Explanation:

Car Y consumes = $\frac{540 \times 10}{15 \times 3} = 120$ litres.

Car X travels $50 \times 2 = 100$ km with 1 litre.

\therefore With 120 litres, the car X travels $120 \times 100 = 12000$ km.

Hence, [2].

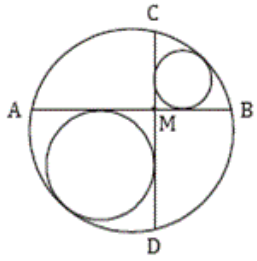
Correct Answer:

Time taken by you: **3 secs**

Avg Time taken by all students: **174 secs**

Your Attempt: **Skipped**

% Students got it correct: **94 %**



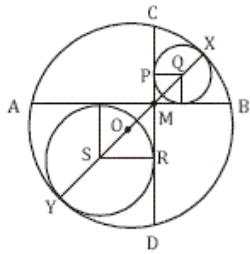
In the circle above, chords AB and CD of equal lengths intersect at right angles at point M. Two smaller circles of radius 2 cm and 4 cm are drawn touching the larger circle such that AB and CD are tangents to both the circles. Find the radius of the outer circle.

- ☐ 6 cm
- ☐ $3\sqrt{2}$ cm
- ☐ $3(2\sqrt{2} - 1)$ cm
- ☒ $3(\sqrt{2} + 1)$ cm ✓



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

Explanation:



$$PQ = QX = 2 \text{ cm} \Rightarrow MQ = 2\sqrt{2} \text{ cm.}$$

$$\text{Similarly, } MS = 4\sqrt{2} \text{ cm.}$$

$$\text{So, } XY = XQ + QM + MS + SY = 2 + 2\sqrt{2} + 4\sqrt{2} + 4 = 6 + 6\sqrt{2} \text{ cm.}$$

$$\text{So, } OX = \frac{1}{2} XY = 3(\sqrt{2} + 1) \text{ cm.}$$

Hence, [4].

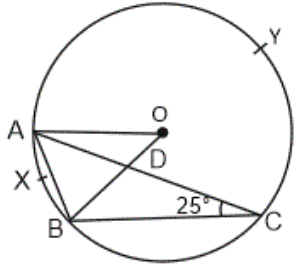
Correct Answer:

Time taken by you: **107 secs**

Avg Time taken by all students: **122 secs**

Your Attempt: **Correct**

% Students got it correct: **83 %**



In the adjoining figure, O is the centre of the circle. If $m\angle BCA = 25^\circ$, then what is the measure of $\angle ABO$?

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

65 °

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

Explanation:

$$m\angle BCA = 25^\circ \Rightarrow m(\text{arc } AXB) = 50^\circ$$

$$\Rightarrow m\angle AOB = 50^\circ \quad \dots \text{ (central angle)}$$

In $\triangle AOB$, $OA = OB$ and $m\angle AOB = 50^\circ$

$$\Rightarrow m\angle ABO = m\angle BAO = 65^\circ$$

Therefore, the required answer is 65.

Correct Answer:

Time taken by you: **55 secs**

Avg Time taken by all students: **70 secs**

Your Attempt: **Correct**

% Students got it correct: **65 %**



How many factors of $(2^{15} \times 3^{31})^2$ are less than $2^{15} \times 3^{31}$ and are not factors of $2^{15} \times 3^{31}$?

- ☐ 234
- ☐ 465
- ☐ 512
- ☐ 640

Explanation:

$$\text{Let } N = 2^{15} \times 3^{31}$$

The number of factors of $N^2 = 2^{30} \times 3^{62}$ is $(30 + 1)(62 + 1) = 1953$ one factor is $N = 2^{15} \times 3^{31}$.

Each factors of N^2 which is less than N has a corresponding factors which is more than N .

$$= \frac{1953 - 1}{2} = 976 \text{ factors are less than } N.$$

Of these $(15 + 1)(31 + 1) = 16 \times 32 = 512$ factors are also factors of N and 511 factors are less than N .

\Rightarrow The remaining $976 - 511 = 465$ factors of N^2 are less than N and not a factor of N .

Hence, [2].

Correct Answer:

Time taken by you: 13 secs

Avg Time taken by all students: 72 secs

Your Attempt: Skipped

% Students got it correct: 53 %

For a positive integer X , $(X)^{\frac{x}{2}} = (3)^{\frac{x}{2}} \times 2^3$; Y is another integer such that $\{(X)^{\frac{x}{2}} + (3)^{\frac{x}{2}}\} \times 2^3$ is an integral multiple of 3^Y . The largest possible value of Y is:

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

Explanation:

$$(x)^{\frac{x}{2}} = (3)^{\frac{x}{2}} \times 2^3$$

$$\therefore \left(\frac{x}{3}\right)^{\frac{x}{2}} = 2^3$$

$$\therefore x = 6$$

$$\text{Now, } \{(X)^{\frac{x}{2}} + (3)^{\frac{x}{2}}\} \times 2^3 = (6^3 + 3^3)2^3 = 2^3 \times 3^3 (2^3 + 1) = 2^3 \times 3^5$$

Thus, Y = 5

Therefore, the required answer is 5.

Correct Answer:

Time taken by you: 29 secs

Avg Time taken by all students: 63 secs

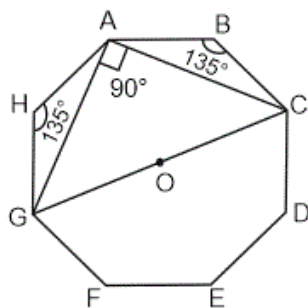
Your Attempt: Skipped

% Students got it correct: 36 %

In a regular octagon ABCDEFGH, find the ratio of the area of $\triangle GAC$ to that of the area of the polygon CDEFG.

- ☐ $1 : (\sqrt{2} + 1)$
- ☐ $(\sqrt{2} - 1) : (\sqrt{2} + 1)$
- ☐ $1 : \sqrt{2}$
- ☐ $1 : 2$

Explanation:



If we inscribe regular octagon ABCDEFGH in a circle, GC will be the diameter of the circle and

$m\angle GAC = 90^\circ$ (angle inscribed in a semicircle)

Also, $m\angle HOG = m\angle HOA = \dots = m\angle FOG = 45^\circ$

Now, $AO = GO = OC = r$

$$\therefore A(\triangle GAC) = \frac{1}{2} \times 2r \times r = r^2$$

$$\triangle GOF \cong \triangle FOE \cong \triangle EOD \cong \triangle DOC.$$

$$A(CDEFG) = 4 \times A(\triangle GOF)$$

In $\triangle GOF$, $GO = FO = r$

$$\therefore A(\triangle GOF) = \frac{1}{2} \times r \times r \sin 45 = \frac{r^2}{2\sqrt{2}}$$

Correct Answer:

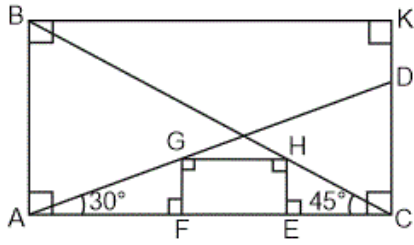
Time taken by you: **17 secs**

Avg Time taken by all students: **76 secs**

Your Attempt: **Skipped**

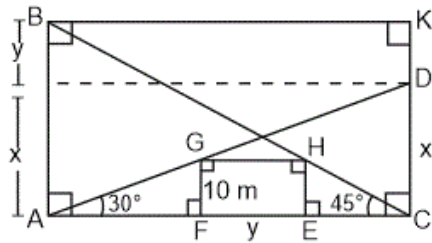
% Students got it correct: **40 %**

In the figure (not drawn to scale), $\ell(FE) = \ell(KD)$, $\ell(GF) = 10$ m, $m\angle DAC = 30^\circ$, $m\angle BCA = 45^\circ$. What is the length of AB?



- ☐ 20 m
- ☐ $20(\sqrt{3} + 3)$ m
- ☐ $10(\sqrt{3} + 1)$ m
- ☐ $10(\sqrt{3} + 3)$ m

Explanation:



$$m\angle BCA = 45^\circ \Rightarrow \ell(BA) = \ell(AC)$$

Similarly, $\ell(BK) = \ell(CK)$

i.e., $\square ABKC$ is a square.

In $\triangle AGF$, $m\angle GAF = 30^\circ$ and $\ell(GF) = 10$ m

$$\Rightarrow \ell(AF) = 10\sqrt{3} \text{ m}$$

Similarly, in $\triangle CEH$, $m\angle HCE = 45^\circ$

$$\therefore \ell(EC) = \ell(HE) = 10 \text{ m}$$

Now, in $\triangle ABC$, $\ell(AC) = \ell(AB)$

Correct Answer:

Time taken by you: **238 secs**

Avg Time taken by all students: **181 secs**

Your Attempt: **Skipped**

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

The value of $\frac{\log_3 144}{\log_{54} 3} - \frac{\log_3 48}{\log_{18} 3}$ is:

- ☒ $4 + \log_3 32$ ✓
- ☐ $\log_3 32$
- ☐ 4
- ☐ 0



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

Explanation:

$$\frac{\log_3 144}{\log_{54} 3} - \frac{\log_3 48}{\log_{18} 3}$$

$$= (\log_3 144)(\log_3 54) - (\log_3 48)(\log_3 18)$$

$$= [\log_3(3^2 \cdot 2^4)][\log_3(3^3 \cdot 2)] - [\log_3(3 \cdot 2^4)] [\log_3(3^2 \cdot 2)]$$

$$= (2 + 4\log_3 2)(3 + \log_3 2) - (1 + 4\log_3 2) (2 + \log_3 2)$$

$$= 5\log_3 2 + 4 = 4 + \log_3 32.$$

Hence, [1].

Correct Answer:

Time taken by you: **104 secs**

Avg Time taken by all students: **170 secs**

Your Attempt: **Correct**

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

Consider a three digit number in base 9. If the same number is expressed in base 5, it becomes a four digit number with digit 1 in the thousands place and the same digits in hundreds, tens and units place in the same order (i.e. if the three digit number expressed in base 9 is 'ABC', then the same number, when converted to base 5 becomes '1ABC'). How many such numbers exist?

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

Explanation:

We have, $(ABC)_9 = (1ABC)_5$

$$\therefore 81A + 9B + C = 125 + 25A + 5B + C$$

$$\therefore 56A + 4B = 125$$

Now, LHS is a multiple of 4 but RHS is not. Therefore, no natural number solution for this equation exists.

Therefore, the required answer is 0.

Correct Answer:

Time taken by you: **5 secs**

Avg Time taken by all students: **67 secs**

Your Attempt: **Skipped**

% Students got it correct: **43 %**

Two pipes A and B can fill a tank in 6 and 4 hours respectively. A tap attached to the tank can be used to take out water from the tank. The open tap was unnoticed when the pipes were opened simultaneously. This took 36 minutes extra to fill the tank. If the tank is full, how much time will the open tap take to empty it?

- ☐ 12 hours
- ☒ 8 hours ❌
- ☐ 6 hours
- ☐ 4 hours



Oops, you got it wrong!

Explanation:

Let pipe A and B fills 'a' litres and 'b' litres in a minute respectively.

$$\therefore 6 \times 60 \times a = 4 \times 60 \times b \Rightarrow a = \frac{2}{3} b$$

The time taken to fill the tank when the tap was not open be 't' minutes.

$$\therefore t(a + b) = 4 \times 60 \times b \Rightarrow t\left(\frac{2}{3} b + b\right) = 4 \times 60 \times b \Rightarrow t = 144 \text{ minutes}$$

Assume that the tap can empty the tank at 'c' litres per minute.

Therefore, water filled in the tank in one hour = (a + b - c) litres

The time taken to fill the tank when the tap was open = 144 + 36 = 180 minutes.

$$\therefore 144\left(\frac{2}{3} b + b\right) = 180\left(\frac{2}{3} b + b - c\right)$$

Solving this, we get 3c = b

Now as pipe B takes 4 hours to fill the tank, the tap will take 12 hours to empty the tank.

Hence, [1].

Correct Answer:

Time taken by you: **480 secs**

Avg Time taken by all students: **167 secs**

Your Attempt: **Wrong**

% Students got it correct: **79 %**

A fruit seller has 10 identical oranges, 15 identical apples and 5 identical guavas. He arranges these fruits in a line in such a way that no two apples are together. In how many ways can he do this?

- ☐ 48048
- ☐ 24024
- ☐ 4004
- ☐ 4368

Explanation:

Ten oranges and five guavas can be arranged in $\frac{15!}{10!5!}$ ways.

This will give 14 places in between 2 fruits (oranges and guavas) and 2 places on the sides of the first and the last fruit. Since no two apples are together we will put 15 apples in these 16 spaces in ${}^{16}C_{15}$ i.e., ${}^{16}C_1 = 16$ ways.

$$\therefore \text{Total number of ways} = \frac{15!}{10!5!} \times 16$$

$$= 14 \times 13 \times 12 \times 11 \times 2 = 48048.$$

Hence, [1].

Correct Answer:

Time taken by you: **28 secs**

Avg Time taken by all students: **95 secs**

Your Attempt: **Skipped**

% Students got it correct: **58 %**

If $\frac{2019^{2019} - 1019^{2019}}{2019^{2018} + 1019^{2018}} = k$ then what can be said about 'k'?

- ☐ $k \leq 0.1$
- ☐ $0.1 < k \leq 10$
- ☐ $10 < k \leq 1000$
- ☐ $1000 < k$

Explanation:

Looking at $k = \frac{2019^{2019} - 1019^{2019}}{2019^{2018} + 1019^{2018}}$ we can see that the numerator is of the form $(a^n - b^n)$ where

n is odd. Consequently it will be divisible by $(a - b)$.

Writing it accordingly: $\frac{2019^{2019} - 1019^{2019}}{2019^{2018} + 1019^{2018}}$

$$= \frac{(2019 - 1019)(2019^{2018} + 2019^{2017} \times 1019 + 2019^{2016} \times 1019^2 + \dots + 1019^{2018})}{2019^{2018} + 1019^{2018}}$$

Now we can see that in the numerator, the first bracket is equal to 1000, while second bracket is greater than the denominator (as it includes both the terms of the denominator and several other additional terms). Hence the resultant product will be greater than 1000.

Hence, [4].

Correct Answer:

Time taken by you: 7 secs

Avg Time taken by all students: 39 secs

Your Attempt: Skipped

% Students got it correct: 31 %

How many natural numbers less than 5000 leave a remainder of 2 when divided by 3, a remainder of 4 when divided by 5, a remainder of 6 when divided by 7 and a remainder of 8 when divided by 9?

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



Congratulations, you got it correct!

Explanation:

It is clear that the numbers are of the form $N \times \text{LCM}(3, 5, 7 \text{ and } 9) - 1$

$\text{LCM}(3, 5, 7 \text{ and } 9) = 315$.

Number of multiples of 315 less than 5000 is 15.

Correct Answer:

Time taken by you: **317 secs**

Avg Time taken by all students: **64 secs**

Your Attempt: **Correct**

% Students got it correct: **42 %**

For how many integer values of x is the product $(x^2 - 12x + 32)(x^2 - 20x + 96) < 0$?

- ☐ 5
- ☐ 6
- ☒ 7 ✖
- ☐ 8



Oops, you got it wrong!

Explanation:

$$(x^2 - 12x + 32)(x^2 - 20x + 96) < 0$$

$$\therefore (x - 8)(x - 4)(x - 8)(x - 12) < 0$$

$$\therefore (x - 4)(x - 12)(x - 8)^2 < 0$$

This expression is less 0 for all integer values of x such that $4 < x < 12$ except $x = 8$, i.e., for $x = 5, 6, 7, 9, 10, 11$. (Total 6 values)

Hence, [2].

Correct Answer:

Time taken by you: **61 secs**

Avg Time taken by all students: **125 secs**

Your Attempt: **Wrong**

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

