SSC CGL Tier-2 25-October-2015 Maths

Instructions

For the following questions answer them individually

Question 1

$\frac{6^2+7^2+8^2+9^2+10^2}{\sqrt{7}+4\sqrt{3}-\sqrt{4}+2\sqrt{3}}$ **is equal to**

A 305

B 355

C 366

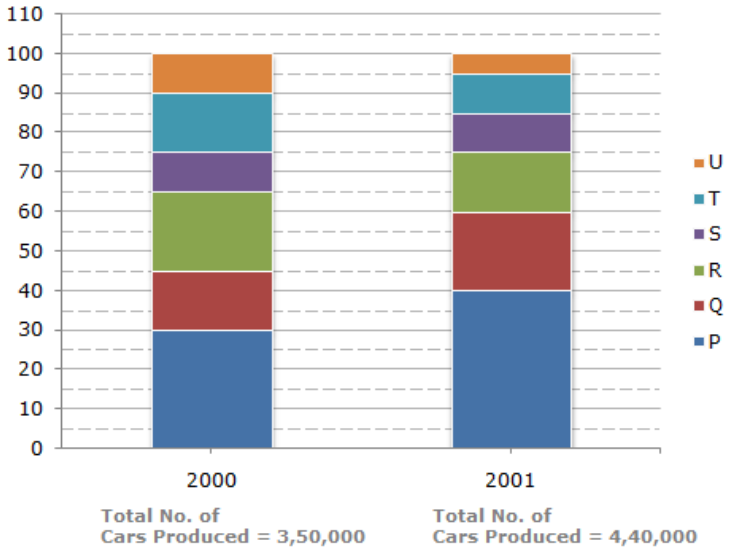
D 330

Answer: D

Instructions

The bar graph given below shows the percentage distribution of the total production of a car manufacturing company into various models over two years.

Percentage of Six different types of Cars manufactured by a Company over Two Years



Question 2

The total producton of Type P vehicles in the years 2008 and 2011 is what percent of total production of Type Q vehicles in 2010 and 2014?

A 80

B 68.25

C 81.25

D 75

Answer: A

Question 3

The total production of Type P vehicles in the years 2008 and 2011 is what percent of total production of Type Q vehicles in 2010 and 2014?

A 75

B 60

C 45.5

D 54.5

Answer: D

Question 4

Approximate percentage decrease in production of Type Q vehicles from 2010 to 2011 is

A 16.7

B 14.3

C 10.1

D 12.5

Answer: A

Question 5

The ratio of total production of Type P vehicles to total production of Type Q vehicles over the years is

A 8:5

B 48:41

C 41:48

D 5:8

Answer: B

Question 6

In how many of the given years, was the production of Type P vehicles of the company more than the average production of this type vehicles in the given years?

A 5

B 4

C 3

D 2

Answer: C

Explanation:

average of Type p production = $\frac{totalproduction}{noofyears}$ = $\frac{100+125+200+225+275+275}{6}$ = $\frac{1200}{6}$ = 200

years when production of type p is greater than average

2012 = 225

2013 = 275

2014 = 275

hence 3 years

Instructions
For the following questions answer them individually

Question 7

If $3(a^2 + b^2 + c^2) = (a + b + c)^2$, then the relation between a,b and c is

A a ≠ b = c

B a = b = c

C a ≠ b ≠ c

D a = b ≠ c

Answer: B

Explanation:
solution

$3(a^2 + b^2 + c^2) = (a + b + c)^2$

we know

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$3(a^2 + b^2 + c^2) = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$2(a^2 + b^2 + c^2) = 2(ab + bc + ca)$

$(a^2 + b^2 + c^2) = (ab + bc + ca)$

as we can observe the symmetry

$a = b = c$

Question 8

A car covers four successive 7 km distances at speeds of 10 km/hour, 20 km/hour, 60 km/hour respectively. Its average speed over this distance is

A 40 km/hour

B 20 km/hour

C 60 km/hour

D 30 km/hour

Answer: B

Question 9

A cylinder with base radius 8 cm and height 2 cm is melted to form a cone of height 6 cm, The radius of the cone will be

A 6 cm

B 5 cm

C 4 cm

D 8 cm

Answer: D

Explanation:
solution

base radius r = 8

height of cylinder = 2

height of cone = 6

volume of the cylinder and cone remains the same

volume of cylinder = volume of cone

$\pi r^2 h = \frac{1}{3}\pi r^2 h$ {substituting the values}

$\pi 8^2 \times 2 = \frac{1}{3}\pi r^2 \times 6$

$8^2 \times 2 = \frac{1}{3} r^2 \times 6$

$8^2 = r^2$

radius of cone = 8cm

Question 10

A dealer fixed the price of an article 40% above the cost of production. While selling it he allows a discount of 20% and makes a profit of 48. The cost of production (in %) of the article is

A 420

B 360

C 400

D 320

Answer: C

Question 11

Average of n numbers is a. Thefirst number is increased by 2, second one is increased by 4, the third one is increased by 8 and so on. The average of the new number is

A $a + 2\frac{2^n - 1}{n}$

B $a + \frac{2^n - 1}{n}$

C $a + 2\frac{2^n + 1}{n}$

D $a + 2\frac{2^{n+1} - 1}{n}$

Answer: A

Question 12

If $x = a\ sin\theta - b\ cos\theta, y = acos\theta\ + bsin\theta$ **, then which of the following is true?**

A $x^2\ + y^2\ = a^2\ + b^2$

B $\frac{x^2}{y^2} + \frac{a^2}{b^2} = 1$

C $x^2 + y^2 = a^2 - b^2$

D $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

Answer: A

Explanation:
solution

$x = a\ sin\theta - b\ cos\theta$ {squaring x}

$y = acos\theta + bsin\theta$ {squaring y}

$x^2 = a^2sin^2\theta + b^2\ cos^2\theta - 2absin\theta\ cos\theta$

$y^2 = a^2sin^2\theta + b^2\ cos^2\theta + 2absin\theta\ cos\theta$

adding both

we get

$x^2 + y^2$ = $a^2sin^2\theta + b^2\ cos^2\theta - 2absin\theta\ cos\theta + a^2sin^2\theta + b^2\ cos^2\theta + 2absin\theta\ cos\theta$

$x^2 + y^2 = a^2sin^2\theta + b^2\ cos^2\theta + a^2sin^2\theta + b^2\ cos^2\theta \quad \{\because\ cos^2\theta + sin^2\ \theta = 1\}$

$x^2 + y^2 = a^2(sin^2\theta + sin^2\theta) + b^2\ (cos^2\theta + cos^2\theta)$

$x^2 + y^2 = a^2 + b^2$

Question 13

Let $x = \frac{\sqrt{13}+\sqrt{11}}{\sqrt{13}-\sqrt{11}}\ and\ y = \frac{1}{x}$**, then the value of** $3x^2 - 5xy + 3y^2\ is$

A 1717

B 1771

C 1171

D 1177

Answer: A

Explanation:
$x = \frac{\sqrt{13}+\sqrt{11}}{\sqrt{13}-\sqrt{11}}\ and\ y = \frac{1}{x}$

So, clearly from the above xy = 1

$x + y = \frac{\sqrt{13}+\sqrt{11}}{\sqrt{13}-\sqrt{11}} + \frac{\sqrt{13}-\sqrt{11}}{\sqrt{13}+\sqrt{11}}$

$= \frac{(\sqrt{13}+\sqrt{11})^2+(\sqrt{13}-\sqrt{11})^2}{13-11}$

$= \frac{13+11+2\sqrt{143}+13+11-2\sqrt{143}}{2}$

$= \frac{48}{2}$

= 24

So, x+y = 24

$3x^2 - 5xy + 3y^2 = 3(x+y)^2 - 11xy$

$=3(24)^2 - 11(1)$

= $3 \times 576 - 11$

= 1728 - 11

= 1717

Question 14

If 64 buckets of water are removed from a cubical shaped water tank completely filled with water, 1/3 of the tank remains filled with water. The length of each side of the tank is 1.2 m. Assuming that all buckets are of the same measures then the volume (in litres) of water contained by each bucketis

A 16

B 18

C 12

D 15

Answer: B

Explanation:
It is given that ,

$\frac{2}{3}$ of tank is emptied using 64 buckets ,

$\frac{2}{3}V = 64buckets$

V = 96 buckets

Volume of each bucket

= $\frac{1.2 \times 1.2 \times 1.2 \times 1000}{96} = 18litres$

So , the answer would be option b)18

Question 15

In trapezium ABCD,AB|| CD and AB = 2CD.Its diagonals intersect at O. If the area of $\triangle AOB = 84\ cm^2$, then the area of $\triangle$COD is equalto
latek

A $42cm^2$

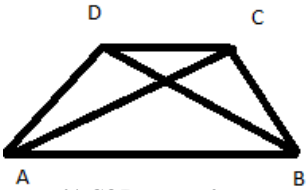
B $21cm^2$

C $72cm^2$

D $26cm^2$

Answer: B

Explanation:



$\frac{area of \triangle COD}{area of \triangle AOB} = \frac{CD^2}{AB^2}$

$\frac{area of \triangle COD}{84} = (\frac{1}{2})^2 = \frac{1}{4}$

$area of \triangle COD = 21 cm^2$

So , the answer would be option b)$21 cm^2$

Question 16

Water tax is increased by 20% but its consumption is decreased by 20%. Then the increase or decrease in the expenditure of the money is

A 5% decrease

B 4% decrease

C No change

D 4%increase

Answer: B

Explanation:
Expenditure = Price $\times$ Consumption

e = pc

When price is increased by 20% but its consumption is decreased by 20%,

p'= 1.2 p

c'= .8c

e' = .96pc

Decrease % in expenditure = $\frac{.04pc}{pc} \times 100$ = 4 %

So, the answer would be option b)4% decrease

Question 17

A number when divided by 361 gives a remainder 47. If the same number is divided by 19, the remainder obtained is

A 1

B 3

C 9

D 8

Answer: C

Explanation:
Let the number be N.

N = $361 \times q + 47$, where q is the quotient.

N = $19^2 \times q + 47$

First part is divisible by 19 . Divide 47 by 19 , you will get remainder as 9.

So, the answer would be option d)9.

Question 18

If $\begin{pmatrix} p^{-1} & q^2 \\ p^3 & q^{-2} \end{pmatrix} + \begin{pmatrix} p^5 & q^{-3} \\ p^{-2} & q^3 \end{pmatrix}^{\frac{1}{3}} = p^a\, q^b$**, then the value of a + b, where p and q are different positive primes, is**

A 1

B 2

C 0

D -1

Answer: E

Explanation:

The second term will have p^7 raised to power $\frac{1}{3}$.

Question 19

In triangle ABC, DE || BC where D is a point on AB and is a point on AC. DE divides the area of A ABC into two equal parts. Then DB : AB is equal to

A $(\sqrt{2}+1):\sqrt{2}$

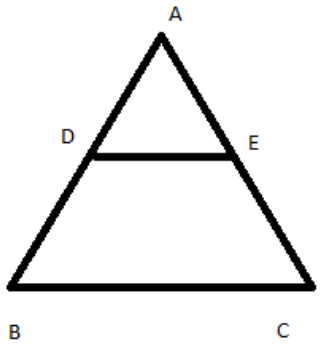
B $\sqrt{2}:(\sqrt{2}+1)$

C $\sqrt{2}:(\sqrt{2}-1)$

D $(\sqrt{2}-1):\sqrt{2}$

Answer: D

Explanation:



DE || BC

DE divides the area of $\triangle ABC$ into two equal parts => D and E are midpoints of AB and AC.

$\triangle ADE and \triangle ABC are similar.$

$\frac{area of \triangle ABC}{area of \triangle ADE} = \frac{AB^2}{AD^2}$

=> $\frac{AB^2}{AD^2} = 2$

=>AB = $\sqrt{2}AD$

=>AB = $\sqrt{2}(AB - BD)$

=> $(\sqrt{2}-1)AB = \sqrt{2}BD$

=> $\frac{BD}{AB} = \frac{(\sqrt{2}-1)}{\sqrt{2}}$

So, the answer would be option d)$(\sqrt{2}-1):\sqrt{2}$

Question 20

A and B have their monthly incomes in the ratio 8:S, While their monthly expenditures are in the ratio S : 3. If they have saved = 12,000 and & 10,000 monthly respectively, then the difference in their monthly income is

A Rs.42,000

B Rs.44,000

C Rs.46,000

D Rs.52,000

Answer: A

Explanation:
Given that A and B have their monthly incomes in the ratio & | 5S

Not sure what & represents. Please provide correct data.

Question 21

ABCDis a cyclic quadrilateral, AB and DC when produced meet at P, if PA = 8 cm, PB = 6 cm, PC = 4 cm, then the length (in cm) of PDis

A 6

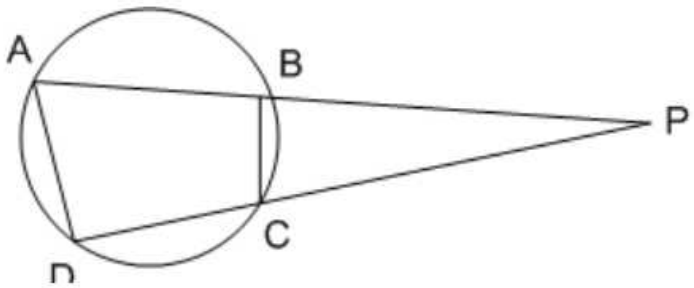
B 12

C 8

D 10

Answer: B

Explanation:



Given that,PA = 8 cm, PB = 6 cm, PC = 4 cm

As per tangent & secant rule,

$PA \times PB = PD \times PC$

=>$PD = \frac{8 \times 6}{4} = 12cm$

Question 22

In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3, After few days, 30 girls joined the school but few boys left; as a result the ratio of the boys and girls became 7 : 6. The number of boys who left the school is

A 84

B 76

C 86

D 74

Answer: B

Explanation:
Given that, In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3.

If we consider number of boys as x and number of girls as y

=> x:y= 4:3

From the ratio and total number of students, we can determine that x=888 & y=666

If 30 girls joined the school and number of boys left is considered as "a"

=> $888 - a : 666 + 30 = 7 : 6$

=> $888 - a = \frac{7}{6} \times 696$

=> $888 - a = 812$

=> $a = 76$

Therefore, Number of boys left the school are 76.

Question 23

If $7sin^2\theta + 3cos^2\theta = 4$**, then the value of** $tan\theta is(\ \theta$ **is acute)**

A $\frac{1}{\sqrt{3}}$

B $\frac{1}{\sqrt{2}}$

C 1

D $\sqrt{3}$

Answer: A

Explanation:
Given that $7sin^2\theta + 3cos^2\theta = 4$

=> $3sin^2\theta + 3cos^2\theta + 4sin^2\theta = 4$

=> $3(sin^2\theta + cos^2\theta) + 4sin^2\theta = 4$

=> $3 + 4sin^2\theta = 4$

=> $4sin^2\theta = \frac{4}{3}$

=> $sin^2\theta = \frac{1}{3}$

=> $sin\theta = \frac{1}{\sqrt{3}}$

=> $\theta = 30^\circ$

Therefore, $tan30^\circ = \frac{1}{\sqrt{3}}$

Question 24

If $(Bx—2y) : (2x + 3y) = 5 : 6$**, then one of value of** $\left(\frac{\sqrt[3]{x}+\sqrt[3]{y}}{\sqrt[3]{x}-\sqrt[3]{y}}\right)^2$ **is?**

A 25

B $\frac{1}{5}$

C $\frac{1}{25}$

D 5

Answer: A

Explanation:
value of b should be given .

Question 25

If $\tan A = n \tan B \; and \;\; \sin A = m \sin B,$ **then the value of** $\cos^2 A$ **is**

A $\frac{m^2+1}{n^2+1}$

B $\frac{m^2-1}{n^2-1}$

C $\frac{m^2+1}{n^2-1}$

D $\frac{m^2-1}{n^2+1}$

Answer: B

Explanation:
Given that $\tan A = n \tan B$ and $\sin A = m \sin B$ ---- (1)

=> $\frac{\sin A}{\cos A}$ = n $\frac{\sin B}{\cos B}$

=> $\frac{m \sin B}{\cos A}$ = n $\frac{\sin B}{\cos B}$

=> $\frac{\cos A}{\cos B}$ = $\frac{m}{n}$ ----- (2)

Squaring equation (1), we get

=> $\sin^2 A = m^2 \sin^2 B$

=> $1 - \cos^2 A = m^2(1 - cos^2 B)$

=> $cos^2 B = \frac{m^2 - 1 + \cos^2 A}{m^2}$ ---- (3)

Squaring equation (2) and substituting equation (3) in equation (2), we get

=> $cos^2 A = [\frac{m^2}{n^2}][\frac{m^2 - 1 + \cos^2 A}{m^2}]$

=> $n^2 cos^2 A = \; m^2 - 1 + \cos^2 A$

=> $cos^2 A = \frac{m^2-1}{n^2-1}$

Question 26

In an office, 40% of the staff is female. 70%of the female staff and 50% of the male staff are married, The percentage of the unmarried staff in the office is

A 42

B 60

C 54

D 64

Answer: A

Explanation:
Here, let's consider total number of staff as 100.

Given that 40% of staff is female. i.e., female staff count=40

Therefore, male staff count=60

Given that, 70% of female staff is married. i.e.., married female staff= $40 \times 70/100$ =28

50% of male staff are married i.e., married male staff=30

Therefore, Unmarried staff =100-30-28=42. i.e.., 42%

Question 27

In an examination average mark obtained by the girls of a class is 85 and the average mark obtained by the boys of the same class is 87. If the girls and boys are in the ratio 4 : 5, average marks of the whole class (approx.) is closest to

A 86.4

B 86.1

C 85.9

D 86.5

Answer: B

Explanation:
Given that, Average mark obtained by girls in a class = 85

and average mark obtained by boys in a class = 87

If number of boys & number of girls is considered as x & y respectively, given that x:y=4:5 => x= $\frac{4y}{5}$

Also, Sum of marks obtained by girls = 85x and sum of marks obtained by boys = 87y

Therefore,

Average of whole class = $\frac{85x+87y}{x+y}$

= $\frac{85\times\frac{4y}{5}+87y}{\frac{4y}{5}+y}$

=86.1

Question 28

Articles are marked at a price which gives a profit of 25%. After allowing a certain discount the profit reduces to $12\frac{1}{2}\%$. The discount percent is

A $\frac{121}{2}\%$

B 10%

C 12%

D 11.1%

Answer: B

Explanation:
Let the cost price be Rs.100.

So , the marked price will be Rs.125.

After allowing a certain discount the profit reduces to $12\frac{1}{2}\%$,

price would be Rs.112.5

Discount percent offered = $\frac{12.5}{125} \times 100$ = 10

So, the answer would be option b)10%.

Question 29

If \sin A + \sin^A = 1,$then the value of$ \cos^A + \cos^4 A is

A $1\frac{2}{3}$

B 2

C $1\frac{1}{2}$

D 1

Answer: D

Explanation:
Information provided in the question is not in a understandable format. Please review and provide correct data.

Question 30

A manufacturer fixes his selling price at 33% over the cost of production. If cost of production goes up by 12% and manufacturer raises his selling price by 10%, his percentage profit is

A 35

B $36\frac{5}{9}\%$

C $28\frac{3}{8}\%$

D $30\frac{5}{8}\%$

Answer: D

Explanation:
If we consider cost price as 100, then selling price is 133.

If cost price is increased by 12% and selling price is increased by 10%, then,

new cost price is 112 & new selling price is 143.3

Percentage profit = $\frac{143.3-112}{112} \times 100$

$= \frac{3430}{112}$

$=30\frac{5}{8}\%$

Question 31

A boat moves downstream at the rate of 1 km in $7\frac{1}{2}$ minutes and upstream at the rate of 5 km an hour, What is the speed (in km/hour) of the boat in the still water?

A 8

B 4

C $3\frac{1}{2}$

D $6\frac{1}{2}$

Answer: D

Explanation:

Downstream speed = $\frac{\frac{1}{15}}{2\times60} = 8km/hr$

Upstream speed = 5 km/hr

Speed of boat in still water = $\frac{8+5}{2}$ = 6.5 km/hr

So, the answer would be option d)$6\frac{1}{2}$

Question 32

The greatest number among $3^{50}, 4^{40}, 5^{30}, \ 6^{20}$ is

A 4^{40}

B 5^{30}

C 6^{20}

D 3^{50}

Answer: A

Explanation:

$3^{50} = 243^{10}$

$4^{40} = 1024^{10}$

$5^{30} = 125^{10}$

$6^{20} = 36^{10}$

So, the greatest would be 4^{40}.

So , the answer would be option a)4^{40}.

Question 33

Give that the ratio of altitudes of two triangles is 4 : 5, ratio of their areas is 3: 2. The ratio of their corresponding bases is

A 8:15

B 5:8

C 15:8

D 8:5

Answer: C

Explanation:

Given that ratio of altitudes of two triangles is 4:5

$\frac{h_1}{h_2} = \frac{4}{5}$

Also, Given that, ratio of areas of two triangles is 3:2

$\frac{\frac{1}{2} \times b_1 \times h_1}{\frac{1}{2} \times b_2 \times h_2} = \frac{3}{2}$

$\frac{b_1 \times 4}{b_2 \times 5} = \frac{3}{2}$

$\frac{b_1}{b_2} = \frac{15}{8}$

Therefore, ratios of the bases is 15:8

Question 34

If $\sec\theta - \tan\theta = \frac{1}{\sqrt{3}}$ **then value of** $\sec\theta\tan\theta$ **is**

A $\frac{2}{3}$

B $\frac{2}{\sqrt{3}}$

C $\frac{1}{\sqrt{3}}$

D $\frac{4}{\sqrt{3}}$

Answer: A

Explanation:

Given that $\sec\theta - \tan\theta = \frac{1}{\sqrt{3}}$ ------> (1)

We know that $sec^2\theta - tan^2\theta = 1$

=> $(sec\theta - tan\theta)(sec\theta + tan\theta) = 1$

=> $sec\theta + tan\theta = \sqrt{3}$ --------> (2)

Solving equations (1) and (2) , we get

$sec\theta = \frac{2}{\sqrt{3}}$ and $tan\theta = \frac{1}{\sqrt{3}}$

Therefore $sec\theta tan\theta = \frac{2}{3}$

Question 35

A man sells an article at 5% above its cost price.\f he had bough tit at 5% less than what he had paid for it and sold it at 2 less, he would have gained 10%. The cost price of the article is

A Rs.100

B Rs.300

C Rs.200

D Rs.400

Answer: D

Explanation:

Let the cost price be Rs.x

Then Selling price = Rs. 1.05 x

If he had bough tit at 5% less than what he had paid for it and sold it at 2 less, he would have gained 10%,

new cost price = .95 x

new selling price = 1.05 - 2

$\frac{1.05x-2-.95x}{.95x} \times 100 = 10$

x = 400

So, the answer would be option d)Rs.400

Question 36

The value of $\frac{(0.67\times0.67\times0.67)\times(0.33\times0.33\times0.33)}{(0.67\times0.67)\div(0.67\times0.33)\div(0.33\times0.33)}$

A 11

B 0.34

C 1.1

D 3.4

Answer: B

Explanation:
Mathematical Operators provided in the question seems to be incorrect. Please review the question again and provide correct data.

Question 37

If a +b =1, find the value of $a^3 + b^3 - ab - (a^2 - b^2)^2$

A 0

B 1

C -1

D 2

Answer: A

Explanation:
$a^3 + b^3 - ab - (a^2 - b^2)^2$

=$(a+b)^3 - 3ab(a+b) - ab - [(a-b)(a+b)]^2$

=$1 - 3ab - ab - (a-b)^2$

=$1 - 4ab - (a^2 + b^2 - 2ab)$

=$1 - 4ab - a^2 - b^2 + 2ab$

=$1 - (a^2 + b^2 + 2ab)$

=$1 - (a+b)^2$

=>$1 - 1$=0

Question 38

AB and CD are two parallel chords of a circle of lengths 10 cm and 4 cm respectively. If the chords are on the same side of the centre and the distance between them is 3 cm, then the diameter of the circle is

A $2\sqrt{29}\,cm$

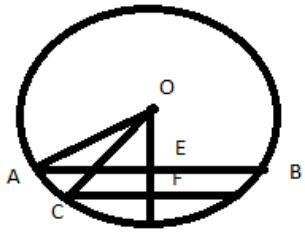
B $\sqrt{21}\,cm$

C $2\sqrt{21}\,cm$

D $\sqrt{29}\,cm$

Answer: A

Explanation:



OA = OC = radius

OE and OF are perpendicular to AB and CD .

AE = EB = 5cm

CF = CD = 2cm

Let OE = x

In $\triangle OAE$,

$OA^2 = AE^2 + OE^2$

$OA^2 = 5^2 + x^2$

In $\triangle OCF$,

$OC^2 = 2^2 + (x+3)^2$

$5^2 + x^2 = 2^2 + (x+3)^2$

$25 + x^2 = 4 + x^2 + 6x + 9$

x = $\frac{12}{6} = 2cm$

$OA^2 = 5^2 + x^2 = 25 + 4 = 29$

OA = $\sqrt{29}$

Diameter = $2\sqrt{29}$

So, the answer would be option b)$2\sqrt{29}cm$

Question 39

Let x be the least number, which when divided by 5, 6, 7 and 8 leaves a remainder 3 in each case but when divided by 9 leaves no remainder. The sum of digits of x is

A 22

B 21

C 18

D 24

Answer: C

Explanation:
Given that , Let x be the least number, which when divided by 5, 6, 7 and & leaves a remainder 3. Not sure what & represents.

Please provide correct data.

Question 40

Three science classes A, B and C take a Life Science test. The average score of class A is 83. The average score of class B is 76. The average score of class C is 85. The average score of class A and B is 79 and average score of class B and CG is 81. Then the average score of classes A, B and C is.

A 80.5

B 81.5

C 80

D 81

Answer: B

Explanation:

Given that average score of class A is 83. Let's consider number of students in class A as "x"

$\Rightarrow \frac{sum of scores of class A}{x} = 83$

=> sum of scores of class A = 83x

Given that average score of class B is 76. Let's consider number of students in class B as "y"

$\Rightarrow \frac{sum of scores of class B}{y} = 76$

=> sum of scores of class B = 76y

Given that average score of class C is 85. Let's consider number of students in class C as "z"

$\Rightarrow \frac{sum of scores of class C}{z} = 85$

=> sum of scores of class C = 85z

Similarly from other given statements,

$\frac{sum of scores of classes A,B}{x+y} = 79$

$\Rightarrow \frac{83x+76y}{x+y} = 79$

=> 83x+76y=79x+79y

=> 4x=3y => $x = \frac{3y}{4}$

and $\frac{sum of scores of classes B,C}{y+z} = 81$

$\Rightarrow \frac{76y+85z}{y+z} = 81$

=> 76y+85z=81y+81z

=> 4z=5y => $z = \frac{5y}{4}$

Therefore, average score of classes A,B & C is

$\frac{83x+76y+85z}{x+y+z} = \frac{83(\frac{3y}{4})+76y+85(\frac{5y}{4})}{\frac{3y}{4}+y+\frac{5y}{4}} = \frac{978}{12} = 81.5$

Question 41

Two blends of a commodity costing ₹35 and ₹40 per kg respectively are mixed in the ratio 2:3 by weight. If one-fifth of the mixture is sold at ₹46 per kg and the remaining at the rate of ₹55 per kg, the profit percent is

A 50

B 20

C 30

D 40

Answer: D

Explanation:
Let the amount for first blend be 2 kg and second blend be 3 kg.

Total cost price = $35 \times 2 + 3 \times 40$ = 190

Now , 1 kg will be sold at Rs 46 and remaining 4 kg at 55 , then total selling price will be

Total selling price = $46 \times 1 + 4 \times 55$ = 266

Profit = 266 - 190 = 76

Profit % = $\frac{76}{190} \times 100$ = 40

So, the answer would be option d)40.

Question 42

If$x^2 + y^2 + z^2$= xy + yx + zx, then the value of $\frac{3x^4+7y^4+5z^4}{5x^2y^2+7y^2z^2+3z^2x^2}$

A 1

B 2

C -1

D 0

Answer: A

Explanation:
We know that if $x^2 + y^2 + z^2$= xy + yx + zx, Then x=y=z

Therefore, substituting x=y=z in given expression $\frac{3x^4+7y^4+5z^4}{5x^2y^2+7y^2z^2+3z^2x^2}$, we get

= $\frac{15x^4}{15x^4}$

=1

Question 43

Ram solid two horses at the same price, In one he gets a profit 10% and in the other he gets a loss of 10%. Then Ram gets

A no loss or profit

B 1%profit

C 2%loss

D 1% loss

Answer: D

Explanation:
Shortcut Formula :In this kind of situation,

There is always loss of $\frac{x^2}{100}$ = $\frac{10^2}{100}$ = 1 ,

where x = Profit/loss %

So, the answer would be option d)1% loss

Question 44

A and B can do a given piece of work in 8 days, Band C can do the same work in 12 days and A, B, C together complete it in 6 days. Number of days required to finish the work by A and C is

A 8

B 16

C 24

D 12

Answer: A

Explanation:
Given that Aand B can doa given piece of workin & days. Not sure what & means. Please provide correct data.

Question 45

Pipe A can fill an empty tank in 6 hours and pipe B in 8 hours. If both the pipes are opened and after 2 hours pipe A is dosed, how much time B will take to fill the remaining tank?

A $2\frac{2}{5}$ hours

B $7\frac{1}{2}$ hours

C $2\frac{1}{3}$ hours

D $3\frac{1}{3}$ hours

Answer: D

Explanation:
Given that Pipe B in & hours. Please provide correct data.

Question 46

There is a number consisting of two digits, the digit in the units place is twice that in the tens place and if 2 be subtracted from the sum of the digits, the difference is equal to $\frac{1}{6}$ thof the number. The number is

A 26

B 23

C 25

D 24

Answer: D

Explanation:
Let the two digit number be ab,

Where ab = 10a + b, and b = 2*a,

According to the Question,

a+b - 2 = 1/6(10a+b)

Multiply both side by 6,

6a + 6b - 12 = 10a + b

5b = 4a + 12,

Subtracting (b + 6a - 12) on both sides,

Substituting b = 2*a,

5(2a) = 4a + 12,

10a = 4a + 12,

Subtract 4a on both sides,

6a = 12,

Divide 6 on both sides,

a = 2,

b = 2*2 = 4,

Therefore , the number is 24

Question 47

The value of

$cot41°.cot42°.cot43°.co44.cot45°.\ cot46°.cot47°.cot48°.cot49°$

A 0

B 1

C $\frac{\sqrt{3}}{2}$

D $\frac{1}{\sqrt{2}}$

Answer: B

Question 48

A man purchases some orangesat the rate of 3 for 40 and the same quantity at 5 for £60.If he sells all the oranges at the rate of 3 for %50,find his gain orloss percent(to the nearest integer).

A 32% profit

B 34% loss

C 31% profit

D 33% profit

Answer: A

Question 49

The perimeter of a rhombus is 60 cm and one ofits diagonal is 24cm. The area (in sq.cm) of therhombus is

A 206

B 432

C 108

D 216

Answer: D

Question 50

A sum of money is paid back in two annual instalments of %17,640 each, allowing 5% compound interest compounded annually. The sum borrowed was

A RS.32400

B RS.32800

C RS.32000

D RS.32200

Answer: B

Question 51

A man starts from a place P and reaches the place Q in 7 hours. He travels $\frac{1}{4}$ th of the distance at 10 km/hour and the remaining distance at 12 km/hour. The distance, in kilometre, between P and Qis

A 72

B 80

C 90

D 70

Answer: B

Explanation:
let the total distance be 4x km

T = D/S

as per question ,

(x/10) + (3x/12) = 7

(x/10)+(x/4) = 7

(2x+5x)/20 = 7

x=(7*20)/7

x=20km

total dist. traveled = 4x = 4*20 = 80km

Question 52

If O is the circumcentre of a tnangle ABC lying inside the triangle, then equal to

A 110°

B 90°

C 120°

D 60°

Answer: B

Question 53

The simple interest on a sum of money is $\frac{8}{25}$ of the sum. If the number of years is numerically half the rate percent per annum, then the rate percent per annum is

A 8

B 5

C $6\frac{1}{4}$

D 4

Answer: A

Explanation:
given,

Time= R/2,Rate=R

Now 8=(25×R×R)/100×2

As , SI=(P×R×T)100

8=(R^2)/(4×2)=64=R^2

R=8 %

Question 54

. In $\triangle$ ABC ,$\angle BAC$ =90^\circ$and$ AD \perp BC$$.If BD= 3 cm and CD= 4 cm then the length (in cms) of AD is

A $2\sqrt{3}$

B 6

C 3.5

D 5

Answer: A

Question 55

Three glasses of equal volume contains acid mixed with water, The ratio of acid and water are 2: 3,3: 4 and 4: 5 respectively. Contents of these glasses are poured in a large vessel. The ratio of acid and water in the large vessel is

A 407:560

B 417:564

C 411: 540

D 401: 544

Answer: D

Question 56

IfA: B=2: 3 and B: C = 3: 7 thenA+B:B+C:C+Ais

A 4:8:9

B 5:8:9

C 4:10:9

D 5:10:9

Answer: D

Question 57

The numerical values of the volume and the area of the lateral surface of a right circular cone are equal. If the height of the cone be h and radius, be r, then the value of $\frac{1}{h^2}+\frac{1}{r^2}$ is

A 3/1

B 9/1

C 1/9

D 1/3

Answer: C

Question 58

Two places P and Q are 162 km apart. A train leaves P for Q and simultaneously another train leaves Q for P. They meet at the end of 6 hours. If the former train travels 8km/hour faster then the other, then speed of train from Qis

A $9\frac{1}{2}$ km/hr

B $10\frac{5}{6}$ km/hr

C $12\frac{5}{6}$ km/hr

D $9\frac{1}{2}$ km/hr

E $8\frac{1}{2}$ km/hr

Answer: A

Explanation:
Let the speed of the train from Q be X km/hr
Then the speed of the train from P is (X+8) km/hr
They meet each other at M after 6 hours travel
PM + MQ = 162 km
6 (X + 8) + 6X = 162 km
12X + 48 = 162
12X = 162 - 48
12X = 114
X = 114/12
9 (1/2) km/hr

Question 59

If $tan\theta - cot\theta = 0$ **and** θ **is positive acute angle then the value of** $\frac{tan(\theta+15)}{tan(\theta-15)}$

A $\frac{1}{3}$

B $\sqrt{3}$

C $\frac{1}{\sqrt{3}}$

D 3

Answer: D

Question 60

The portion of a ditch 48 m long, 16.5 m wide and 4 m deep that can be filled with stones and earth available during excavation of a tunnel, cylindrical in shape, of a diameter 4 m and length S6 mis

A $\frac{1}{9}$ part

B $\frac{2}{9}$ part

C $\frac{1}{2}$ part

D $\frac{1}{4}$ part

Answer: B

Explanation:
Volume of the earth dugout as a tunnel

= pi*r^2*h=(22)/7×2×2×56=704m^3

Volume of the ditch = 48×(33)/2×4

= 24 X 33 X 4 = 3168

Therefore, Part required = 704/3168=29

Question 61

If $(x^3 - y^3) : (x^2 + xy + y^2)$**=5:1 and** $(x^2 - y^2) : (x - y)$**=7:1 then the value of 2x:3y equals**

A 2:3

B 4:1

C 4:3

D 3:2

Answer: B

Question 62

If x=$a^{\frac{1}{2}} + a^{\frac{-1}{2}}$**, y=**$a^{\frac{1}{2}} - a^{\frac{-1}{2}}$ **then the value of** $(x^4 - x^2y^2 - 1) + (y^4 - x^2y^2 + 1)$

A 16

B 14

C 12

D 13

Answer: B

Question 63

The marked price of a tape recorder is $12,600. A festival discount of 5%is allowed onit. Further for cash payment, a second discount of 2%is given. The cash payment, in rupees, that is to be made for buying it is

A 11,780.60

B 11,073.60

C 11,703.60

D 11,370.60

Answer: A

Question 64

A man walks at the rate of Skm/hour, he misses a train by 7 minutes. However,if he walks at the rate of Gkm/hour, he reaches the station 5 minutes before the arrival of the train. The distance covered by him to reach the station is

A 6 km

B 7 km

C 4 km

D 6.25 km

Answer: A

Explanation:
Lets assume the required distance = x km.
Difference in the times taken at two speeds=12mins=1/5 hr.
Therefore (x/5-x/6)=1/5 or (6x-5x) = 6 or x = 6km.
So required distance = 6 km

Question 65

If $x - \sqrt{3} - \sqrt{2} = 0$ **and** $y - \sqrt{3} + \sqrt{2} = 0$ **then the value of** $(x^3 - 20\sqrt{2}) - (y^3 + 2\sqrt{2})$

A 3

B 2

C 0

D 1

Answer: C

Question 66

The radil of two solid iron spheres are 1 cm and6 cm respectively. A hollow sphere is made bymelting the two s pheres. If the external radius of the hollow sphere is 3 cm, then its thickness (in cm) is

A 0.5

B 2

C 1.5

D 1

Answer: D

Question 67

There is a wooden sphere of radius 6 $\sqrt{3}$ cm. The surface area of the largest possible cube cut outfrom the sphere will be

A $464\sqrt{3}\ cm^2$

B $646\sqrt{3}\ cm^2$

C $462\ cm^2$

D $864\ cm^2$

Answer: D

Question 68

If 60% of A = 30 % of B , B = 40 % of C and C = x % of A, then value of x is

A 200

B 500

C 300

D 800

Answer: B

Question 69

Aand B can do piece of work in 30 and 36 days respectively. They began the work together but A leaves after some days and B finished the remaining work in 25 days. After how many days did A leave?

A 6 days

B 5 days

C 11 days

D 10 days

Answer: B

Question 70

A sum of money placed at compound interest doubles itself in S years. It will amount to eight times Itself at the same rate of interest in

A 10

B 20

C 12

D 15

Answer: D

Explanation:
Formula for this is n2= n1 ^(t2/t1)
n= Number of times
t= years

n2=8 =2^3
n1=2(doubles.....given)
t2=?
t1=5

Applying this in formula
2^3=2^(t2/5)2
3=t2/5
t2= 15

Question 71

Quadnlateral ABCD is circumscribed about a circle. If the lengths of AB, BC, CD are 7 cm, 85 cm and 9.2 cm respectively, then the length {in cm) of DA i

A 16.2

B 7.2

C 7.7

D 10.7

Answer: C

Explanation:
AB+CD=BC+DA(Property)

7+9.2=x+8.5

16.2=x+8.5

x=7.7

Question 72

A right prism has a triangular base whose sides are 13 cm, 20 cm and 21 cm. If the altitude of the prism is 9 cm, then its volume is

A 1134 cm^3

B 1314 cm^3

C 1413cm^3

D 1143 cm^3

Answer: A

Question 73

300 gramsof sugar solution has 40% of sugar in it. How much sugar should be added to make it 50 % in the solution?

A 60 gms

B 10 gms

C 80 gms

D 40 gms

Answer: A

Explanation:
Sugar Solution =300kg.

40% Sugar =(40×300)/100=120kg

Let the sugar added = x kg.

120+x=180kg

x = 60 kg.

Question 74

The area of isosceles trapezium is 176 cm^2 and the height h is $\frac{2}{11}$ th of the sum of its parallel sides if the ratio of the length of the parallel sides is 4:7, then the length of a diagonal {in cm) is

A $2\sqrt{137}$

B $\sqrt{137}$

C 24

D 28

Answer: A

Explanation:
Area =12(sum of parallel sides)× distance between them

12(7x+4x)×2x=176

11x2=176x216

x=4

AB=7×4=28cm

CD=4×4=16cm

CM=2×4=8cm

AM=AN+NM

AN+16

6+16=22

(AN=BM > =12/2=6)

AC^2=CM^2+AM^2

AC^2=8^2+22^2

AC= √ (64+484)------ √(548)...= 2√(137)

Question 75

A and B are centres of twocircles of radii 11 cm and 6 cm, respectively. PQ is a direct common tangent to the circles. If $\bar{AB}$ = 13 cm, then length of $\bar{PQ}$ will be

A 8.5 cm

B 12 cm

C 13 cm

D 17 cm

Answer: B

Question 76

A, B and C can do work separately in 16, 32 and48 days respectively. They started the work together but B leaving off & days and C six daysbefore the completion of the work. In what time is the work finished?

A 12

B 10

C 14

D 9

Answer: A

Question 77

AD is perpendicular to the internal bisector of $\angle ABC$ of $\triangle$ ABC. DE is drawn through D and parallel to BC to meet AC at E. If the length of AC is 12 cm, then the length of AE (in cm)is

A 3

B 6

C 8

D 4

Answer: B

Explanation:
$\angle ABD$ = $\angle MBD$=?(angle bisector)

BD ⊥AM

$\angle BDA$= $\angle BDM$=90°

It happen only in equilateral and isosceles triangle

AD=DM

i.e.AD=AM/2

Given DE || BC

From Thales theorem

E will be mid point of AC.

AC=12cm.

So,

AE=6cm

Question 78

The average of five consecutive positive integers is n, If the next two integers are also included, the average of all these integers will

A increase by 1

B remains the same

C increase by 2

D increase by 1.5

Answer: A

Question 79

If a- $\overset{1}{a-3}$ **=5 then the value of** $(a-3)^3 - \overset{1}{(a-3)^3}$

A 14

B 5

C 2

D 7

Answer: A

Question 80

.A plane divides a night circular cone into two parts of equal volume. If the plane is parallel to the base, then the ratio, in which the height of the coneis divided, is

A $1:\sqrt[3]{2}$

B $1:\sqrt{2}$

C $1:\sqrt[3]{2}-1$

D $1:\sqrt[3]{2}+1$

Answer: C

Question 81

Let x be the smallest number, which when added to 2000 makes the resulting number divisible by 12, 16, 18 and 21. The sum of the digits of x is

A 4

B 7

C 6

D 5

Answer: B

Explanation:
L.C.M. of 12,16,18,21 is 1008

then multiply by 2 =1008×2=2016

sum of the number of 16 is 1+6=7

Question 82

The diameter of each wheel of a car is 70 cm. If each wheel rotates 400 times per minute, then the speed of the car(in km/hr)is

A 52.8

B 0.528

C 528

D 5.28

Answer: A

Explanation:
Circumference of wheel=2*pi*r

=(2×3.14×70)/2=220cm

Speed per hour

=(220×400×60)/1000×100=52.8 km/h

Question 83

The average age of 30.students of a class is 14 years 4 months. After admission of 5 new students in the class the average becomes 13 years 9 months. The youngest one of the five new students is 9 years 11 months old. The average age of the remaining 4 new studentsis

A 13 years 6 months

B 10 years 4 months

C 11 years 2 months

D 12 years 4 months

Answer: B

Explanation:
According to the question,

Total age of 30 students = 30×(14 years 4 months)=30×1413

= 30×433=430 years

Total age of (30 + 5) students = 35 (13 years 9 months)

= 35×1334=19254 years

Total age of 5 students = 19254-430

= 2054 = 51 years 3 months

One of the new five student is = 9 years 11 month old

Remaining 4 students age = 41 years 4 months4

Question 84

P and Q together can do a job in 6 days. Q and Rcan finish the same job in 60/7 days. P started the work and worked for 3 days. Q and R continued for 6 days. Then the difference of days in which R and P can complete the job is

A 8

B 12

C 10

D 15

Answer: C

Question 85

Telegraph post is bent at a point above the ground due to storm. Its top just touches the ground at a distance of 10 $\sqrt{3}$**m from its foot and makes an angle of** 30° **with the horizontal. Then height (in metres) of the telegraph post is**

A 24

B 20

C 25

D 30

Answer: D

Question 86

If $5cos\theta + 12sin\theta$**=13,** $0 < \theta < 90^\circ$ **then value of** $sin\theta$

A $\frac{12}{-13}$

B $\frac{5}{13}$

C $\frac{12}{13}$

D $\frac{6}{13}$

Answer: C

Question 87

if a+$\frac{1}{b}$ **=b+**$\frac{1}{c}$**=c+**$\frac{1}{a}$ **where as a≠b≠c≠0 then the value of** $a^2b^2c^2$ **is**

A -1

B 1

C abc

D 0

Answer: B

Question 88

The H.C.F and L.C.M of two numbers are 21 and 84 respectively. If the ratio of the two numbers is 1: 4, then the larger of the two numbers is

A 48

B 108

C 12

D 84

Answer: D

Explanation:
Let the numbers be x,4x.
given,
HCF=21
LCM=84

We know that , LCM × HCF=1st number × 2nd number

84×21 = x×4x
1764 = 4x^2
1764/4 = x^2
441 = x^2
x=21

therefore one number is 21 and other is 84(21×4).

Question 89

If 90 men can do a certain job in 16 days, working 12 hours/day, then the part of that work which can be completed by 70 men in 24 days, working 8hours/dayis

A $\frac{2}{3}$

B $\frac{7}{9}$

C $\frac{1}{3}$

D $\frac{5}{8}$

Answer: B

Question 90

A sum of 7,930 is divided into 3 parts and given on loan at 5% simple interest to A, B and C for 2,3 and 4 years respectively. If the amounts of all three are equal after their respective periods of loan, then the A received a loan of

A Rs.2750

B Rs.2800

C Rs.2760

D Rs.3050

Answer: C

Explanation:
given ,

A+((A×5×2)/100) = B+((B×5×3)/100) = C+((C×5×4)/100)

110A = 115B = 120C

22A = 23B = 24C

Ratio of amount .....(by using L.C.M. of 22, 23 and 24)
276 : 264 : 253

A's loan = (276)/793×7930 = Rs. 2760

Question 91

The value of (coseca — sina) (seca — cosa) (tana + cota)

A 4

B 2

C 1

D 6

Answer: C

Question 92

There would be a 10% loss,if rice is sold at RS.54 per kg. To earn a profit of 20%, the price of rice per kg will be

A Rs.65

B Rs.63

C Rs.70

D Rs.72

Answer: D

Question 93

If a hemisphere is melted and four spheres of equal volume are made, the radius of each sphere will be equal to

A radius of the hemisphere

B $\frac{1}{6}$ th of the radius of the hemisphere

C $\frac{1}{2}$ of the radius of the hemisphere

D $\frac{1}{4}$ th of the radius of the hemisphere

Answer: C

Question 94

60 kg of an alloy A is mixed with 100 kg of alloyB. If alloy A has lead and tin in the ratio 3 ; 2 and alloy B has tin and copperin the ratio 1: 4, the amount of tin in the new alloy is

A 53 kg

B 80 kg

C 44 kg

D 24 kg

Answer: C

Question 95

Base of a right pyramid is a square of side 10cm. If the height of the pyramid is 12cm, then its total surface area is

A $260cm^2$

B $460cm^2$

C $400cm^2$

D $360cm^2$

Answer: D

Explanation:
Area of base =10×10=100cm^2

Area of 4 Phase

=(12×Base×slant height)×4

(12×10×13)×4 .....[Slant height = √(122+52)=√169=13]

=(64×4)=260

Total Surface area

260+100

360cm^2

Question 96

If a shopkeeper wants to give 20% discount on toy, he has to sell it for RS.300. If he sells it at RS. 7405, then his gain percentage

A 6%

B 4%

C 8%

D 5%

Answer: C

Question 97

The unit digit in the product $(2467)^{153} \times (841)^{72}$**is**

A 1

B 3

C 7

D 9

Answer: C

Question 98

The interior angle of a regular polygon exceedsits extenior angle by 108°**, The numberof sides ofthe polygonis**

A 10

B 16

C 14

D 12

Answer: A

Explanation:

.

Let the exterior angle be x

given , the interior angle of a regular polygon exceeds its exterior angle by 108degree.

So, interior angle = x+108

as, the sum of interior angle and exterior angle = 180°

So,

Hence , polygon has 10 sides

Question 99

The value of $4 - \cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5^{2+\frac{1}{4}}}}}$

A $\frac{1}{8}$

B $\frac{1}{64}$

C $\frac{1}{16}$

D $\frac{1}{32}$

Answer: A

Question 100

The centroid of a $\triangle ABC$ is G. The area of $\triangle abc$ is 50cm^2, The area of $\triangle GBC$ is

A $40cm^2$

B $30cm^2$

C $20cm^2$

D $10cm^2$

Answer: C