SSC CGL Tier-2 9-March-2018 Maths Shift-1

Instructions
For the following questions answer them individually

Question 1

If the unit digit of $(433 \times 456 \times 43N)$ is $(N+2)$, then what is the value of N?

A 1

B 8

C 3

D 6

Answer: D

Explanation:
If we multiply 433 and 456 then we will get 8 as unit digit .

But when 433 and 456 multiply together with 43N then the unit digit appears as 8N .

So,Unit digit of $8N = N + 2$.

It is possible only when N=6 .

So, D is correct choice.

Question 2

If $N = (12345)^2 + 12345 + 12346$, then what is the value of $\sqrt{N}$?

A 12346

B 12345

C 12344

D 12347

Answer: A

Explanation:
$N = (12345)^2 + 12345 + 12346 = 12345^2 + 12345 + 12345 + 1 = 12345^2 + 2 \times 12345 \times 1 + 1^2$

So, $N = (12345 + 1)^2$

So, $\sqrt{N} = 12346$.

A is correct choice.

Question 3

Which of the following statement(s) is/are TRUE?

I. $\binom{0.03}{0.2} + \binom{0.003}{0.02} + \binom{0.0003}{0.002} + \binom{0.00003}{0.0002} = 0.6$

II. $(0.01) + (0.01)^2 + (0.001)^2 = 0.010101$

A only I

B only II

C Neither I nor II

D Both I and II

Answer: D

Explanation:

$\binom{0.03}{0.2} + \binom{0.003}{0.02} + \binom{0.0003}{0.002} + \binom{0.00003}{0.0002}$

$= 0.15 + 0.15 + 0.15 + 0.15$

$= 0.60$.

I is correct .

$(0.01) + (0.01)^2 + (0.001)^2$

$= 0.01 + 0.0001 + 0.000001$

=0.010101

II is also correct .

D is correct choice.

Question 4

What is the value of $\frac{1}{(0.1)^2} + \frac{1}{(0.01)^2} + \frac{1}{(0.5)^2} + \frac{1}{(0.05)^2}$ **?**

A 10504

B 10404

C 10004

D 11400

Answer: A

Explanation:

$\frac{1}{(0.1)^2} + \frac{1}{(0.01)^2} + \frac{1}{(0.5)^2} + \frac{1}{(0.05)^2}$

$= \frac{100}{1} + \frac{10000}{1} + \frac{100}{25} + \frac{10000}{25}$

$= 100 + 10000 + 4 + 400$.

$= 10504$.

A is correct choice.

Question 5

Which of the following statement(s) is/are TRUE?

I. $\left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{3}\right)\left(1 + \frac{1}{4}\right) \ldots\ldots \left(1 + \frac{1}{998}\right) > 497$

II. $14\frac{3}{4} + 5\frac{1}{4} - 2\frac{1}{2} > 11\frac{1}{8} + 12\frac{3}{8} - 7\frac{1}{4}$

A only I

B only II

C Neither I nor II

D Both I and II

Answer: A

Explanation:

$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)$ ..... $\left(1+\frac{1}{998}\right) > 497$ is definitely true as

their would 998 times 1's present in the series , So, the result will definitely bigger than 497.

Now,

$14\frac{3}{4}+5\frac{1}{4}-2\frac{1}{2}=\frac{59+21-10}{4}=\frac{70}{4}=17.50$.

And, $11\frac{1}{8}+12\frac{3}{8}-7\frac{1}{4}=\frac{89+99-29}{8}=\frac{159}{8}=19.875$.

So, II is not correct .

A is correct choice.

Question 6

Which of the following statement(s) is/are TRUE?

I. $\frac{3}{110} < \frac{9}{308} < \frac{7}{225}$

II. $99\frac{1}{7}+99\frac{2}{7}+99\frac{3}{7}.....99\frac{6}{7}=297$

A only I

B only II

C Neither I nor II

D Both I and II

Answer: D

Explanation:

$\frac{7}{225}=0.3111,\ \frac{9}{308}=0.2922,\ \frac{3}{110}=0.2727$.

So, I is correct .

$99\frac{1}{7}+99\frac{2}{7}+...+99\frac{6}{7}=99\left(\frac{1+2+3+4+5+6}{7}\right)=99\times 3=297$.

So, II is also correct .

D is correct choice.

Question 7

If $f(x)=\frac{1}{x}-\frac{1}{x+1}$ **,then what is the value of** $f(1)+f(2)+f(3)+.....f(10)?$

A $\frac{9}{10}$

B $\frac{10}{11}$

C $\frac{11}{12}$

D $\frac{12}{13}$

Answer: B

Explanation:

$f(x)=\frac{1}{x}-\frac{1}{x+1}$

So, $f(1)=\frac{1}{1}-\frac{1}{2}$.

$f(2)=\frac{1}{2}-\frac{1}{3}$.

$f(3) = \frac{1}{3} - \frac{1}{4}$.

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$.f(10) = \frac{1}{10} - \frac{1}{11}$.

So, $f(1) + f(2) + ... + f(10) = \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + ... - \frac{1}{11}$.

or, $f(1) + f(2) + ... + f(10) = \frac{1}{1} - \frac{1}{11} = \frac{10}{11}$.

B is correct choice.

Question 8

If $N = 4^{11} + 4^{12} + 4^{13} + 4^{14}$, then how many positive factors of N are there?

A 92

B 48

C 50

D 51

Answer: A

Explanation:

$N = 4^{11} + 4^{12} + 4^{13} + 4^{14}$

or, $N = 4^{11}\left(1 + 4^1 + 4^2 + 4^3\right) = 4^{11} \times 5 \times 17$.

So, $N = 2^{22} \times 5 \times 17$.

Case1 (1 factor) :

$2, 2^2, 2^3, ..., 2^{22}, 5, 17$

Total 24 factors .

Case2 (2 factors) :

$2 \times 5, 2 \times 17,\ 2^2 \times 5, 2^2 \times 17, ..., 5 \times 17$.

Total $2 \times 22 + 1 = 45$ factors .

Case3 (3 factors) :

$2 \times 5 \times 17,\ 2^2 \times 5 \times 17, ..., 2^{22} \times 5 \times 17$.

Total 22 factors .

Case4 :

1 is also a factor .

Total number of factors = $24 + 45 + 22 + 1 = 92$.

A is correct choice.

Question 9

If $N = 9^9$, then N is divisible by how many positive perfect cubes?

A 6

B 7

C 4

D 5

Answer: B

Explanation:
$N = 9^9$ is divisible by $1^3,\ 3^3,\ 9^3,\ 27^3,\ 81^3, 243^3\ and\ 729^3$.

So, B is correct choice.

Question 10

If $N = 3^{14} + 3^{13} - 12$, then what is the largest prime factor of N?

A 11

B 79

C 13

D 73

Answer: D

Explanation:
$3^{14} + 3^{13} - 12$

$= 3^{13}(3+1) - 12 = 3.4\left(3^{12} - 1\right)$

$= 3.4\left(3^6 - 1\right)\left(3^6 + 1\right)$

$= 3.4\left(3^2 - 1\right)\left(3^4 + 3^2 + 1\right)\left(3^2 + 1\right)\left(3^4 - 3^2 + 1\right)$

$= 2^6.3.5.7.13, 73$

Largest prime factor is 73

D is correct choice.

Question 11

Which of the following statement(s) is/are TRUE?

I. $\sqrt{121} + \sqrt{12321} + \sqrt{1234321} = 1233$

II. $\sqrt{0.64} + \sqrt{64} + \sqrt{36} + \sqrt{0.36} > 15$

A only I

B only II

C Neither I nor II

D Both I and II

Answer: D

Explanation:
$\sqrt{121} + \sqrt{12321} + \sqrt{1234321}$

$= 11 + 111 + 1111$.

$= 1233$.

I is correct .

And,

$\sqrt{0.64} + \sqrt{64} + \sqrt{36} + \sqrt{0.36}$

$= 0.8 + 8 + 6 + 0.6$

$= 15.4$.

II is also correct .

D is correct choice.

Question 12

What is the value of $(2 + \sqrt{2}) + \left(\frac{1}{2+\sqrt{2}}\right) + \left(\frac{1}{2-\sqrt{2}}\right) + (2 - \sqrt{2})$**?**

A 2

B 4

C 8

D 6

Answer: D

Explanation:

$(2 + \sqrt{2}) + \left(\frac{1}{2+\sqrt{2}}\right) + \left(\frac{1}{2-\sqrt{2}}\right) + (2 - \sqrt{2})$

$= (2 + \sqrt{2}) + \left(\frac{2-\sqrt{2}}{4-2}\right) + \left(\frac{2+\sqrt{2}}{4-2}\right) + (2 - \sqrt{2})$

$= (2 + 2) + \left(\frac{2-\sqrt{2}+2+\sqrt{2}}{2}\right)$.

$= 4 + \binom{4}{2}$.

$= 6$.

D is correct choice.

Question 13

The sum of two positive numbers is 14 and difference between their squares is 56. What is the sum of their squares?

A 106

B 196

C 53

D 68

Answer: A

Explanation:

$x + y = 14\ and\ x^2 - y^2 = 56$.

So, $x - y = 4$.

So, $x - y + x + y = 4 + 14$.

or, $x = \frac{18}{2} = 9$.

So, $y = 5$.

So, $x^2 + y^2 = 9^2 + 5^2 = 81 + 25 = 106$.

A is correct choice.

Question 14

What is the value of $1006^2 - 1007 \times 1005 + 1008 \times 1004 - 1009 \times 1003$**?**

A 6

B 3

C 12

D 24

Answer: A

Explanation:

$1006^2 - 1007 \times 1005 + 1008 \times 1004 - 1009 \times 1003$

$= 1006^2 - \left(1006^2 - 1\right) + \left(1006^2 - 2^2\right) - \left(1006^2 - 3^2\right)$

$= 1006^2 - 1006^2 + 1 + 1006^2 - 4 - 1006^2 + 9$.

$= 10 - 4$.

$= 6$.

A is correct choice.

Question 15

If $a^2 + b^2 = 4b + 6a - 13$**, then what is the value of** $a + b$

A 3

B 2

C 5

D 10

Answer: C

Explanation:

$a^2 + b^2 = 4b + 6a - 13$

or, $a^2 + b^2 - 4b - 6a - 13 = 0$.

or, $\left(a^2 - 2.3.a + 3^2\right) + \left(b^2 - 2.2.b + 2^2\right) = 0$.

or, $(a-3)^2 + (b-2)^2 = 0$.

So, $(a-3) = 0\ and\ (b-2) = 0$.

or, $(a = 3)\ and\ (b = 2)$.

So, a+b=5 .

C is correct choice.

Question 16

x **and** y **are positive integers. If** $x^4 + y^4 + x^2y^2 = 481$ **and** $xy = 12$**, then what is the value of** $x^2 - xy + y^2$**?**

A 16

B 13

C 11

D 15

Answer: B

Explanation:
$x^4 + y^4 + x^2y^2 = 481$

or, $\left(x^2\right)^2 + \left(y^2\right)^2 + 2x^2y^2 - x^2y^2 = 481$.

or, $\left(x^2 + y^2\right)^2 = 481 + 144 = 25^2 \ \ (given\ xy = 12)$.

or, $\left(x^2 + y^2\right) = 25$.

So, $x^2 - xy + y^2 = 25 - 12 = 13.$

B is correct choice.

Question 17

If $A = 1 + 2^p$ and $B = 1 + 2^{-p}$,then what is the value of B?

A $\frac{(A+1)}{(A-1)}$

B $\frac{(A+2)}{(A+1)}$

C $\frac{A}{(A-1)}$

D $\frac{(A-2)}{(A+1)}$

Answer: C

Explanation:
$B = 1 + 2^{-p}$.

or, $B = 1 + \frac{1}{2^P}.\ \left(given\ A\ = 1 + 2^P\right)$

or, $B = 1 + \frac{1}{A-1}$.

or, $B = \frac{A-1+1}{A-1} = \frac{A}{A-1}$.

C is correct choice.

Question 18

If a and b are roots of the equation $ax^2 + bx + c = 0$, then which equation will have roots $(ab + a + b)$ and $(ab - a - b)$?

A $a^2x^2 + 2acx + c^2 + b^2 = 0$

B $a^2x^2 - 2acx + c^2 - b^2 = 0$

C $a^2x^2 - 2acx + c^2 + b^2 = 0$

D $a^2x^2 + 2acx + c^2 - b^2 = 0$

Answer: B

Explanation:

a and b are roots of the equation $ax^2+bx+c=0$

So, $a+b=-\frac{b}{a}\ and\ ab=\frac{c}{a}$.

So, Sum of roots of new equation is= $(ab+a+b)+(ab-a-b)=2ab$.

And, product of roots = $(ab+a+b)(ab-a-b)=\left\{ab^2-(a+b)^2\right\}=\left(\frac{c^2}{a^2}-\frac{b^2}{a^2}\right)$.

So, new equation :

$x^2-(sum\ of\ roots)\,x+(product\ of\ roots)=0$.

or, $x^2-\left(\frac{2c}{a}\right)x+\left(\frac{c^2}{a^2}-\frac{b^2}{a^2}\right)=0$.

or, $a^2x^2-(2ac)\,x+\left(c^2-b^2\right)=0$.

B is correct choice.

Question 19

If $\sqrt{(1-p^2)(1-q^2)}=\frac{\sqrt{3}}{2}$, then what is the value of $\sqrt{2p^2+2q^2+2pq}+\sqrt{2p^2+2q^2-2pq}$?

A 2

B $\sqrt{2}$

C 1

D None of these

Answer: B

Explanation:

From $\sqrt{(1-p^2)(1-q^2)}=\frac{\sqrt{3}}{2}$

we can say that :

$(1-p^2)(1-q^2)=\frac{3}{4}=\left(1-0^2\right)\left(1-\frac{1}{2^2}\right)$.

So, either p/q=0/(1/2) .

So,

$\sqrt{2p^2+2q^2+2pq}+\sqrt{2p^2+2q^2-2pq}=\sqrt{0+2\times\frac{1}{4}+0}+\sqrt{0+2\times\frac{1}{4}-0}=\sqrt{\frac{1}{2}}+\sqrt{\frac{1}{2}}=\frac{2}{\sqrt{2}}=\sqrt{2}.$

So, B is correct choice.

Question 20

If $(a+b)^2-2(a+b)=80$ and $ab=16$, then what is the value of $3a-19b$?

A -16

B -14

C -18

D -20

Answer: B

Explanation:

$(a+b)^2 - 2(a+b) = 80$

or, $(a+b)^2 - 2(a+b) + 1 = 80 + 1$.

or, $(a+b-1)^2 = 9^2$.

or, $(a+b-1) = 9$.

or, $(a+b) = 10$ ..... (1)

Now, $(a-b)^2 = (a+b)^2 - 4ab = 100 - 4.16 = 36$.

or, $(a-b) = 6$ ..... (2)

By solving (1) & (2) we get :

a=8 and b=2 .

So, $3a - 19b = 3 \times 8 - 19 \times 2 = -14$.

B is correct choice.

Question 21

If $x^{y+z} = 1, y^{x+z} = 1024$ and $z^{x+y} = 729$(x, y and z are natural numbers), then what is the value of $(z+1)^{y+x+1}$?

A 6561

B 10000

C 4096

D 14641

Answer: B

Explanation:

$x^{y+z} = 1$ from this we can say that , $x = 1$.

And, From $y^{x+z} = 1024$ we can say that :

$y^{x+z} = 2^{10}$.

or, $y = 2 \; and \; x + z = 10$.

or, $z = 9$.

Now, if we put this value in $z^{x+y} = 729 \; equation$,

it implies that : $9^{1+2} = 9^3 = 729$.

So, Value of x=1, y=2 and z=9 .

So, $(z+1)^{y+x+1} = 10^{1+2+1} = 10000$.

B is correct choice.

Question 22

If $x + y + z = 1, x^2 + y^2 + z^2 = 2$ and $x^3 + y^3 + z^3 = 3$,then what is the value of xyz?

A $\frac{1}{3}$

B $\frac{1}{6}$

C $\frac{1}{2}$

D $\frac{1}{4}$

Answer: B

Explanation:

$(x+y+z)^2 = x^2+y^2+z^2+2(xy+yz+xz)$.

Or, $(1)^2 = 2+2(xy+yz+xz)$.

Or, $(xy+yz+xz) = -\frac{1}{2}$.

$x^3+y^3+z^3 = (x+y+z)[x^2+y^2+z^2-xy-yz-xz]+3xyz$.

Or, $3 = (1)[2+\frac{1}{2}]+3xyz$.

Or, $3xyz = 3-\frac{5}{2} = \frac{1}{2}$.

Or, $xyz = \frac{1}{6}$.

B is correct choice.

Question 23

In triangle PQR, the internal bisector of $\angle Q$ and $\angle R$ meets at O. If $\angle QPR$ = 70°, then what is the value (in degrees) of $\angle QOR$?

A 45

B 125

C 115

D 110

Answer: B

Explanation:

we know that,

If Bisectors of angle Q and angle R of triangle PQR meet at point O. then, angle QOR = 90°+1/2 angle P

So,

$\angle QOR = 90^\circ + \frac{70^\circ}{2} = 125^\circ$.

So, B is correct choice.

Question 24

PQR is a triangle such that $PQ = PR$. RS and QT are the median to the sides PQ and PR respectively. If the medians RS and QR intersect at right angle, then what is the value of $\left(\frac{PQ}{QR}\right)^2$?

A $\frac{3}{2}$

B $\frac{5}{2}$

C 2

D None of these

Answer: B

Question 25

PQR is a triangle. S and T are the midpoints of the sides PQ and PR respectively. Which of the following is TRUE?
I. Triangle PST is similar to triangle PQR.
II. ST = $\frac{1}{2}$(QR)
III. ST is parallel to QR.

A only I and II

B only II and III

C only I and III

D All I, II and III

Answer: D

Question 26

ABC is a triangle in which ∠ABC = 90°. BD is perpendicular to AC. Which of the following is TRUE?
I. Triangle BAD is similar to triangle CBD.
II. Triangle BAD is similar to triangle CAB.
III. Triangle CBD is similar to triangle CAB.

A only I

B only II and III

C only I and III

D All I, II and III

Answer: D

Question 27

Two parallel chords are one the one side of the centre of a circle. The length of the two chords is 24 cm and 32 cm. If the distance between the two chords is 8 cm, then what is the area (in cm^2) of the circle?

A 724.14

B 832.86

C 924.12

D 988.32

Answer: B

Question 28

Two circles of radius 4 cm and 6 cm touch each other internally. What is the length (in cm) of the longest chord of the outer circle, which is also a tangent to inner circle?

A $12\sqrt{2}$

B $8\sqrt{2}$

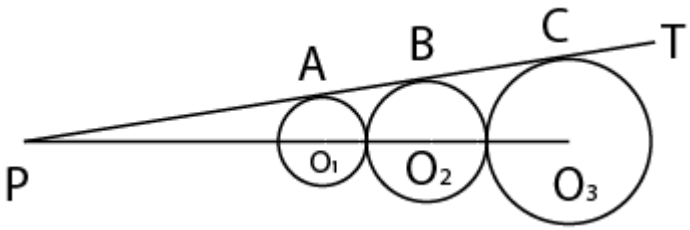
C $6\sqrt{2}$

D $4\sqrt{2}$

Answer: B

Question 29

In the given figure, PT is a common tangent to three circles at points A, B and C respectively. The radius of the small, medium and large circles is 4 cm, 6 cm and 9 cm. O_1, O_2 and O_3 are the centre of the three circles. What is the value (in cm) of PC?



A $18\sqrt{6}$

B $9\sqrt{6}$

C $24\sqrt{6}$

D $15\sqrt{6}$

Answer: A

Question 30

PQRS is a cyclic quadrilateral. PR and QS intersect at T. If $\angle$SPR = 40° and $\angle$PQS = 80°, then what is the value (in degrees) of $\angle$PSR?

A 60

B 40

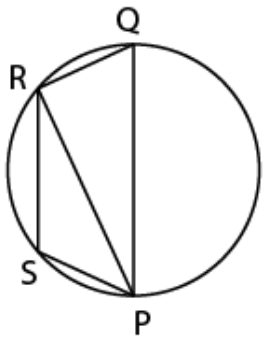
C 80

D 100

Answer: A

Question 31

In the given figure, $\angle PSR$ = 105° and PQ is the diameter of the circle. What is the value (in degrees) of $\angle QPR$?



A 75

B 15

C 30

D 45

Answer: B

Question 32

There are two identical circles of radius 10 cm each. If the length of the direct common tangent is 26 cm, then what is the length (in cm) of the transverse common tangent?

A $2\sqrt{69}$

B $4\sqrt{23}$

C $4\sqrt{46}$

D $3\sqrt{46}$

Answer: A

Question 33

PQRS is a rectangle in which side of PQ = 24 cm and QR = 16 cm. T is a point on RS. What is the area (in cm) of the triangle PTQ?

A 192

B 162

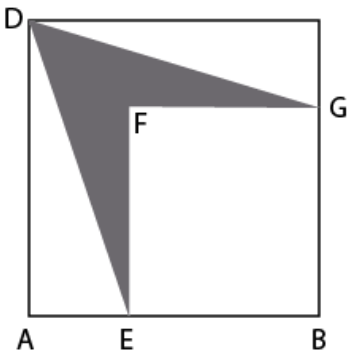
C 148

D Cannot be determined

Answer: A

Question 34

In the given figure. ABCD and BEFG are squares of sides 8 cm and 6 cm respectively. What is the area (in cm ^{2}) of the shaded region?



A 14

B 12

C 8

D 16

Answer: B

Question 35

PQRS is a parallelogram and its area is 300 cm ^{2}. Side PQ is extended to X such that PQ = QX. If XS intersects QR at Y, then what is the area (in cm^2) of triangle SYR?

A 75

B 50

C 120

D 100

Answer: A

Question 36

PQRST is a regular pentagon. If PR and QT intersects each other at X, then what is the value (in degrees) of $\angle$TXR?

A 98

B 90

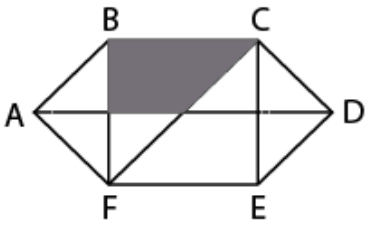
C 72

D 108

Answer: D

Question 37

In the given figure, ABCDEF is a regular hexagon whose side is 12 cm. What is the shaded area (in cm ^{2})?



A $54\sqrt{3}$

B $36\sqrt{3}$

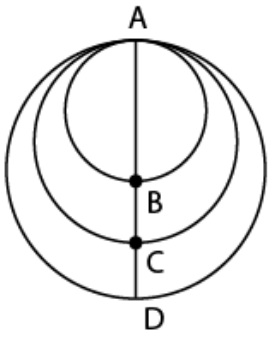
C $48\sqrt{3}$

D $52\sqrt{3}$

Answer: A

Question 38

ABCD passes through the centres of the three circles as shown in the figure. AB = 2 cm and CD = 1 cm. If the area of middle circle is the average of the areas of the other two circles, then what is the length (in cm) of BC?



A $(\sqrt{6}) - 1$

B $(\sqrt{6}) + 1$

C $(\sqrt{6}) - 3$

D $(\sqrt{6}) + 3$

Answer: A

Question 39

A = Area of the largest circle drawn inside a square of side 1 cm.
B = Sum of areas of 4 identical (largest possible) circles drawn inside a square of side 1 cm.
C = Sum of areas of 9 identical circle (largest possible) drawn inside a square of side 1 cm.
D = Sum of area of 16 identical circles (largest possible) drawn inside a square of side 1 cm.

Which of the following is TRUE about A, B, C and D?

A A > B > C > D

B A < B < C < D

C A > B = C > D

D No option is correct.

Answer: D

Question 40

A prism has a square base whose side is 8 cm. The height of prism is 80 cm. The prism is cut into 10 identical parts by 9 cuts which are parallel to base of prism. What is the total surface area (in cm^2) of all the 10 parts together?

A 4260

B 2560

C 3840

D 3220

Answer: C

Question 41

A cone of radius 90 cm and height 120 cm stands on its base. It is cut into 3 parts by 2 cuts parallel to its base such that the height of the three parts (from top to bottom) are in ratio of 1 : 2 : 3. What is the total surface area (in cm^2) of the middle part?

A 14600

B 16500

C 17800

D 18500

Answer: B

Question 42

The curved surface area of a cylinder is 594 cm^2 and its volume is 1336.5 cm^3. What is the height (in cm) of the cylinder?

A 14

B 21

C 24.5

D 10.5

Answer: B

Explanation:
According to question :

$2\pi rh = 594$.

And,

$\pi r^2 h = 1336.50$

So, $\frac{\pi r^2 h}{2\pi rh} = \frac{1336.50}{594} = 2.25.$

or, $\frac{r}{2} = 2.25.$

or, $r = 4.5$.

So, $2\pi \times 4.5 \times h = 594$.

or, $h = \frac{594}{9 \times \frac{22}{7}} = 21$.

So, B is correct choice.

Question 43

A hollow cylinder is made up of metal. The difference between outer and inner curved surface area of this cylinder is 352 cm^2. Height of the cylinder is 28 cm. If the total surface area of this hollow cylinder is 2640 cm^2, then what are the inner and outer radius (in cm)?

A 4, 6

B 10, 12

C 8, 10

D 6, 8

Answer: D

Explanation:

Let say, outer radius is R and inner radius is r .

So, According to question :

$2\pi\ (R-r)\times h\ =\ 352$.

or, $(R-r)=\ ^{352}_{2\times\ ^{22}_{7}\times 28}=2$ ..... (1)

We know that , Total surface area of hollow sphere is = $2\pi\,(R+r)\,(h+R-r)$.

So, $2\pi\,(R+r)\,(h+R-r)\ =\ 2640$.

or, $2\pi\,(R+r)\,(28+2)\ =\ 2640$.

or, $(R+r)=\ ^{2640}_{2\times\ ^{22}_{7}\times 30}=14$ ..... (2)

So, By solving (1) & (2) ,we get :

$R=8\,and\,r=6$.

D is correct choice.

Question 44

A solid metal sphere has radius 14 cm. It is melted to form small cones of radius 1.75 cm and height 3.5 cm. How many small cones will be obtained from the sphere?

A 512

B 256

C 1024

D 2048

Answer: C

Explanation:

Volume of sphere = $^{4}_{3}\pi\ \times r^3=\ ^{4}_{3}\pi\ \times 14^3=\ ^{10976}_{3}\pi$.

Volume of each cone is = $^{1}_{3}\pi\times r^2\times h=\ ^{1}_{3}\pi\times 1.75^2\times 3.5=\ ^{10.71875}_{3}\pi$.

So, required number = $^{^{10976}_{3}\pi}_{^{10.71875}_{3}\pi}=1024$.

C is correct choice.

Question 45

A metallic hemispherical bowl is made up of steel. The total steel used in making the bowl is $486\pi cm^3$. The bowl can hold $144\pi cm^3$ water. What is the thickness (in cm) of bowl and the curved surface area (in cm^2) of outer side?

A $6,162\pi$

B $3,162\pi$

C $6,81\pi$

D $3,81\pi$

Answer: B

Explanation:

Volume of hemisphere = $\left(^{2}_{3}\pi\times r^3\right)$.

So, $\left(\frac{2}{3}\pi \times r_1^3\right) = 486\pi$.

or, $r_1^3 = 486 \times \frac{3}{2} = 729.$

or, $r_1 = 9.$

And, $\frac{2}{3} \times \pi \times r_2^3 = 144\pi$.

or, $r_2^3 = 144 \times \frac{3}{2} = 216$.

or, $r_2 = 6$.

So, Thickness of bowl = $r_1 - r_2 = 9 - 6 = 3$.

So, Curved surface area = $2 \times \pi \times r_1^2 = 2 \times \pi \times 9^2 = 162\pi$.

So, B is correct choice.

Question 46

There is a box of cuboid shape. The smallest side of the box is 20 cm and largest side is 40 cm. Which of the following can be volume (in cm^3) of the box?

A 18000

B 12000

C 36000

D 42000

Answer: A

Explanation:

We know that , Volume of a cuboid is $(l \times b \times h)$.

So, if we consider given Volume's :

For 18000 :

$40 \times 20 \times x = 18000$.

or, $x = 22.5$.

which means that this side length is lies between 20 and 40 .

So, 18000 can be the volume .

For 12000 :

$40 \times 20 \times x = 12000$.

or, $x = 15$.

But given that smallest side is 20 .

So, 12000 is not possible volume .

For 36000:

$40 \times 20 \times x = 36000$.

or, $x = 45$.

But given that largest side is 40.

So, 36000 is not possible volume.

For 42000 :

$20 \times 40 \times x = 42000$.

or, x=52.5 .

But given that largest side is 40 .

So,42000 is not possible volume .

A is correct choice.

Question 47

A pyramid has a square base, whose side is 8 cm. If the height of pyramid is 16 cm, then what is the total surface area (in cm ^{2}) of the pyramid?

A $64(\sqrt{17}+1)$

B $32(\sqrt{13}+1)$

C $64(\sqrt{3}+1)$

D $32(\sqrt{5}+1)$

Answer: A

Explanation:

Area of the base of Pyramid is = $(8 \times 8)\ cm = 64\, cm.$

Curved or lateral surface area of pyramid

=1/2×(perimeter of base)×slant height

Slant height = $\sqrt{16^2 + \left(\frac{8}{2}\right)^2} = \sqrt{256+16} = \sqrt{272} = 4\sqrt{17}.$

So, Curved surface area = $\frac{1}{2} \times 32 \times 4\sqrt{17} = 64\sqrt{17}.$

So, Total surface area= $64\sqrt{17} + 64 = 64\left(\sqrt{17}+1\right)\ cm^2.$

A is correct choice.

Question 48

What is the value of $\frac{2(1-\sin^2\theta)\,\mathrm{cosec}^2\theta}{\cot^2\theta(1+\tan^2\theta)} - 1$**?**

A $\sin 2\theta$

B $\sin^2\theta$

C $\cos^2\theta$

D $\cos 2\theta$

Answer: D

Explanation:

$\frac{2(1-\sin^2\theta)\,\mathrm{cosec}^2\theta}{\cot^2\theta(1+\tan^2\theta)} - 1\ .$

$= \frac{2\cos^2\theta\ \mathrm{cosec}^2\theta}{\frac{\cos^2\theta}{\sin^2\theta}.\sec^2\theta} - 1\ .$

$= \frac{2\cos^2\theta\ \mathrm{cosec}^2\theta\sin^2\theta}{\cos^2\theta.\sec^2\theta} - 1\ .$

$= \frac{2\ .\ 1.\ 1}{\sec^2\theta} - 1\ .$

$= 2\ \cos^2\theta\ - 1\ .$

$= \cos 2\theta\ .$

D is correct choice.

Question 49

What is the value of $\frac{\cos 2A+2\cos^2 A-2\cos 2A\cos A}{\sin 2A-2\sin^2 A\sin 2A}$ **?**

A $2\cot A$

B $2\tan A$

C $\cot A$

D $\tan A$

Answer: D

Question 50

What is the value of cos 15° - cos 165°?

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

B $\frac{2}{(\sqrt{3}-1)}$

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

D $\frac{\sqrt{3}+1}{2}$

Answer: C

Explanation:
cos 15 = cos (45-30)

=> cos 15 = cos 45 * cos 30 + sin 45 * sin 30

=> cos 15 = (1/√2)* (√3/2) + (1/√2)*(1/2)

=> cos 15 = (√3 + 1)/2√2

$\cos 15^\circ - \cos 165^\circ = \cos 15^\circ + \cos 15^\circ = 2\cos 15^\circ$.

So,

$\cos 15^\circ - \cos 165^\circ = \frac{\sqrt{3}+1}{\sqrt{2}}$.

C is correct choice.

Question 51

If $P+Q+R=60°$**, then what is the value of** $\cos Q\cos R(\cos P-\sin P)+\sin Q\sin R(\sin P-\cos P)$**?**

A $\frac{1}{2}$

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

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

D $\sqrt{2}$

Answer: A

Question 52

What is the value of $\frac{[1-\tan(90-\theta)]^2}{[\cos^2(90-\theta)]} - 1$**?**

A $-\sin 2\theta$

B $-\cos 2\theta$

C $\cos 2\theta$

D $\sin 2\theta$

Answer: A

Explanation:

$$\frac{[1-\tan(90-\theta)]^2}{[\sec^2(90-\theta)]} - 1$$

$$= \frac{[1-\cot(\theta)]^2}{[\operatorname{cosec}^2(\theta)]} - 1 .$$

$$= [1 - \frac{2\cos(\theta)}{\sin(\theta)} . \frac{\sin^2(\theta)}{1} - 1 .$$

$$= -\sin(2\theta) .$$

A is correct choice.

Question 53

What is the value of $\frac{[1+2\cot^2(90-x)-2\operatorname{cosec}(90-x)\cot(90-x)]}{[\operatorname{cosec}(90-x)-\cot(90-x)]}$**?**

A $\cos x + \sin x$

B $\sin x - \cos x$

C $\sec x + \tan x$

D $\sec x - \tan x$

Answer: D

Explanation:

$$\frac{[1+2\cot^2(90-x)-2\operatorname{cosec}(90-x)\cot(90-x)]}{[\operatorname{cosec}(90-x)-\cot(90-x)]}$$

$$= \frac{[1+2\tan^2(x)-2\sec(x)\tan(x)]}{[\sec(x)-\tan(x)]}$$

$$= \frac{[\sec^2 x-\tan^2 x+2\tan^2(x)-2\sec(x)\tan(x)]}{[\sec(x)-\tan(x)]}$$

$$= \frac{[\sec(x)-\tan(x)]^2}{[\sec(x)-\tan(x)]} .$$

$$= [\sec(x) - \tan(x)] .$$

D is correct choice.

Question 54

What is the value of $\sin(180-\theta)\sin(90-\theta) - \left[\frac{\cot(90-\theta)}{1+\tan^2\theta}\right]$

A $\cos^2\theta \sin\theta$

B $\frac{\cot\theta}{1+\cot^2\theta}$

C $\frac{\tan\theta}{1+\tan^2\theta}$

D 0.

Answer: D

Explanation:

$\sin(180-\theta)\sin(90-\theta) - \left[\frac{\cot(90-\theta)}{1+\tan^2\theta}\right]$

$= \sin\theta\ \cos\theta - \left[\frac{\tan\theta}{\sec^2\theta}\right]$

$= \sin\theta\ \cos\theta - \begin{bmatrix}\sin\theta & \cos^2\theta \\ \cos\theta . & 1\end{bmatrix}$

$= \sin\theta\ \cos\theta - [\sin\theta\ \cos\theta]$

$= 0\ .$

D is correct choice.

Question 55

A pole is standing on the top of a house. Height of house is 25 metres. The angle of elevation of the top of house from point P is 45° and the angle of elevation of the top of pole from P is 60°. Point P is on the ground level. What is the height (in metres) of pole?

A $10(\sqrt{3}+1)$

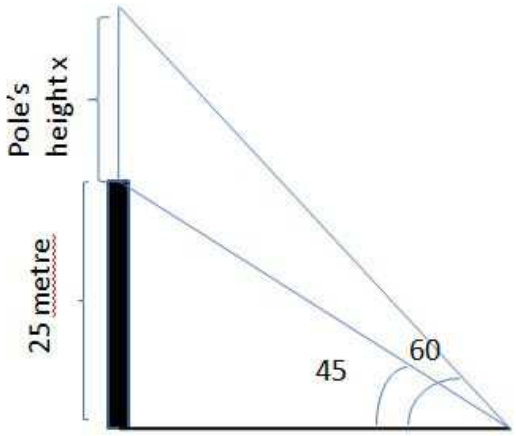
B $15(\sqrt{3}+1)$

C $25(\sqrt{3}-1)$

D $20(\sqrt{3}-1)$

Answer: C

Explanation:



Let say, Pole's height is x and point P is m meter far from base of House.

$\tan 45^\circ = \frac{25}{m}.$

or, $m = 25.$

So, $\tan 60^\circ = \frac{25+x}{m}$.

or, $\sqrt{3} = \frac{25+x}{25}$.

or, $x = 25\left(\sqrt{3}-1\right)$.

C is correct choice.

Question 56

A ladder is placed against a wall such that it just reaches the top of the wall. The foot of the ladder is at a distance of 5 metres from the wall. The angle of elevation of the top of the wall from the base of the ladder is 15°. What is the length (in metres) of the ladder?

A $5\sqrt{6}-5\sqrt{3}$

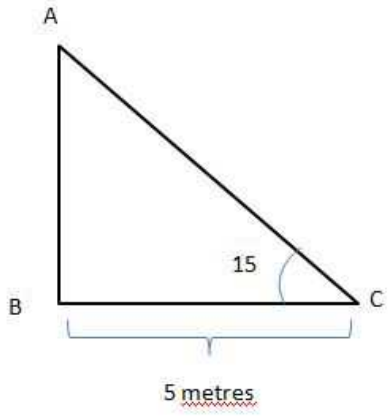
B $5\sqrt{6}-5\sqrt{2}$

C $5\sqrt{2}-1$

D $5\sqrt{3}+5\sqrt{2}$

Answer: B

Explanation:



So, $\tan 15^\circ = \frac{AB}{BC} = \frac{AB}{5}$.

We know that , $\tan 15^\circ = \left(2-\sqrt{3}\right)$.

So, $AB = 5\left(2-\sqrt{3}\right)$.

So, Ladder height = AC = $\sqrt{BC^2+AB^2}$.

Now, AC = $\sqrt{5^2+\left(5\left(2-\sqrt{3}\right)\right)^2} = \sqrt{25+100-100\sqrt{3}+75} = \sqrt{\left(5\sqrt{6}-5\sqrt{2}\right)^2} = \left(5\sqrt{6}-5\sqrt{2}\right)$.

B is correct choice.

Question 57

An aeroplane is flying horizontally at a height of 1.8 km above the ground. The angle of elevation of plane from point X is 60° and after 20 seconds, its angle of elevation from X is become 30°. If point X is on ground, then what is the speed (in km/hr) of aeroplane?

A $180\sqrt{3}$

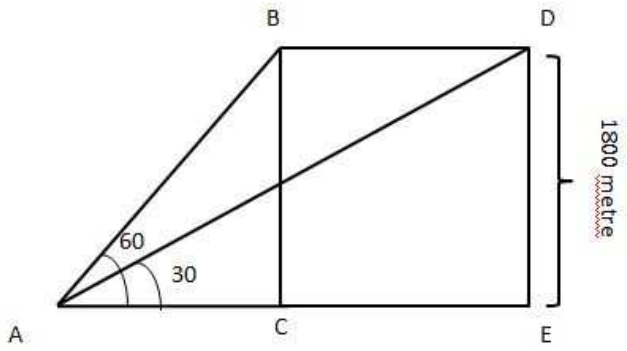
B $105\sqrt{3}$

C $201\sqrt{3}$

D $305\sqrt{3}$

Answer: A

Explanation:



In ΔABC,
cot 60° = AC/BC
=> 1/√3 = AC/1800
=> AC = 1800/√3 ....(i)

In ΔAED,
cot 30° = AE/ED
=> √3 = AE/1800
=> AE = 1800√3 ....(ii)

From figure,
BD = CE
and, CE = AE - AC
so, BD = AE - AC

Now, substituting value of AE and AC from equations (i) and (ii),
BD = 1800√3 - 1800/√3
= 1800 (√3 - 1/√3)
= 1800 × 2/√3
BD = 3600/√3

BD is covered by the aeroplane in 20 seconds. So,
Speed of Aeroplane = Distance (BD) ÷ Time (t)
= (3600/√3 ÷ 20) m/sec
= 180√3 m/sec

A is correct choice.

Instructions

The table given below shows the production of maize by 5 different states as a percentage of total production. Each state produces only maize and rice. There are three types of rice — R1, R2 and R3. The table also shows the R1 type of rice produced as a percentage of total rice production and the ratio of R2 and R3 type of rice. Total production by each state is 625000.

State	Maize	R1	R2 : R3
H	32%	60	6:11
R	62%	60	9:10
X	52%	60	3:05
S	52%	55	4:05
T	74%	80	3:10

Question 58

What is the difference between the R1 type of rice produced by state X and the R2 type of rice produced by state H?

A 115000

B 120000

C 55000

D 65000

Answer: B

Explanation:
The difference between the R1 type of rice produced by state X and the R2 type of rice produced by state H is =180000-60000=120000.

B is correct choice.

Question 59

What is the sum of the total production of maize by state X and T and total production of R2 type of Rice by state S and R?

A 868500

B 1025000

C 925000

D 892500

Answer: D

Explanation:
The total production of maize by state X and T = $0.52 \times 625000 + 0.74 \times 625000 = 787500.$

Total production of R2 type of Rice by state S and R = 60000+45000=105000 .

So, Total = $787500 + 105000 = 892500$.

D is correct choice.

Question 60

Production of R3 type of rice by state X is what percentage of production of R1 type of rice by state S?

A 45.45

B 52.52

C 42.5

D 39.5

Answer: A

Explanation:
$\frac{\text{Production of } R3 \text{ type of rice by state } X}{\text{Production of } R1 \text{ type of rice by state } S}$

$= \frac{75000}{165000} \times 100 = 45.45\ \%$.

A is correct choice.

Question 61

A = Average of the R3 type of rice produced by state H, R, S and X together.
B = Difference between the R2 type of rice produced by state T and R1 type of rice produced by state R.
What is the value of B - A?

A 54750

B 56750

C 57500

D 57000

Answer: C

Explanation:
R3 Productions :

H = $0.68 \times 0.40 \times 625000 \times \frac{11}{17} = 110000.$

R = $0.38 \times 0.40 \times 625000 \times \frac{10}{19} = 50000.$

X = $0.48 \times 0.40 \times 625000 \times \frac{5}{8} = 75000.$

S = $0.48 \times 0.45 \times 625000 \times \frac{5}{9} = 75000.$

So, Average (A) = 77500.

R2 Production of T = $0.26 \times 0.20 \times 625000 \times \frac{3}{13} = 7500.$

R1 Production of R = $0.38 \times 0.60 \times 625000 = 142500.$

So, (B-A) = 135000-77500= 57500.

C is correct choice.

Question 62

F = Total production of R2 type of rice by all the states.
K = Average of the total production of R1 type of rice by all the states.
What is the value of K/F?

A .875

B 0.802

C 0.08

D .702

Answer: B

Explanation:
R2 productions :

H = $0.68 \times 0.40 \times 625000 \times \frac{6}{17} = 60000.$

R = $0.38 \times 0.40 \times 625000 \times \frac{9}{19} = 45000.$

X = $0.48 \times 0.40 \times 625000 \times \frac{3}{8} = 45000.$

S = $0.48 \times 0.45 \times 625000 \times \frac{4}{9} = 60000.$

T = $0.26 \times 0.20 \times 625000 \times \frac{3}{13} = 7500.$

Total Production of R2 (F)= 217500 .

R1 Productions :

H = $0.68 \times 0.60 \times 625000 = 255000.$

R = $0.38 \times 0.60 \times 625000 = 142500.$

X = $0.48 \times 0.60 \times 625000 = 180000.$

S = $0.48 \times 0.55 \times 625000 = 165000.$

T = $0.26 \times 0.80 \times 625000 = 130000.$

Average of R1(K) =174500 .

So, K/F = $\frac{174500}{217500} = 0.802$.

B is correct choice.

Instructions
For the following questions answer them individually

Question 63

If x beakers of 100 ml containing 1:4 acid-water solution are mixed with y beakers of 200 ml containing 3:17 acid-water solution then the ratio of acid to water in the resulting mixture becomes 19:91. Find x:y.

A 5 : 3

B 3 : 5

C 7 : 13

D 13 : 7

Answer: A

Explanation:
beakers of 100 ml containing 1 : 4 acid-water solution

=> acid = 100 * 1/5 = 20 ml

Water = 100 * 4/5 = 80 ml

in x beaker acid = 20x ml

& in x beakers water = 80x ml

beakers of 200 ml containing 3 : 17 acid-water solution

=> acid = 200 * 3/20 = 30 ml

& water = 200 * 17/20 = 170 ml

in y beaker acid = 30y ml

& in y beakers water = 170y ml

Acid = 20x + 30y

Water = 80x + 170y

Resulting mixture = 19 : 91

=> (20x + 30y)/(80x + 170y) = 19/91

=> (2x + 3y) /(8x + 17y) = 19/91

=> 91(2x + 3y) = 19(8x + 17y)

=> 182x + 273y = 152x + 323y

=> 30x = 50y

=> 3x = 5y

=> x /y = 5/3

=> x : y = 5 : 3

A is correct choice.

Question 64

In what ratio should 20% ethanol solution be mixed with 40% ethanol solution to obtain a 28% ethanol solution?

A 2 : 3

B 8 : 5

C 3 : 2

D 5 : 8

Answer: C

Explanation:
$0.2x + 0.4y = 0.28\,(x + y)$

or, $0.08x = 0.12y$

or, $\frac{x}{y} = \frac{12}{8} = \frac{3}{2}$.

C is correct choice.

Question 65

A and B start a business by investing equal amounts. Four months later, C joins them by investing Rs 3.5 lakhs. By withdrawing his investment in the business B leaves the business 4 months after C joined. At the end of the year the business makes Rs 62,400 profit out of which A collects Rs 24,000 as his share of profit. How much should be paid to C (in Rs) as his share of profit?

A 16000

B 32000

C 22400

D 27800

Answer: C

Explanation:
Let A and B invested Rs. x each in the business at the starting and as given, C invested Rs. 3.5

Lakhs.

Since A invested for 12 months, B invested for 8 months and C invested for 8 months.

⇒ Ratio in which profit would be shared = (x × 12) : (x × 8) : (3.5 × 8) = 3x : 2x : 7 .

Now given total profit is Rs. 62400 and profit share of A is Rs. 24000,

⇒ 3x/ (5x + 7) = 24000/62400

⇒ 3x/ (5x + 7) = 5/13

⇒ 39x = 25x + 35

⇒ 14x = 35

⇒ x = 5/2 = 2.5 lakhs

∴ Share of C = [7/ (12.5 + 7)] × 62400 = Rs. 22400

C is correct choice.

Question 66

A and B invest in a business in the ratio 3 : 7. The business makes a profit of Rs 60,000 in 1 year. They decide to distribute the profit remaining after reinvesting 40% of the profit. How much will A get (in Rs)?

A 25200

B 15600

C 10800

D 20400

Answer: C

Explanation:
Profit after reinvestment = $60000 - 0.40 \times 60000 = 36000\ Rs.$

So, A will get = $\left(\frac{3}{10} \times 36000\right)\ Rs\ = 10800\ Rs.$

C is correct choice.

Question 67

A can do a work in 72 days and B in 90 days. If they work on it together for 10 days, then what fraction of work is left?

A $\frac{3}{4}$

B $\frac{1}{4}$

C $\frac{4}{5}$

D $\frac{5}{6}$

Answer: A

Explanation:
In 10 days ,they together will do = $10\left(\frac{1}{90} + \frac{1}{72}\right) = 10\left(\frac{4+5}{360}\right) = \frac{1}{4}\ part\ of\ work\ .$

So, work left = $\left(1 - \frac{1}{4}\right) = \frac{3}{4}$.

A is correct choice.

Question 68

A is thrice as good a workman as B. C alone takes 48 days to paint a house. All three A, B and C working together take 16 days to paint the house. It will take how many days for B alone to paint the house?

A 32

B 64

C 96

D 72

Answer: C

Explanation:
Let say , B alone can paint in b days .

So, C alone can do in $\left(\frac{b}{3}\right)$ days.

So, According to question,

$\frac{1}{b} + \frac{3}{b} + \frac{1}{48} = \frac{1}{16}$.

or, $\frac{4}{b} = \frac{1}{16} - \frac{1}{48}$.

or, $\frac{4}{b} = \frac{3-1}{48} = \frac{2}{48}$.

or, $b = 96$.

C is correct choice.

Question 69

C is 5 times as productive as B. A takes 60 days to complete a task. If A, B and C work together they can complete the task in 12 days. In how many days can B complete the task if he worked alone?

A 18

B 27

C 90

D 72

Answer: C

Explanation:
Let say, B can do in b days.

So, C can do in $\left(\frac{b}{5}\right)$ days.

So, in 1 day A,B,C will do = $\left(\frac{1}{b} + \frac{5}{b} + \frac{1}{60}\right)$.

So, $\left(\frac{1}{b} + \frac{5}{b} + \frac{1}{60}\right) = \frac{1}{12}$.

or, $\frac{6}{b} = \frac{1}{12} - \frac{1}{60} = \frac{5-1}{60} = \frac{4}{60} = \frac{1}{15}$.

or, $b = 90$.

So, C is correct choice.

Question 70

A can complete 50% of a job in 9 days and B can complete 25% of the job in 9 days if they worked alone. If they worked together how much of the job (in %) can they complete in 9 days?

A 80

B 90

C 75

D 100

Answer: C

Explanation:
A can do :

in 1 day = $\left(\frac{1}{2} \times \frac{1}{9}\right) = \frac{1}{18}\ \ part\ of\ job$.

B can do :

in 1 day = $\left(\frac{1}{4} \times \frac{1}{9}\right) = \frac{1}{36}\ \ part\ of\ job$.

So, in 1 day they together do = $\left(\frac{1}{36} + \frac{1}{18}\right) = \frac{3}{36} = \frac{1}{12}\ \ part\ of\ job$.

So, in 9 days they will do = $\left(\frac{9 \times 100}{12}\right) = 75\%\ \ \ of\ job$.

C is correct choice.

Question 71

Giving two successive discounts of 60% is equal to giving one discount of ..... %.

A 90

B 72

C 96

D 84

Answer: D

Explanation:
If he gives two successive discount of 60% ,means the present price of the item is $= 0.40 \times 0.40 = 0.16$ of the CP.

It means a discount of $(1 - 0.16) = 0.84$ is made .

D is correct choice.

Question 72

If an item marked at Rs 480 is being sold at Rs 400, then what is the effective discount on the item?

A 20

B 16.67

C 25

D 15

Answer: B

Explanation:
Given

M.P.= 480/-

S.P.= 400/-

Discount = 80/-

Effective discount= $\frac{discount}{M.P} \times 100$

Therefore,

$\frac{80}{480} \times 100$

=16.67

Hence option B is right answer.

Question 73

On an item there is cash 5% discount on the marked price of Rs 25,000. After giving an additional season's discount the item is sold at Rs 20,900. How much was the season's discount (in %)?

A 11

B 10

C 12

D 9

Answer: C

Explanation:

After 5% discount on the marked price of Rs 25,000 ,the price become = $0.95 \times 25000 = 23750\ Rs.$

Let say, he gave x% discount .

So, $23750\left(1-\frac{x}{100}\right)=20900$.

or, $\left(1-\frac{x}{100}\right)=\frac{20900}{23750}=0.88$.

or, $\frac{x}{100}=1-0.88=0.12$.

or, $x=12$.

C is correct choice.

Question 74

A retailer marks up his goods by 20% and then offers 25% discount. What will be the selling price on an item that he sells if its cost price (in Rs) is Rs 2500?

A 2400

B 3000

C 2750

D 2250

Answer: D

Explanation:

Selling price is = $2500 \times (1.20) \times (1-0.25) = 2250\ Rs.$

D is correct choice.

Question 75

Find two numbers such that their mean proportional is 18 and the third proportional to them is 144.

A 6 and 42

B 9 and 36

C 3 and 18

D 6 and 12

Answer: B

Explanation:

$\frac{x}{18}=\frac{18}{y}$.

or, $xy=18^2$.....(1)

Again,

$\frac{x}{y}=\frac{y}{144}$.

or, $x=\frac{y^2}{144}$.

So, from eq (1) :

$\frac{18^2}{y}=\frac{y^2}{144}$.

or, $y^3=18^2\times 144$.

or, $y = 36$.

So, $x = \frac{18^2}{36} = 9$.

B is correct choice.

Question 76

If 6A = 4B = 9C; find A: B: C

A 6:4:9

B 6:9:4

C 4:9:6

D 9:6:4

Answer: B

Explanation:
Given that

$6A = 4B = 9C$

let

6A=4B & 4B=9C

$\frac{A}{B} = \frac{4}{6}$.....(1)

$\frac{B}{C} = \frac{9}{4}$.....(2)

From eq.1&2

$A : B : C = 12 : 18 : 8$

Or

$A : B : C = 6 : 9 : 4$

Hence option B is right answer

Question 77

Find the third proportional to 10 and 25.

A 2.5

B 62.5

C 40

D 100

Answer: B

Explanation:
Let say, x is third proportional .

So, $\frac{10}{25} = \frac{25}{x}$.

or, $x = \frac{625}{10} = 62.5$.

B is correct choice.

Question 78

A purse has Rs 34.5 in the form of 1-rupee, 50-paise and 10-paise coins in the ratio of 6:9:10. Find the number of 10-paise coins.

A 10

B 30

C 20

D 40

Answer: B

Explanation:
Let say, 1-rupee , 50-paise and 10-paise coins are 6k,9k and 10k.

So, $6k + 0.50 \times 9k + 0.10 \times 10k = 34.50$.

or, $11.50k = 34.50$.

or, $k = \frac{34.50}{11.50} = 3.$

So, there are $(10 \times 3) = 30$ number of 10-paise coins.

B is correct choice.

Question 79

What number should be added to each of the numbers 103, 135, 110 and 144 so that the resulting numbers are in proportion?

A 12

B 15

C 9

D 6

Answer: C

Explanation:
Let say, x be the number.

So,

$\frac{103+x}{135+x} = \frac{110+x}{144+x}$

or, $(103 + x)(144 + x) = (135 + x)(110 + x)$

or, $\left(103x + x^2 + 144x + 14832\right) = \left(135x + x^2 + 110x + 14850\right)$

or, $(247x + 14832) = (245x + 14850)$

or, $2x = 18$.

or, $x = 9$.

C is correct choice.

Question 80

When ticket prices to a water park are increased in the ratio 11:12 then the number of daily visitors to the park fall in the ratio 8:7. If the daily revenues before the increase in ticket price was Rs 176,000, then find the daily revenues after the increase in ticket price.

A 264000

B 112000

C 192000

D 168000

Answer: D

Explanation:
Let say, new price is 12k and old price was 11k .

And, Previous visitors was 8m and new visitors are 7m.

According to question ,

$8m \times 11k = 176000$.

or, $mk = \frac{176000}{88} = 2000$.

So, New revenue = $7m \times 12k = 7 \times 12 \times 2000 = 168000$.

D is correct choice.

Question 81

The average weight of X, Y and Z is 74 kg. If the average weight of X and Y be 68 kg and that of Y and Z be 78 kg, then the weight (in kg) of Y is

A 72

B 70

C 68

D 66

Answer: B

Explanation:
Given that average value of x & y is 68kg

$\frac{x+y}{2} = 68$

$x + y = 68 \times 2 = 136$.....(1)

also,

$\frac{z+y}{2} = 78$

$x + y = 78 \times 2 = 156$...(2)

average of x,y& z is 74kg

$\frac{x+y+z}{3} = 74$

$x + y + z = 74 \times 3 = 222$.....(3)

subtracting eq. 3 from sum of eq. 1 & 2

$292 - 222 = 70$

Hence, option B is right answer.

Question 82

Of the 3 numbers whose average is 26, the first is $\frac{2}{11}$ times the sum of other two. The first number is:

A 16

B 13

C 11

D 12

Answer: D

Explanation:
Let say , other two numbers are x and y.

So, First number is = $\frac{2}{11}(x+y)$.

So,

$\frac{(x+y)+\frac{2}{11}(x+y)}{3} = 26$.

or, $\frac{13}{11}(x+y) = 78$.

or, $(x+y) = 66$.

So, first number is = $\frac{2}{11}(x+y) = \frac{2}{11} \times 66 = 12$.

D is correct choice.

Question 83

The average weight of a class of 50 students is 48.6 kg. If the average weight of the 20 boys is 54 kg, then find the average weight (in kg) of the girls in the class.

A 40

B 46

C 45

D 42

Answer: C

Explanation:
Total weight of 50 students = $50 \times 48.6 = 2430$.

Total weight of boys = $20 \times 54 = 1080$.

Total of 30 girls = $2430 - 1080 = 1350$.

So, Average weight of them = $\frac{1350}{30} = 45$.

C is correct choice.

Question 84

The average of all odd numbers from 113 to 159 is .....

A 135

B 134

C 133

D 136

Answer: D

Explanation:
first term is 113 .

So, next odd terms would be at common difference of 2.

So, $113 + (n-1)\,2 = 159$.

or, $(n-1) = {}^{46}_{2} = 23.$

or, $n = 24.$

So, Total of all odd numbers from 113 to 159 = ${}^{24}_{2}\,(113 + 159) = 3264.$

So, Average of them = ${}^{3264}_{24} = 136$.

D is correct choice.

Question 85

A trader buys jowar at Rs 30 per kg. 20% of the grain gets wasted. He plans to sell the remaining grain so that he makes 40% overall profit. At what price (in Rs per kg) should he sell the grain?

A 48

B 50

C 52.5

D 47.5

Answer: C

Explanation:
Let say, total jowar is 100 kg and he sold rest of jowar in x Rs/kg.

Iotal cost price of 100 kg = $100 \times 30 = 3000\ Rs.$

Wasted grain = $100 \times 0.20 = 20\ kg.$

So, He sold 80 kg at the price of x Rs/kg to gain 40% overall.

So, according to question,

$80x - 3000 = 0.40 \times 3000$.

or, $x = 1.40 \times {}^{3000}_{80} = 52.50$.

So, C is correct choice.

Question 86

If a vendor sells a watermelon at Rs 69 he makes 8% loss. If he wants to make 16% profit then at what price (in Rs) should he sell?

A 91

B 83

C 87

D 79

Answer: C

Explanation:
According to question ,

$0.92 \times\ Watermilon^{\text{cost price}} = 69$.

or, $Watermilon^{\text{cost price}} = {}^{69}_{0.92} = 75.$

To have a 16% profit, he must sells it in = $75 \times 1.16 = 87\ Rs.$

C is correct choice.

Question 87

The cost of 25 items is the same as the revenue earned by selling x items. Find x, if the profit made in the transaction is 25%.

A 25

B 16.67

C 20

D 32

Answer: C

Explanation:
Let say, cost price of each item is c and selling price of each item p.

So, $25c = xp.$

And,

$xp - xc = 0.25xc$

or, $p = 1.25c.$

So, $25c = x \times 1.25c$.

or, $x = \frac{25c}{1.25c} = 20.$

C is correct choice.

Question 88

An item is sold for Rs 7130 making a 15% profit. What is the cost price (in Rs) of this item?

A 6000

B 6125

C 6250

D 6200

Answer: D

Explanation:
Let say, the cost price is x Rs.

So, $1.15x = 7130$.

or, $x = \frac{7130}{1.15} = 6200$.

D is correct choice.

Question 89

0.02% of 150% of 600 is:

A 0.18

B 1.8

C 18

D 0.018

Answer: A

Explanation:
$0.02\,\% \times 150\,\% \times\ 600 = 0.12 \times 1.5 = 0.18$.

A is correct choice.

Question 90

When a number is increased by 40, it becomes 125% of itself. What is the number?

A 200

B 60

C 160

D 100

Answer: C

Explanation:
Let say, number is x.

So, $x + 40 = 1.25x$.

or, $x = \ ^{40}_{0.25} = 160.$

C is correct choice.

Question 91

In an exam of 300 marks a student gets 75 marks. If she had scored 6 more marks she would have attained passing percentage. What is the passing percentage?

A 25

B 30

C 35

D 27

Answer: D

Explanation:
According to question, passing marks =75+6=81.

So, passing percentage = $^{81}_{300} \times 100 = 27\,\%.$

D is correct choice.

Question 92

A man's annual income has increased by Rs 2 laths but the tax on income that he has to pay has reduced from 20% to 16%. He now pays the same amount of tax as before. What is his increased income (in Rs laths)?

A 8

B 10

C 12

D 6

Answer: B

Explanation:
Let say, previous income was = x lakhs.

So, According to question,

$x \times 0.20 = (x+2) \times 0.16$

or, $0.04x = 0.32.$

or, $x = \frac{0.32}{0.04} = 8.$

So, his increased income = $8 + 2 = 10\, lakhs.$

B is correct choice.

Question 93

A car covers 630 km in 20 hours. Calculate its average speed in meters/second?

A 8.25

B 7.75

C 8.75

D 7.25

Answer: C

Explanation:
Average speed = $\frac{630}{20}\ \frac{km}{h} = \frac{630\times1000}{20\times3600}\ \frac{m}{\text{sec}} = 8.75\ \frac{m}{\text{sec}}.$

C is correct choice.

Question 94

A jet ski goes upstream at a speed of 48 km/hr and comes back the same distance at 80 km/hr. Find the average speed (in km/hr) for the total journey.

A 64

B 62

C 66

D 60

Answer: D

Explanation:
Let say, total distance is d km.

We know , Average speed = $\frac{Total\ distance\ covered}{Total\ time\ taken\ in\ journey}.$

So, Average speed = $\frac{2d}{\frac{d}{48}+\frac{d}{80}}\ \frac{km}{h} = \frac{2d}{\frac{d(5+3)}{240}}\ \frac{km}{h} = 60\ \frac{km}{h}.$

D is correct choice.

Question 95

A bullet fired from a rifle travels at an average speed of 2520 km/hr. It hits the target after 0.2 seconds. How far (in m) is the target from the rifle?

A 70

B 140

C 100

D 200

Answer: B

Explanation:

Distance of rifle and target is = $\left(\frac{2520\times1000}{3600}\times 0.2\right) m = 140\, m.$

B is correct choice.

Question 96

Train A and B start at the same time. Train A travels at 55 km/hr from station X to station Y and train B travels at 80 km/hr from station Y to station X. They cross each other after 1 hour and 36 minutes. What is the distance (in km) between stations X and Y?

A 196

B 232

C 240

D 216

Answer: D

Explanation:

1 hr 36 min = 1.6 hr.

So, Distance between X and Y is= $80 \times 1.6 + 55 \times 1.6 = 216\, km.$

D is correct choice.

Question 97

If in 2 years at simple interest the principal increases by 16%, what will be the compound interest earned (in Rs) on Rs 25,000 in 2 years at the same rate?

A 4000

B 2160

C 2000

D 4160

Answer: D

Explanation:

Let the rate be r% and principle be p .

So, According to question,

$0.16p = p \times \frac{r}{100} \times 2$

or, $r = 8\ \%$.

So, C.I= $25000\left(1+0.08\right)^2 - 25000 = 4160\ Rs.$

D is correct choice.

Question 98

If compound interest received on a certain amount in the 2^{nd} year is Rs 250. What will be the compound interest (in Rs) for the 3^{rd} year on the same amount at 12% rate of interest?

A 250

B 300

C 280

D 270

Answer: C

Explanation:
3rd year it earned 12% interest , So it will earn 12% interest on last year's interest.

So, Compound interest is = $250 \times 1.12 = 280\ Rs.$

C is correct choice.

Question 99

What is the difference (in Rs) between the compound interests on Rs 12,500 for 1 year at 8% per annum compounded yearly and half-yearly?

A 16

B 25

C 20

D 40

Answer: C

Explanation:
Annual compound interest=$\left\{12500\left(1+0.08\right)^1 - 12500\right\} = 1000\ Rs.$

Half-yearly compound interest= $\left\{12500\left(1+{}^{0.08}{}_{2}\right)^{1\times2} - 12500\right\} = 1020\ Rs.$

So, their difference is= (1020-1000) Rs.=20 Rs.

C is correct choice.

Question 100

The amount received at 8% per annum compound interest after 2 yrs is Rs 72,900. What was the principal (in Rs)?

A 65000

B 67500

C 60000

D 62500

Answer: D

Explanation:
Let say, amount is P.

So,

$P\left(1+\frac{8}{100}\right)^2 = 72900$

or, $P = \frac{72900}{1.1664} = 62500.$

D is correct choice.