

A Mathematics teacher has a novel way of teaching Mathematics through games. She writes two different linear expressions on two chits, namely $(7 - x)$ and $(3 + x)$. Every day she asks two students to choose one chit each and asks a third one to assign an integral value to the variable 'x' ($x \leq 7$). The student, who gets the maximum value for the expression on his chit for this value of 'x', gets a number of chocolates equal to the value of the expression, while the other student does not get any chocolate. What is the minimum number of chocolates that the teacher would have to give away at the end of seven days, if the third student assigns a different value to 'x' every day?

- ☐ 47
- ☐ 35
- ☐ 56
- ☐ None of these

**Explanation:**

Let the number of chocolates given for integer 'x' be $f(x)$.

Then, $f(x) = \max(7 - x, 3 + x)$

The minimum value of $f(x)$ is attained at the point of intersection,

i.e., when $7 - x = 3 + x$

i.e., for $x = 2$

For $x = 2$, $f(x) = 5$

Since the student names a new integer every day, he cannot repeat the integer 2.

The next least value of $f(x)$ obtained for $x = 1$ or 3, viz., $f(x) = 6$

So the least number of chocolates given at the end of 3 days = $5 + 6 + 6$

Similarly, the least number of chocolates given at the end of 7 days
= $5 + 6 + 6 + 7 + 7 + 8 + 8 = 47$. (If the integers named are 2, 1, 3, 0, 4, -1, 5)

Hence, [1].

Correct Answer:

Time taken by you: **3 secs**

Avg Time taken by all students: **52 secs**

Your Attempt: **Skipped**

% Students got it correct: **21 %**

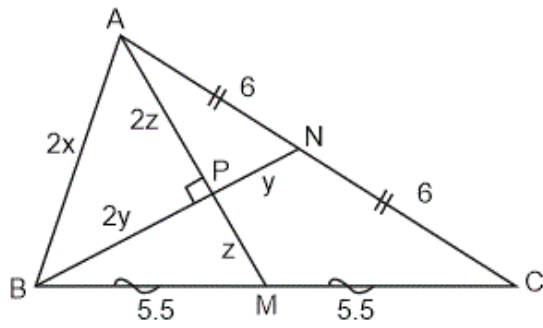
In $\triangle ABC$, $AC = 12$ cm and $BC = 11$ cm. The medians from A and B intersect at right angles. Find length of AB.

- ☐ 7 cm
- ☐ $\sqrt{23}$ cm
- ☐ 5.75 cm
- ☒ $\sqrt{53}$ cm ✓



Congratulations, you got it correct!

Explanation:



In $\triangle APN$,

Since, M and N are midpoints, $CN = NA = 6$ cm and $CM = MB = 5.5$ cm

\therefore In $\triangle APN$, $4z^2 + y^2 = (6)^2$ and in $\triangle BPM$, $z^2 + 4y^2 = (5.5)^2$

Combining the two equations we get

$$5(z^2 + y^2) = 30.25 + 36 = 66.25$$

$$\text{So, } z^2 + y^2 = 13.25$$

$$\therefore \text{In } \triangle APB, (2x)^2 = (2z)^2 + (2y)^2 = 4(z^2 + y^2) = 4 \times 13.25 = 53$$

$$\therefore AB = 2x = \sqrt{53}$$

Correct Answer:

Time taken by you: **427 secs**

Avg Time taken by all students: **85 secs**

Your Attempt: **Correct**

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

Tim and Max participated in a car race around a circular track such that the race lasts for four laps. Tim beats Max by one lap or 9 minutes. How much time would Tim take to complete one lap of the circular track?

- ☐ 9 minutes 20 seconds
- ☐ 7 minutes 35 seconds
- ☒ 6 minutes 45 seconds ✓
- ☐ 8 minutes 15 seconds



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

Explanation:

Tim beats Max by one lap or by 9 minutes. i.e., Max's speed = 9 minutes per lap

The race consists of 4 laps and Tim beats Max by one lap.

∴ Time taken by Tim to complete 4 laps = Time taken by Max to complete 3 laps = 27 minutes.

∴ Tim's speed = $\frac{27}{4}$ minutes per lap = 6 minutes 45 seconds per lap.

Hence, [3].

Correct Answer:

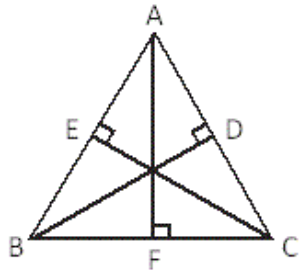
Time taken by you: **109 secs**

Avg Time taken by all students: **156 secs**

Your Attempt: **Correct**

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

The altitudes of the given triangle are $AF = 3$ units, $BD = 4$ units and $CE = 5$ units.



What is the ratio of $BC : AC : AB$?

- ☒ 20 : 15 : 12 ✓
- ☐ 20 : 12 : 15
- ☐ 15 : 12 : 20
- ☐ 12 : 20 : 15



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



Explanation:



Area of the triangle can be calculated as:

$$\frac{1}{2} \times 3 \times BC = \frac{1}{2} \times 4 \times AC = \frac{1}{2} \times 5 \times AB = K \text{ (assume)}$$

$$\therefore BC : AC : AB = \frac{K}{3} : \frac{K}{4} : \frac{K}{5} = 20 : 15 : 12$$

Hence, [1].

Correct Answer:



Time taken by you: **66 secs**

Avg Time taken by all students: **133 secs**

Your Attempt: **Correct**

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

Maharshi Bhrigu Academy is a B-school in Western India. Each second-year student is required to register for exactly 7 electives in term 4 of the curriculum. In the current academic year, it was coincidentally observed that each elective had exactly 32 registrations. If the number of second-year students was between 100 and 150, how many electives were offered by the Academy?

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



Oops, you got it wrong!

**Explanation:**

Let the number of students be 'S' and the number of electives be 'E'.

Each student has registered for 7 electives. \Rightarrow The total number of registrations = 7S

Each elective has 32 registrations. \Rightarrow The total number of registrations = 32E

$$\therefore 7S = 32E$$

Since 7 and 32 are co-prime, 'S' must be a multiple of 32 and 'E' must be a multiple of 7. We know that 'S' is between 100 and 150, and a multiple of 32.

$$\therefore S = 128$$

$$\text{As } 7S = 32E, E = 28$$

Therefore, the required answer is 28

Correct Answer:

Time taken by you: **82 secs**

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

Your Attempt: **Wrong**

% Students got it correct: **36 %**

ABCD is a parallelogram of sides 20 cm and 13 cm and area 240 cm^2 . Points M and N are on the longer sides AB and DC respectively such that $AM = CN$ and MN is perpendicular to the longer diagonal BD. Find the length of AM.

- ☐ 4.21 cm
- ☐ 4.42 cm
- ☒ 4.62 cm ✓
- ☐ 4.72 cm



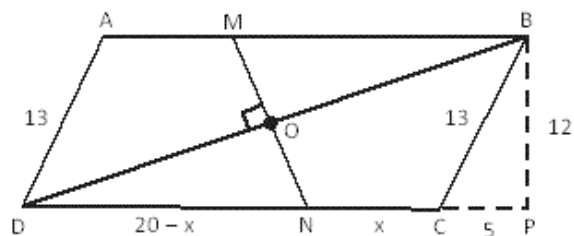
Congratulations, you got it correct!

Explanation:

Let 'h' be the distance between AB and CD.

$$\therefore A(\square ABCD) = 240 = \frac{1}{2} \times h \times (AB + DC)$$

$$240 = \frac{1}{2} \times h \times 40 \Rightarrow h = 12$$



In $\triangle BPC$, $BP = 12$, $BC = 13 \Rightarrow CP = 5$

$BM = DN$; $\angle BMO \cong \angle DNO$; $\angle MBO \cong \angle NDO \Rightarrow \triangle BMO \cong \triangle DNO$

$\therefore MN$ is the perpendicular bisector of BD , $\therefore BN = DN = (20 - x)$

So, in $\triangle BNP$, $12^2 + (x + 5)^2 = (20 - x)^2$

$$144 + x^2 + 10x + 25 = 400 - 40x + x^2$$

$$50x = 231$$

So, $x = 4.62$ cm

Correct Answer:

Time taken by you: 403 secs

Avg Time taken by all students: 74 secs

Your Attempt: Correct

% Students got it correct: 37 %

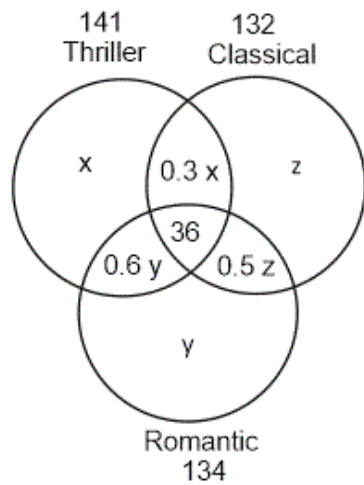


A survey conducted in a library shows that 141 persons like to read thriller novels, 132 persons like classical novels and 134 like romantic novels. The number of persons who like both thriller and classical novels but not romantic novels is 30% of the number of persons who like only thriller novels. Number of persons who like both classical and romantic novels but not thriller novels is 50% of the number of persons who like only classical novels. The number of persons who like both thriller and romantic novels but not classical novels is 60% of the number of persons who like only romantic novels. If 36 persons like to read all the three types of novels, then find the total number of persons on whom the survey was conducted in the library.

(All the persons surveyed like at least one of the three types of the novels)

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

Explanation:



Let x , y and z be the number of persons who like to read only thriller, only romantic and only classical novels, respectively.

$$\therefore x + 0.3x + 0.6y + 36 = 141$$

$$\text{i.e., } 13x + 6y = 1050 \quad \dots (i)$$

$$z + 0.3x + 0.5z + 36 = 132$$

$$\text{i.e., } 3x + 15z = 960 \quad \dots (ii)$$

Correct Answer:

Time taken by you: **4 secs**

Avg Time taken by all students: **123 secs**

Your Attempt: **Skipped**

% Students got it correct: **26 %**

The speed of a railway engine is 42 km per hour when no compartment is attached, and the reduction in speed of the railway engine is directly proportional to the square root of the number of compartments attached. If the speed of the train carried by this engine is 24 kmph when 9 compartments are attached, the maximum number of compartments that can be carried by the engine is:

- ☒ 49 ❌
- ☐ 48
- ☐ 46
- ☐ 47



Oops, you got it wrong!

Explanation:

Maximum speed of the train (i.e., when no compartment is attached to the engine)

$$= S_{\max} = 42 \text{ kmph}$$

Let speed of the train be S_N when N compartments are attached to the engine.

Reduction in speed $\propto \sqrt{\text{number of compartments}}$

$$\text{Reduction in speed} = k\sqrt{N}$$

$$\therefore k\sqrt{N} = S_{\max} - S_N = 42 - S_N$$

$$S_N = 24 \text{ when } N = 9$$

$$\therefore k\sqrt{9} = 42 - 24$$

Solving this, we get, $k = 6$.

$$\therefore 6\sqrt{N} = 42 - S_N$$

Reduction in speed has to be less than 42 kmph.

$$6\sqrt{N} < 42$$

$$\therefore 6\sqrt{N} < 42 \therefore N < 49$$

\therefore Maximum number of compartments that the engine can carry = 48

Hence, [2].

Correct Answer:

Time taken by you: **72 secs**

Avg Time taken by all students: **124 secs**

Your Attempt: **Wrong**

% Students got it correct: **70 %**

The median of 13 distinct positive integers is 16. Nine of these numbers are 9, 15, 6, 16, 13, 21, 12, 8, 20. The difference between the average of the smallest five and the largest five numbers is 10.4. Find the 2nd largest number.

- ☐ 21
- ☐ 22
- ☐ 23
- ☐ Cannot be determined



Explanation:



Median of 13 distinct positive integers is 16, it means 6 numbers are smaller than 16 and 6 numbers are greater than 16. 7 numbers out of given 9 numbers can be arranged in ascending order like follows:

6, 8, 9, 12, 13, 15, 16

$$\text{Average of smallest five numbers} = \frac{6 + 8 + 9 + 12 + 13}{5} = 9.6$$

$$\text{Thus average of largest five numbers} = 9.6 + 10.4 = 20$$

Sum of the largest five numbers = $20 \times 5 = 100$ and one of the number is definitely 21.

The 6th largest number can be minimum 17 so definitely five largest numbers must be 18, 19, 20, 21 and 22.

Hence, [1].

Correct Answer:



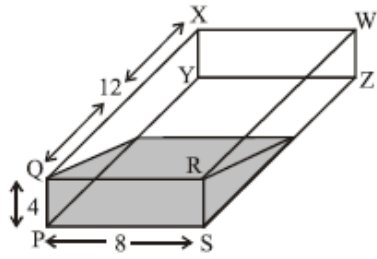
Time taken by you: 93 secs

Avg Time taken by all students: 119 secs

Your Attempt: Skipped

% Students got it correct: 43 %

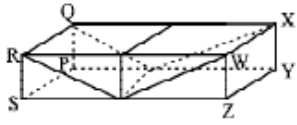
A water container is in the shape of a rectangular parallelopiped with length = 12 m, breadth = 8 m and height = 4 m. When the container is tilted along one of its edges along the base as shown in the figure, the water covers side PQRS of the container completely and half of side SZYP. Find the ratio of the volume of the container that is empty to its total volume.



- ☐ $\frac{4}{5}$
- ☐ $\frac{3}{4}$
- ☐ $\frac{19}{32}$
- ☐ $\frac{11}{16}$

Explanation:

The container can be seen as follows:



It is divided into four equal volumes out of which one is completely filled.

∴ Required ratio = $\frac{3}{4}$. Hence, [2].

Correct Answer:

Time taken by you: 3 secs

Avg Time taken by all students: 145 secs

Your Attempt: Skipped

% Students got it correct: 92 %

The length of the longest diagonal (i.e., body diagonal) of a box in the shape of rectangular parallelepiped with a square base is $\sqrt{153}$ cm. If the sum of all the edges of the box is 84 cm, the area of the base can be:

- ☐ 16 cm²
- ☐ 25 cm²
- ☐ 49 cm²
- ☒ 64 cm² ✓



Congratulations, you got it correct!

Explanation:

Let height be 'h' and each side of the base be 'a'.

Then largest diagonal = $\sqrt{h^2 + a^2 + a^2}$

$$\therefore h^2 + 2a^2 = 153 \quad \dots (i)$$

$$4a + 4a + 4h = 84$$

$$\therefore 2a + h = 21 \quad \dots (ii)$$

$$\therefore h = 21 - 2a$$

$$\therefore (21 - 2a)^2 + 2a^2 = 153$$

$$a^2 - 14a + 48 = 0$$

$$\therefore a = 8 \text{ or } 6$$

$$a^2 = 64 \text{ or } 36$$

$$\therefore \text{Area of base} = 64 \text{ cm}^2 \text{ or } 36 \text{ cm}^2.$$

Hence, [4].

Alternatively,

Consider values of 'a' from options and substitute in equations (i) and (ii) to find the correct answer.

Correct Answer:

Time taken by you: **192 secs**

Avg Time taken by all students: **166 secs**

Your Attempt: **Correct**

% Students got it correct: **70 %**

If $x < y$, then which of the following definitely holds true?

I. $\frac{2xy + (x^2 - y^2)}{x^2 + y^2} < 1$

II. $x^4 - y^4 > 0$

- ☐ Only I
- ☐ Only II
- ☐ Both I and II
- ☒ Neither I nor II ✓



Congratulations, you got it correct!



Explanation:



If $x < y$, then $x - y < 0$.

In addition if $|x| < |y|$, then $x + y > 0$, otherwise $x + y < 0$.

Hence, $x^2 - y^2 < 0$ if $|x| < |y|$

and $x^2 - y^2 > 0$ if $|x| > |y|$

Also, $x^2 + y^2 > 2xy$

Thus, $2xy + (x^2 - y^2) < x^2 + y^2$ i.e., [1] holds only if $x < y$ and $|x| < |y|$ and not otherwise.

And $(x^2 - y^2)(x^2 + y^2) = x^4 - y^4 > 0$

i.e., [2] holds only if $x < y$ and $|x| > |y|$ and not otherwise.

Hence, [4].

Correct Answer:



Time taken by you: **59 secs**

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

Your Attempt: **Correct**

% Students got it correct: **37 %**

Pipe A can fill a tank in 50 minutes while pipe B can fill it in 60 minutes. If both the pipes are opened together, after how many minutes should pipe A to be closed so that the tank be full in 36 minutes?

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

minutes



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

Explanation:



Let pipe A fills the tank at 'a' litres per minute while pipe B fills it at 'b' litres per minute.

Capacity of the tank = $50a = 60b \Rightarrow a = 1.2b$

Let the two pipes together fill the tank for 'X' minutes.

Therefore,

$$X(a + b) + (36 - X)b = 60b$$

$$\therefore X(1.2b + b) + (36 - X)b = 60b$$

$$\therefore 1.2Xb + 36b = 60b$$

$$\therefore X = 20 \text{ minutes}$$

Therefore, the required answer is 20.

Correct Answer:



Time taken by you: **73 secs**

Avg Time taken by all students: **124 secs**

Your Attempt: **Correct**

% Students got it correct: **74 %**

The number of non-negative integer solutions of the inequality $2x^2 - 9x - 56 < 0$ is same as that of which of the following inequalities?

- ☐ $2x^2 + 9x - 56 < 0$
- ☐ $3x - 2x^2 + 90 > 0$
- ☐ $2x^2 - 5x - 63 > 0$
- ☒ $9x - 2x^2 - 56 > 0$ ❌



Oops, you got it wrong!



Explanation:



$2x^2 - 9x - 56 < 0 \Rightarrow (2x + 7)(x - 8) < 0 \Rightarrow -3.5 < x < 8 \rightarrow$ This has 8 non-negative integer solutions (0, 1, 2, ... 7).

Option [1]: $2x^2 + 9x - 56 < 0 \Rightarrow (2x - 7)(x + 8) < 0 \Rightarrow -8 < x < 3.5$

\rightarrow This has 4 non-negative integer solutions (0, 1, 2, 3).

Option [2]: $3x - 2x^2 + 90 > 0 \Rightarrow 2x^2 - 3x - 90 < 0 \Rightarrow (x + 6)(2x - 15) < 0 \Rightarrow -6 < x < 7.5$

\rightarrow This gives 8 non-negatives integer solutions (0, 1, ... 7).

Option [3]: $2x^2 - 5x - 63 < 0 \Rightarrow (2x + 9)(x - 7) < 0 \Rightarrow -4.5 < x < 7$

\rightarrow This gives 7 non-negative integer solutions (0, 1, ... 6).

Option [4]: $9x - 2x^2 - 56 > 0 \Rightarrow 2x^2 - 9x + 56 < 0 \Rightarrow 2x^2 - 9x + 56$ this has no real roots so it is always positive ($a > 0$)

\rightarrow This gives 0 non-negative integer solutions.

Hence, [2].

Correct Answer:



Time taken by you: **508 secs**

Avg Time taken by all students: **81 secs**

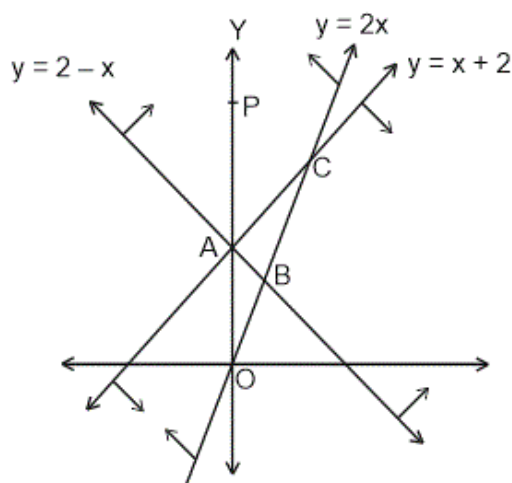
Your Attempt: **Wrong**

% Students got it correct: **33 %**

What is the area of the region on the XY-plane that satisfies the inequalities $y > 2x$, $y > 2 - x$ and $y < 2 + x$?

- ☐ 4 sq. units
- ☐ $4\sqrt{2}$ sq. units
- ☐ $\frac{4}{3}$ sq. units
- ☐ $\frac{4\sqrt{2}}{3}$ sq. units

Explanation:



Note that the lines $y = 2 - x$ and $y = 2 + x$ are perpendicular to each other and pass through $A = (0, 2)$. So the required region ($\triangle ABC$) is a right angled triangle.

Solving pairs of equations we get, $C = (2, 4)$ and $B = \left(\frac{2}{3}, \frac{4}{3}\right)$

Also $m\angle OAB = m\angle PAC = 45^\circ$

Correct Answer:

Time taken by you: **97 secs**

Avg Time taken by all students: **141 secs**

Your Attempt: **Skipped**

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

Bunty bought three books of Science, Mathematics and History and sold each of them at some profit. The cost price of the Mathematics book is 10% more than that of the Science book and the cost price of the History book is 20% less than that of the Mathematics book. Also, the profit earned by selling the Science book is 20% more than that earned by selling the History book and the profit earned by selling the Mathematics book is 10% less than that earned by selling the Science book. If Bunty made a profit of 20% by selling the Mathematics book, then the profit he made by selling the Science book is approximately:

- ☐ 45%
- ☐ 40%
- ☐ 35%
- ☐ 25%

Explanation:

Let the cost price of the Science book be Rs. $100x$, then the cost prices of the Mathematics and the History books are Rs. $110x$ and Rs. $88x$, respectively.

Similarly, if we take the profit earned by selling the History book to be Rs. $100y$, then the profits earned by selling the Science and the Mathematics books are Rs. $120y$ and Rs. $108y$, respectively.

$$\text{Now, } 108y = 0.2 \times 110x \Rightarrow \frac{y}{x} = \frac{11}{54}$$

\therefore The profit made by selling the Science book is $\frac{120y}{100x} \times 100$

$$= \frac{120y}{100x} \times \frac{11}{54} \times 100 \approx 25\%.$$

Hence, [4].

Note: The information about the History book is redundant.

Correct Answer:

Time taken by you: **1 secs**

Avg Time taken by all students: **183 secs**

Your Attempt: **Skipped**

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

For any value of a and b; $f(a + b) = f(a) g(b) + g(a) f(b)$ & $g(a + b) = g(a) g(b) + f(a) f(b)$

Find $g(3a)$.

- ☐ $[f(a)]^3 + f(a) [g(a)]^2 + g(a)[f(a)]^2$
- ☐ $[f(a)]^3 + 3f(a) [g(a)]^2$
- ☐ $[g(a)]^3 + [f(a)]^2 g(a) + [g(a)]^2 f(a)$
- ☐ $[g(a)]^3 + 3g(a)[f(a)]^2$

Explanation:

$$g(a + b + c) = g(a + b) g(c) + f(a + b) f(c) = g(a) g(b) g(c) + f(a) f(b) g(c) + f(a) g(b) f(c) + g(a) f(b) f(c)$$

If $a = b = c$ then,

$$g(3a) = [g(a)]^3 + 3[f(a)]^2 g(a)$$

Hence, [4].

Correct Answer:

Time taken by you: **5 secs**

Avg Time taken by all students: **140 secs**

Your Attempt: **Skipped**

% Students got it correct: **82 %**

After the annual budget, the cost price of a computer of a particular make increases by 15%. Due to this, the dealer increases the selling price by 10%. The dealer still earns an additional profit of Rs. 600 per computer. Calculate the original profit margin (in Rs.) if the cost price per computer before the budget was Rs. 25,000.

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



Congratulations, you got it correct!

Explanation:

Before Budget:

Cost Price of the computer = Rs. 25,000

Let Selling Price of the computer = Rs. x

\therefore Profit = Rs. $(x - 25000)$.

After Budget:

Cost Price of computer = 25000×1.15 = Rs. 28,750

Selling Price of computer = Rs. $1.1x$

\therefore Profit = Rs. $(1.1x - 28750)$

Since, the profit after the budget has increased by Rs. 600 per computer we get,

$$(1.1x - 28750) - (x - 25000) = 600$$

$$\therefore 0.1x = 4350 \quad \therefore x = 43500$$

$$\therefore \text{Original profit margin} = 43500 - 25000 = \text{Rs. } 18,500.$$

Therefore, the required answer is 18500.

Correct Answer:

Time taken by you: **104 secs**

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

Your Attempt: **Correct**

% Students got it correct: **32 %**

A certain sum has been invested with compound interest of $r\%$ per annum. It is known that the difference between the interest for the second year and that for the first year is Rs. 36. Similarly the difference between the interest for the third year and that for the second year is Rs. 38.16. What is the value of r ?

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:

Suppose the principal is 'P' and the rate of interest is 'r'%. We have the following:

| Year | Principal | Interest | Amount |
|------|--------------|---------------|--------------|
| 1 | P | Pr | $P(1 + r)$ |
| 2 | $P(1 + r)$ | $P(1 + r)r$ | $P(1 + r)^2$ |
| 3 | $P(1 + r)^2$ | $P(1 + r)^2r$ | $P(1 + r)^3$ |

Therefore we have

$$Pr(1 + r) - Pr = 36 \text{ or } Pr^2 = 36$$

$$Pr(1 + r)^2 - Pr(1 + r) = 38.16 \text{ or } Pr^2(1 + r) = 38.16$$

Therefore, we get $\frac{Pr^2(1 + r)}{Pr^2} = \frac{38.16}{36}$ or $1 + r = 1.06$

Therefore, rate of interest is 6%

Therefore, the required answer is 6.

Correct Answer:

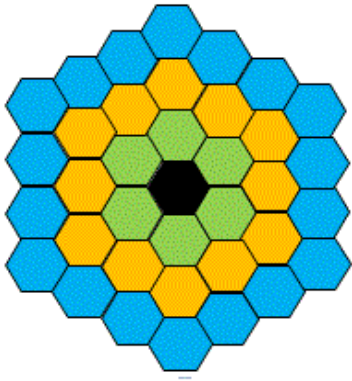
Time taken by you: **47 secs**

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

Your Attempt: **Correct**

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

In the opening ceremony of the Commonwealth Games, a dance show has been organised. Exactly 13 dancers take part from each participating country. All the dancers arrange themselves in a hexagonal array as follows: first one dancer stands in the centre. Then 6 more stand around him in a ring. Then another 12 arrange themselves around them in a second ring and so on (the first dancer (*in black*) and the first 3 rings (*in green, orange and blue*) are shown in the adjoining figure). If there are less than 100 dancers in total, how many countries are participating in the games?



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

Explanation:

Apart from the first (central) dancer, the number of dancers in each subsequent ring can be seen to be in AP (6, 12, 18 and so on). Also, the total number of dancers has to be a multiple of 13, as there are exactly 13 dancers from each country. Let us see the totals after adding each ring:

Initial: 1 dancer

1 ring: $1 + 6 = 7$ dancers

2 rings: $1 + 6 + 12 = 19$ dancers

3 rings: $1 + 6 + 12 + 18 = 37$ dancers

4 rings: $1 + 6 + 12 + 18 + 24 = 61$ dancers

5 rings: $1 + 6 + 12 + 18 + 24 + 30 = 91$ dancers

Adding more rings will take the total number of dancers beyond 100. Now out of the possible cases above, only 91 is divisible by 13. So there must be $\frac{91}{13} = 7$ countries involved.

Therefore, the required answer is 7.

Correct Answer:

Time taken by you: **3 secs**

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

Your Attempt: **Skipped**

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

A, B and C are positive integers such that A : B is 3 : 4, and B : C is 7 : 9. Which of the following is a possible value of $(8A + 3B + 7C)$?

- ☒ 1512 ✓
- ☐ 1530
- ☐ 1548
- ☐ 1566



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

Explanation:

Given: $\frac{A}{B} = \frac{3}{4}$ or $A = \frac{3}{4}B$

Also, $\frac{B}{C} = \frac{7}{9}$ or $C = \frac{9}{7}B$

$\therefore 8A + 3B + 7C = 8 \times \frac{3}{4}B + 3B + 7 \times \frac{9}{7}B = 18B$

Since $A = \frac{3}{4}B$ and $C = \frac{9}{7}B$, B must be a multiple of 28.

Therefore, $8A + 3B + 7C$ must be a multiple of $28 \times 18 = 504$.

Only option [1] is a multiple of 504.

Hence, [1].

Correct Answer:

Time taken by you: **62 secs**

Avg Time taken by all students: **135 secs**

Your Attempt: **Correct**

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

If 20 litres of water is added to a milk-water solution, the ratio of milk to water becomes 1 : 2. On the other hand, had 20 litres of pure milk been added to the solution, the ratio of milk to water would have become 2 : 1. Calculate the volume of the original solution.

- ☐ 45 litres
- ☒ 40 litres ✓
- ☐ 60 litres
- ☐ 75 litres



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

Explanation:

Let the volume of the solution become $3V$ when 20 litres of water is added to it.

Milk = V and water = $2V$

Milk and water in the original solution will be V and $2V - 20$.

Given that $\frac{V + 20}{2V - 20} = \frac{2}{1}$

$\therefore V + 20 = 4V - 40 \Rightarrow 3V = 60$ litres

Volume of original Solution = $V + 2V - 20 = 60$ litres $- 20$ litres = 40 litres

Hence, [2].

Correct Answer:

Time taken by you: **110 secs**

Avg Time taken by all students: **117 secs**

Your Attempt: **Correct**

% Students got it correct: **93 %**

Tab 'L' and tab 'M', if opened together, can fill an empty bucket in 12 minutes. If tab 'L' takes 10 minutes less than tab 'M' to fill the empty bucket independently, how much time will tab 'M' take to fill the empty bucket?

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



Congratulations, you got it correct!

Explanation:

Let tab 'L' takes 't' minutes to fill the bucket at rate 'a' litres per minute.

Therefore, tab 'M' takes (t + 10) minutes to fill the bucket at rate 'b' litres per minute.

Capacity of the bucket = ta = b(t + 10)

By the given condition,

$$12(a + b) = b(t + 10)$$

$$12t(a + b) = bt(t + 10)$$

$$\therefore 12ta + 12tb = bt(t + 10)$$

$$\therefore 12b(t + 10) + 12tb = bt(t + 10)$$

$$\therefore 12(t + 10) + 12t = t(t + 10)$$

$$\therefore t^2 - 14t - 120 = 0$$

$$\therefore (t - 20)(t + 6) = 0$$

$$\therefore t = 20$$

Tab M takes (t + 10) minutes i.e., (20 + 10 =) 30 minutes.

Therefore, the required answer is 30.

Correct Answer:

Time taken by you: **195 secs**

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

Your Attempt: **Correct**

% Students got it correct: **72 %**

Zakir can paint a wall in 3 days if he works alone. If Anwar and Zakir work together, they can paint the same wall in 33.33% of the time that Anwar alone would have taken to paint the same wall. How many days will Anwar take to paint two such walls if he works alone?

- ☒ 12 ✓
- ☐ 10
- ☐ 9
- ☐ 6



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

Explanation:

Let Anwar paints the wall in 'm' days.

In one day, Zakir paints $\frac{1}{3}$ of the wall and Anwar paints $\frac{1}{m}$ of the wall.

Work done by Zakir and Anwar together in one day: $\frac{3}{m} = \frac{1}{3} + \frac{1}{m}$

Solving this, we get m = 6

Anwar paints one wall in 6 days, thus, he paints two walls in 12 days.

Hence, [1].

Correct Answer:

Time taken by you: **63 secs**

Avg Time taken by all students: **78 secs**

Your Attempt: **Correct**

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

What is the minimum value of the expression $(4x^4 + 2x^2 - 20x + 7)$?

- ☒ -7 ✓
- ☐ -6
- ☐ -8
- ☐ -9



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



Explanation:



$$4x^4 + 2x^2 - 20x + 7 = 4(x^4 - 2x^2 + 1) + 10(x^2 - 2x + 1) - 7 = 4(x^2 - 1)^2 + 10(x - 1)^2 - 7$$

The value of the expression will be minimum when $x = 1$

Therefore, the minimum value of the expression is -7 .

Hence, [1].

Correct Answer:



Time taken by you: **94 secs**

Avg Time taken by all students: **108 secs**

Your Attempt: **Correct**

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

S is a set of four-digit numbers formed using the digits 5, 6, 7 and 8 using each digit only once. M is a subset of S that contains numbers whose tens place digit is a prime number. What is the sum of all the numbers in M?

- ☐ 42258
- ☐ 173316
- ☐ 46542
- ☒ 88800 ✓



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

Explanation:

Numbers in M are of the form:

__ 7 _ or __ 5 _.

Consider numbers of the form __ 7 _.

There are 3! such numbers. 5, 6 and 8 each will occupy the thousands, hundreds and units place twice. Thus, the sum of numbers of this form is $2(5000 + 500 + 5 + 6000 + 600 + 6 + 8000 + 800 + 8) + 6(70) = 42258$

Similarly,

The sum of numbers of the form __ 5 _ is

$2(7000 + 700 + 7 + 6000 + 600 + 6 + 8000 + 800 + 8) + 6(50) = 46542$

\therefore The sum of all the numbers = $42258 + 46542 = 88800$

Hence, [4].

Correct Answer:

Time taken by you: **79 secs**

Avg Time taken by all students: **156 secs**

Your Attempt: **Correct**

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

In all total 'N' pipes have been attached to a tank. Out of these, some are inlet pipes while the remaining are outlet pipes. Each inlet pipe can completely fill a tank in 25 hours while each outlet pipe can completely empty the tank in 35 hours. If all the 'N' pipes are operating together, then the tank, which is initially empty is completely filled in 5 hours. Which of the following is not a possible value of 'N'?

- ☐ 53
- ☐ 63
- ☐ 89
- ☐ 113

Explanation:

Given: One filling pipe can fill a tank in 25 hours and one emptying pipe can empty the same tank in 35 hours. Thus, 7 emptying pipes are required to empty the filling done by 5 filling pipes.

To fill the tank in 5 hours, $\frac{25}{5} = 5$ filling pipes are required.

So, $N = 5 + 12a$, where 'a' is a natural number.

Option 2. 63 cannot be written as $5 + 12a$

Hence, [2].

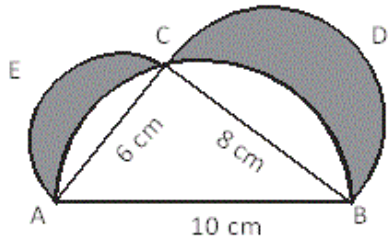
Correct Answer:

Time taken by you: **64 secs**

Avg Time taken by all students: **161 secs**

Your Attempt: **Skipped**

% Students got it correct: **77 %**



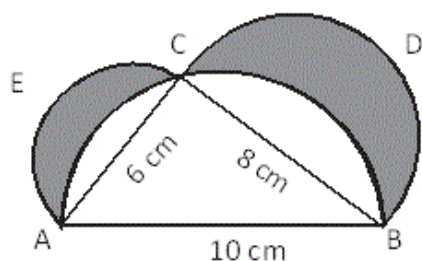
Find the area of the shaded region, given that AEC is the semicircle on AC, CBD is the semicircle on CB, and ACB is the semicircle on AB.

- ☒ 24 cm^2 ✓
- ☐ 48 cm^2
- ☐ $(100\pi - 24) \text{ cm}^2$
- ☐ $(12.5\pi - 24) \text{ cm}^2$



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

Explanation:



$$\text{Area of semicircle on AC} = \frac{\pi}{2} \times 3^2 = \frac{9\pi}{2}$$

$$\text{Area of semicircle on BC} = \frac{\pi}{2} \times 4^2 = \frac{16\pi}{2}$$

$$\text{Area of semicircle on AB} = \frac{\pi}{2} \times 5^2 = \frac{25\pi}{2}$$

$$A(\triangle ACB) = \frac{1}{2} \times 6 \times 8 = 24 \text{ (as } \triangle ACB \text{ is right-angled at C)}$$

∴ The area of the shaded region = $[A(\triangle ACB) + \text{Area of semicircle on AC} + \text{Area of semicircle on BC}] - \text{Area of semicircle on AB}$

$$= \left[24 + \frac{9\pi}{2} + \frac{16\pi}{2} \right] - \frac{25\pi}{2} = 24 \text{ cm}^2.$$

Correct Answer:

Time taken by you: 79 secs

Avg Time taken by all students: 136 secs

Your Attempt: Correct

% Students got it correct: 84 %

$77^3 + 13^3 - 90^3$ is divisible by

- ☐ Both 13 and 17
- ☐ Both 11 and 17
- ☒ Both 11 and 13 ✓
- ☐ Both 3 and 19



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

Explanation:

$$\begin{aligned}
 &77^3 + 13^3 - (77 + 13)^3 \\
 &= 77^3 + 13^3 - 77^3 - 3 \times 77^2 \times 13 - 3 \times 77 \times 13^2 - 13^3 \\
 &= -3 \times 77^2 \times 13 - 3 \times 77 \times 13^2 \\
 &= 3 \times 77 \times 13(-77 - 13) \\
 &= -3 \times 77 \times 13 \times 90 \\
 &\text{Hence, [3].}
 \end{aligned}$$

Correct Answer:

Time taken by you: **37 secs**

Avg Time taken by all students: **131 secs**

Your Attempt: **Correct**

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

Consider the sets $T_n = \{n, n + 1, n + 2, n + 3\}$, where $n = 1, 2, \dots, 97$. How many of these sets will not contain 15 or any integral multiple thereof (i.e., any one of the numbers 15, 30, 45, ...)?

- ☒ 73 ✓
- ☐ 91
- ☐ 88
- ☐ 82



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

Explanation:

For $n = 15k$, $15k - 1$, $15k - 2$ and $15k - 3$; T_n contains 15 or any integral multiple of 15.

As $n \leq 97$, $k = 1, 2, \dots, 6$.

$\therefore 6 \times 4 = 24$ sets will contain 15 or integral multiple of 15.

$\therefore 97 - 24 = 73$ sets will not contain 15 or integral multiple of 15. Hence, [1].

Correct Answer:

Time taken by you: **110 secs**

Avg Time taken by all students: **134 secs**

Your Attempt: **Correct**

% Students got it correct: **84 %**

P persons are sitting at the corners of a p sided table. They are asked to pass around a bag of coins. There are two rules to be followed.

- (i) A person cannot pass the bag to his neighbour.
- (ii) There should be exactly one pass between all possible pairs of persons.

Each time the bag is handed over, a bell rings. If after all the possible transactions are over, the bell has rung 90 times, find the number of people.

- ☐ 15
- ☐ 12
- ☐ 90
- ☐ 60

Explanation:

The rules imply that a person, say P_1 , can pass the bag to any other person, say P_2 , sitting diagonally opposite to him and that P_2 cannot pass it back to P_1 . Thus, the number of transactions is equal to the number of diagonals of the p-sides table.

$$\therefore {}^pC_2 - P = 90$$

$$\therefore \frac{P(P-1)}{2} - P = 90$$

$$\therefore P^2 - P - 2P = 180$$

$$\therefore P^2 - 3P - 180 = 0$$

$$\therefore (P-15)(P+12) = 0$$

$$\therefore P = 15$$

$$\therefore \text{Number of people} = 15$$

Hence, [1].

Correct Answer:

Time taken by you: **28 secs**

Avg Time taken by all students: **93 secs**

Your Attempt: **Skipped**

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

Harry and Ron start a business of burger stall together. Harry invests Rs. 50,000 and Ron invests Rs. 20,000. Ron manages the stall singlehandedly and for this he is entitled to get 30% of the total profit earned. The remaining profit is to be divided in the ratio of the investment made by them. At the end of the year, Harry gets Rs. 21,293 out of the total profit. What is the total amount earned by Ron from the business at the end of the year?

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



Congratulations, you got it correct!

Explanation:

Let the profit earned at the end of the year be $100a$.

Ron's salary = $30a$

Harry's share in profit = $\frac{70a}{7} \times 5 = 50a = 21,293$

Amount earned by Ron from the business at the end of the year = $100a - 50a = 50a = \text{Rs. } 21,293$

Therefore, the required answer is 21293.

Correct Answer:

Time taken by you: **183 secs**

Avg Time taken by all students: **134 secs**

Your Attempt: **Correct**

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

'Fast Forward Express' is a daily train that runs between Guwahati and Mumbai. The trains travelling in either direction leave the starting station at 7:00 AM everyday and reach the destination after travelling for 73 hours. Rahul boarded 'Fast Forward Express' that left Mumbai at 7:00 AM on Monday. What time will he see the 'Fast Forward Express' travelling in the opposite direction for the first time?

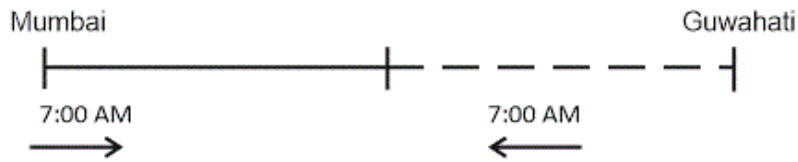
- ☐ 7:00 AM same day
- ☐ 8:00 AM same day
- ☒ 7:30 AM same day ✓
- ☐ 8:00 AM next day



Congratulations, you got it correct!

Explanation:

Rahul leaves Mumbai at 7:00 AM on Monday. The first train he would meet is the one scheduled to arrive at Mumbai at 8:00 AM the same day.



Since both trains travel at the same speed, they would meet at 7:30 AM on Monday.
Hence, [3].

Correct Answer:

Time taken by you: 115 secs

Avg Time taken by all students: 90 secs

Your Attempt: Correct

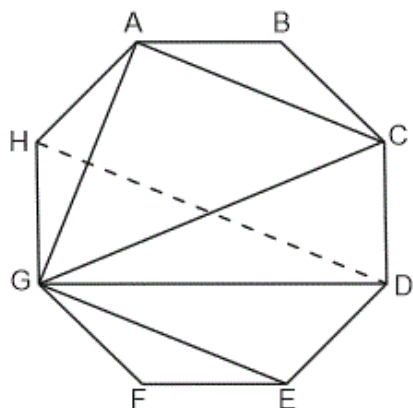
% Students got it correct: 53 %

ABCDEFGH is a regular octagon. If the area of $\triangle ACG$ is 72 square units, find the area, in square units, of $\triangle DEG$.

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

Explanation:

Let us draw HD. Therefore, $AC \parallel HD \parallel GE$ and AC and GE are equidistant from HD.



Let distance between HD and GE = distance between AC and HD = x units

Therefore, the distance between AC and GE = $x + x = 2x$ units

Therefore, the height of $\triangle DEG$ = distance of D from GE = x units

Also, the height of $\triangle ACG$ = distance of G from AC = $2x$ units

Note that $\ell(AC) = \ell(GE)$.

4

Correct Answer:

Time taken by you: 0 secs

Avg Time taken by all students: 71 secs

Your Attempt: Skipped

% Students got it correct: 41 %

