Instructions

For the following questions answer them individually

Question 1

If $A = 1 - 10 + 3 - 12 + 5 - 14 + 7 + \ldots$ **upto 60 terms, then what is the value of** A**?**

A   -360

B   -310

C   -240

D   -270

   Answer: D

Explanation:

$A = 1 - 10 + 3 - 12 + 5 - 14 + 7 + \ldots \ldots upto\ 60\ terms$.

or, $A = (1 + 3 + 5 + 7 + \ldots 59) - (10 + 12 + 14 + \ldots + 68)$.

or, $A = \frac{(1+59) \times 30}{2} - \frac{(10+68) \times 30}{2}$.

or, $A = 900 - 1170 = -270$.

D is correct choice.

Question 2

How many natural numbers are there between 1000 to 2000, which when divided by 341 leaves remainder 5?

A   3

B   2

C   4

D   1

   Answer: A

Explanation:

Number should be in the form of, $N = (341k + 5)$. $(where,\ k = 0, 1, 2, 3, \ldots.)$

So, There are only 3 numbers present between 1000 and 2000 which satisfy the above condition.

These are 1028,1369 and 1710 (when , k=3 , 4 and 5)

A is correct choice.

Question 3

Which of the following statement(s) is/are TRUE?
I. $\sqrt{(64)} + \sqrt{(0.0064)} + \sqrt{(0.81)} + \sqrt{(0.0081)} = 9.07$
II. $\sqrt{(0.010201)} + \sqrt{(98.01)} + \sqrt{(0.25)} = 11.51$

A   Only I

B   Only II

C   Both I and II

D Neither I nor II

Answer: A

Explanation:
$\sqrt{(64)} + \sqrt{(0.0064)} + \sqrt{(0.81)} + \sqrt{(0.0081)} = 8 + 0.08 + 0.9 + 0.09 = 9.07$.

So, I is correct .

$\sqrt{(0.010201)} + \sqrt{(98.01)} + \sqrt{(0.25)} = 10.501$.

II is not correct .

A is correct choice.

Question 4

Which of the following statement(s) is/are TRUE?
I. $(0.7)^2 + (0.07)^2 + (11.1)^2 > 123.8$
II. $(1.12)^2 + (10.3)^2 + (1.05)^2 > 108.3$

A Only I

B Only II

C Both I and II

D Neither I nor II

Answer: B

Explanation:
$(0.7)^2 + (0.07)^2 + (11.1)^2 = 123.7049$.

So, I is not correct .

And, $(1.12)^2 + (10.3)^2 + (1.05)^2 = 108.4469$.

II is correct .

B is correct choice.

Question 5

Which of the following statement(s) is/are TRUE?
I. $\frac{1}{1\times3} + \frac{1}{3\times5} + \frac{1}{5\times7} + \text{.......} + \frac{1}{11\times13} = \frac{12}{13}$

II. $\frac{1}{1\times2} + \frac{1}{2\times3} + \frac{1}{3\times4} + \text{.......} + \frac{1}{12\times13} = \frac{12}{13}$

A Only I

B Only II

C Both I and II

D Neither I nor II

Answer: B

Explanation:
$\frac{1}{1\times3} + \frac{1}{3\times5} + \frac{1}{5\times7} + \text{.......} + \frac{1}{11\times13}$

$= \frac{1}{2} \left(1 - \frac{1}{3} + \frac{1}{3} - \frac{1}{5} + \frac{1}{5} + - \frac{1}{7} \text{.......} + \frac{1}{11} - \frac{1}{13} \right)$

$$= \frac{1}{2} \left(1 - \frac{1}{13}\right)$$
$$= \frac{6}{13}.$$

I is not correct.

And,

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{12 \times 13}$$

$$= \left(\frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} \dots + \frac{1}{12} - \frac{1}{13}\right)$$

$$= \left(\frac{1}{1} - \frac{1}{13}\right)$$

$$= \frac{12}{13}.$$

So, II is correct.

B is correct choice.

Question 6

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

I. $\frac{3}{71} < \frac{5}{91} < \frac{7}{99}$

II. $\frac{11}{135} > \frac{12}{157} > \frac{13}{181}$

A   Only I

B   Only II

C   Both I and II

D   Neither I nor II

   Answer: C

Explanation:

Statement I :

$\frac{7}{99} = 0.0707$, $\frac{5}{91} = 0.0549$, $\frac{3}{71} = 0.0422$.

So, I is correct.

Statement II :

$\frac{11}{135} = 0.0814$, $\frac{12}{157} = 0.0764$, $\frac{13}{181} = 0.0718$ ..

So, II is also correct.

C is correct choice.

Question 7

If $1 + \left(\frac{1}{2}\right) + \left(\frac{1}{3}\right) + \dots + \left(\frac{1}{20}\right) = k$, then what is the value of $\left(\frac{1}{4}\right) + \left(\frac{1}{6}\right) + \left(\frac{1}{8}\right) + \dots + \left(\frac{1}{40}\right)$?

A $\frac{k}{2}$

B $2k$

C $\frac{(k-1)}{2}$

D $\frac{(k+1)}{2}$

   Answer: C

Explanation:

$1 + \left(\frac{1}{2}\right) + \left(\frac{1}{3}\right) + \dots + \left(\frac{1}{20}\right) = k$.

or, $\left(\frac{1}{2}\right) + \left(\frac{1}{3}\right) + \cdots + \left(\frac{1}{20}\right) = k - 1$.

So, $\left(\frac{1}{4}\right) + \left(\frac{1}{6}\right) + \left(\frac{1}{8}\right) + \ldots + \left(\frac{1}{40}\right)$

$= \frac{1}{2}\left(\left(\frac{1}{2}\right) + \left(\frac{1}{3}\right) + \cdots + \left(\frac{1}{20}\right)\right)$

$= \frac{1}{2}\left(k - 1\right)$.

C is correct choice.

Question 8

If $A = 2^{32}$, $B = 2^{31} + 2^{30} + 2^{29} + \ldots + 2^0$ and $C = 3^{15} + 3^{14} + 3^{13} + \ldots + 3^0$, then which of the following option is TRUE?

A $\ \ C > B > A$

B $\ \ C > A > B$

C $\ \ A > B > C$

D $\ \ A > C > B$

Answer: C

Explanation:

$B = 2^{31} + 2^{30} + 2^{29} + \cdots + 2^0$

or, $B = 2^0 . \frac{2^{32}-1}{2-1} = \left(2^{32} - 1\right)$.

And , $C = 3^{15} + 3^{14} + 3^{13} + \ldots + 3^0$

or, $C = 3^0 . \frac{3^{16}-1}{3-1} = \frac{1}{2}\left(3^{16} - 1\right)$.

So, $A > B > C$.

C is correct choice.

Question 9

If $x + y = 10$ and $xy = 4$, then what is the value of $x^4 + y^4$?

A $\ \ $ 8464

B $\ \ $ 8432

C $\ \ $ 7478

D $\ \ $ 6218

Answer: B

Explanation:

So, $x^2 + y^2 = (x + y)^2 - 2xy = 10^2 - 8 = 92$.

And $x^2 y^2 = 16$

So, $x^4 + y^4 = \left(x^2 + y^2\right)^2 - 2x^2 y^2 = 92^2 - 2 \times 16 = 8432$.

B is correct choice.

Question 10

M is the largest three digit number which when divided by 6 and 5 leaves remainder 5 and 3 respectively. What will be the remainder when M is divided by 11?

A 1

B 2

C 3

D 4

Answer: D

Explanation:
Lcm of (6,5) = 30

format is "30K + constant"

Constant is remainder.

let that remainder be N.

N/6 = 5 remainder
N could be 5,11,17,23,30,..

N/5 =3 remainder
N could be 3,8,13,18,23,28,...

The very first number common in both term is 23

So N is 23 I.e a constant term

30K + 23
Largest three digit number comes when K is 32
30 (32) + 23
= 983

So, it will give 4 remainder when divide by 11 .

D is correct choice.

Question 11

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

I. $\sqrt{5} + \sqrt{5} > \sqrt{7} + \sqrt{3}$
II. $\sqrt{6} + \sqrt{7} > \sqrt{8} + \sqrt{5}$
III. $\sqrt{3} + \sqrt{9} > \sqrt{6} + \sqrt{6}$

A Only I

B Only I and II

C Only II and III

D Only I and III

Answer: B

Explanation:
Statement I :

$\sqrt{5} + \sqrt{5} = 4.47$. and $\sqrt{7} + \sqrt{3} = 4.37$.

So, Statement I is correct .

Statement II :

$\sqrt{6} + \sqrt{7} = 5.09 \ and \ \sqrt{8} + \sqrt{5} = 5.06$.

II is also correct .

Statement III:

$\sqrt{3} + \sqrt{9} = 4.73 \ and \ \sqrt{6} + \sqrt{6} = 4.89$.

So, III is not correct .

B is correct choice.

Question 12

If $a = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $b = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then what is the value of $a^2 + b^2 - ab$?

A 97

B $(2\sqrt{3}) + 2$

C $(4\sqrt{6}) + 1$

D 98

   Answer: A

Explanation:
From given data , ab=1 .

And, $a + b = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{3+2+2\sqrt{6}+3+2-2\sqrt{6}}{3-2} = 10$.

So, $a^2 + b^2 - ab = (a + b)^2 - 3ab = 10^2 - 3.1 = 97$.

A is correct choice.

Question 13

If the difference between the roots of the equation $Ax^2 - Bx + C = 0$ is 4, then which of the following is TRUE?

A $B^2 - 16A^2 = 4AC + 4B^2$

B $B^2 - 10A^2 = 4AC + 6A^2$

C $B^2 - 8A^2 = 4AC + 10A^2$

D $B^2 - 16A^2 = 4AC + 8B^2$

   Answer: B

Explanation:
Let say , x and y are two roots .

So,

$x + y = - \frac{-B}{A} = \frac{B}{A} \ and \ xy = \frac{C}{A}$.

So, $x - y = 4$.

or, $(x - y)^2 = 4^2$.

or, $(x + y)^2 - 4xy = 16$.

or, $\frac{B^2}{A^2} - \frac{4C}{A} = 16$.

or, $B^2 - 4AC = 16A^2$.

or, $B^2 - 10A^2 = 4AC + 6A^2$.

B is correct choice.

Question 14

α and β are the roots of quadratic equation. If $\alpha + \beta = 8$ and $\alpha - \beta = 2\sqrt{5}$, then which of the following equation will have roots α^4 and β^4?

A $x^2 - 1522x + 14641 = 0$

B $x^2 + 1921x + 14641 = 0$

C $x^2 - 1764x + 14641 = 0$

D $x^2 + 2520x + 14641 = 0$

  Answer: A

Explanation:
According to question :

$2\alpha = 8 + \sqrt{5}\ or\ \alpha = 4 + \sqrt{5}$.

And, $2\beta = 8 - \sqrt{5}\ or\ \beta = 4 - \sqrt{5}$.

So, $\alpha^2 = \left(4 + \sqrt{5}\right)^2 = \left(21 + 8\sqrt{5}\right)$.

And, $\beta^2 = \left(4 - \sqrt{5}\right)^2 = \left(21 - 8\sqrt{5}\right)$.

Again ,

$\alpha^4 = \left(\alpha^2\right)^2 = \left(21 + 8\sqrt{5}\right)^2 = \left(761 + 336\sqrt{5}\right)$.

$\beta^4 = \left(\beta^2\right)^2 = \left(21 - 8\sqrt{5}\right)^2 = \left(761 - 336\sqrt{5}\right)$.

So, new equation whose roots are above two :

$x^2 - \left(\alpha^4 + \beta^4\right)x + \left(\alpha^4\beta^4\right) = 0$.

or, $x^2 - \left(761 + 336\sqrt{5} + 761 - 336\sqrt{5}\right)x + \left(761 + 336\sqrt{5}\right)\left(761 - 336\sqrt{5}\right) = 0$.

or, $x^2 - 1522x + 14641 = 0$.

A is correct choice.

Question 15

If a and b are the roots of the equation $Px^2 - Qx + R = 0$, then what is the value of $\left(\frac{1}{a^2}\right) + \left(\frac{1}{b^2}\right) + \left(\frac{a}{b}\right) + \left(\frac{b}{a}\right)$?

A $\frac{(Q^2 - 2P)(2R + P)}{PR^2}$

B $\frac{(Q^2 - 2PR)(R + P)}{PR^2}$

C $\frac{(Q^2 - 2R)(2P + R)}{P^2R^2}$

D $\frac{(Q^2 - 2PR)(2R + 2P)}{P^2R^2}$

  Answer: B

Explanation:
According to question :

$a + b = \frac{Q}{P}\ and\ ab = \frac{R}{P}$.

So, $(a^2 + b^2) = \frac{Q^2}{P^2} - \frac{2R}{P} = \frac{(Q^2 - 2PR)}{P^2}$.

And, $\left(\frac{1}{a^2 b^2} + \frac{1}{ab}\right) = \left(\frac{P^2}{R^2} + \frac{P}{R}\right) = \frac{P(P+R)}{R^2}$.

So, $\frac{1}{a^2} + \frac{1}{b^2} + \frac{b}{a} + \frac{a}{b}$

$= \left(\frac{b^2 + a^2}{a^2 b^2}\right) + \left(\frac{b^2 + a^2}{ab}\right)$

$= (a^2 + b^2)\left(\frac{1}{a^2 b^2} + \frac{1}{ab}\right)$.

$= \frac{(Q^2 - 2PR)}{P^2} \cdot \frac{P(P+R)}{R^2}$

$= \frac{(Q^2 - 2PR)(P+R)}{PR^2}$.

B is correct choice.

Question 16

If $x^2 - 16x - 59 = 0$, then what is the value of $(x - 6)^2 + \left[\frac{1}{(x-6)^2}\right]$?

A 41

B 81

C 61

D 90

Answer: B

Explanation:
$x^2 - 16x - 59 = 0$

So, $x = \frac{16 \pm \sqrt{256 + 236}}{2} = 19 \; or \; -3$.

when , x=19 :

$(x - 6)^2 + \frac{`1}{(x-6)^2} = 169$.

Or, when x=-3 :

$(x - 6)^2 + \frac{`1}{(x-6)^2} = 81.01$.

So, B is correct choice.

Question 17

If A and B are the roots of the equation $Ax^2 - A^2 x + AB = 0$, then what is the value of A and B respectively?

A 1, 0

B 1, 1

C 0, 2

D 0, 1

Answer: A

Explanation:
A and B are the roots of the equation $Ax^2 - A^2 x + AB = 0$

So, $A + B = -\frac{(-A)}{A} = 1$.

And, $A.B = \frac{AB}{A} = B$.

or, $A = 1$.

So, $B = 1 - 1 = 0$.

A is correct choice.

Question 18

α and β are the roots of the quadratic equation $x^2 - x - 1 = 0$. **What is the value of** $\alpha^2 + \beta^2$?

A 3

B 5

C 9

D 6

Answer: A

Explanation:

We know ,For a quadratic equation $ax^2 + bx + c = 0$, Sum of roots= $-\frac{b}{a}$ and Product of roots= $\frac{c}{a}$.

So, According to question,

$\alpha + \beta = -\frac{(-1)}{1} = 1$.

And, $\alpha\beta = \frac{-1}{1} = -1$.

So, $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = 1 - 2 \times (-1) = 3$.

A is correct choice.

Question 19

If $a + b + c = 9, ab + bc + ca = 26, a^3 + b^3 = 91, b^3 + c^3 = 72$ **and** $c^3 + a^3 = 35$, **then what is the value of** abc?

A 48

B 24

C 36

D 42

Answer: B

Explanation:

We know that :

$a^3 + b^3 + c^3 = (a + b + c)\left(a^2 + b^2 + c^2 - ab - ac - bc\right) + 3abc$.

Here, $a + b + c = 9, ab + bc + ca = 26, a^3 + b^3 = 91, b^3 + c^3 = 72$ and $c^3 + a^3 = 35$

So, $2\left(a^3 + b^3 + c^3\right) = 72 + 91 + 35 = 198$.

So, $a^3 + b^3 + c^3 = 99$.

And , $a^2 + b^2 + c^2 = 9^2 - 2 \times 26 = 29$.

So, $a^3 + b^3 + c^3 = (a + b + c)\left(a^2 + b^2 + c^2 - ab - ac - bc\right) + 3abc$

or, $99 = (9)(29 - 26) + 3abc$.

or, $abc = 24$.

B is correct choice.

Question 20

If $x^3 - 4x^2 + 19 = 6(x - 1)$, then what is the value of $\left[x^2 + \left(\frac{1}{x-4}\right)\right]$?

A 3

B 5

C 6

D 8

Answer: C

Explanation:
Given that :

$x^3 - 4x^2 + 19 = 6(x - 1)$

or, $x^3 - 4x^2 + 1 = (6x - 6 - 18)$.

So,

$\left[x^2 + \left(\frac{1}{x-4}\right)\right] = \frac{x^3-4x^2+1}{(x-4)} = \frac{6x-6-18}{(x-4)} = \frac{6(x-4)}{(x-4)} = 6.$

C is correct choice.

Question 21

Cost of 8 pencils, 5 pens and 3 erasers is Rs 111. Cost of 9 pencils, 6 pens and 5 erasers is Rs 130. Cost of 16 pencils, 11 pens and 3 erasers is Rs 221. What is the cost (in Rs) of 39 pencils, 26 pens and 13 erasers?

A 316

B 546

C 624

D 482

Answer: B

Explanation:
Let say,

$8P_c + 5P + 3E = 111$ .... (1)

And, $9P_c + 6P + 5E = 130$ .... (2)

And, $16P_c + 11P + 3E = 221$ .... (3)

Now, (2)-(1) :

$P_c + P + 2E = 19$ .... (4)

Now, (3)-(1) :

$8P_c + 6P = 110$ .... (5)

Now, $5 \times (1) - 3 \times (2)$:

$13P_c + 7P = 165$ ....(6)

Now, $6 \times (6) - 7 \times (7)$:

$22P_c = 220$.

or, $P_c = 10$.

Put this value in (5) :

P=5 .

Put values of $P_c = 10 \ and \ P = 5$ in (4) :

$E = 2$.

So, $39P_c + 26P + 13E = 39 \times 10 + 26 \times 5 + 13 \times 2 = 546$.

B is correct choice.

Question 22

If $2x + 3y - 5z = 18, 3x + 2y + z = 29$ and $x + y + 3z = 17$, then what is the value of $xy + yz + zx$?

A   32

B   52

C   64

D   46

Answer: B

Explanation:
x+y+3z=17..........(1)

2x+3y-5z=18.......(2)

3x+2y+z=29........(3)

Now, (1)×2-(2) :

11z-y=6......(4)

And, (3)×2-(2)×3 :

17z-5y=4............(5)

Now,4×(4)-(5) :

z=2 .

Now, put this value in (4) ,we get :

y=6.

From equation (1) we get : x=5.

So,xy+yz+xz=10+30+12=52.

B is correct choice.

Question 23

PQR is an equilateral triangle whose side is 10 cm. What is the value (in cm) of the inradius of triangle PQR?

A $\frac{5}{\sqrt{3}}$

B $10\sqrt{3}$

C $\frac{10}{\sqrt{3}}$

D $5\sqrt{2}$

Answer: A

Explanation:

Semi peremeter,S=(10+10+10)/2=15 .

Area,K=(√3/4)×10×10=25√3.

So,inradius,r=(25√3/15)=(5/√3).

A is correct choice.

Question 24

What is the area (in cm^2) of the circumcircle of a triangle whose sides are 6 cm, 8 cm and 10 cm respectively?

A $\frac{275}{7}$

B $\frac{550}{7}$

C $\frac{2200}{7}$

D $\frac{1100}{7}$

Answer: B

Explanation:

Circumradius of triangle is calculated by formula -

R = abc / √[(a+b+c)(a+b-c)(a-b+c)(-a+b+c)]

R = 6 × 8 × 10 / √[(6+8+10)(6+8-10)(6-8+10)(-6+8+10)]

R = 480 / √(24 × 4 × 8 × 12)

R = 480 / √(96×96)

R = 480 / 96

R = 5 cm

So, area of circumcircle=πr^2=(22/7)×25=550/7 .

B is correct choice.

Question 25

In the given figure, MNOP is a parallelogram. PM is extended to Z. OZ intersects MN and PN at Y and X respectively. If OX = 27 cm and XY = 18 cm, then what is the length (in cm) of YZ?
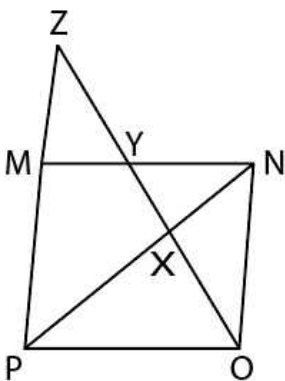
A 21.4

B 22.5

C 23.8

D 24.5

    Answer: B

Question 26

ABCD is a trapezium in which AB is parallel to CD and AB = 4(CD). The diagonals of the trapezium intersects at O. What is the ratio of area of triangle DCO to the area of the triangle ABO?
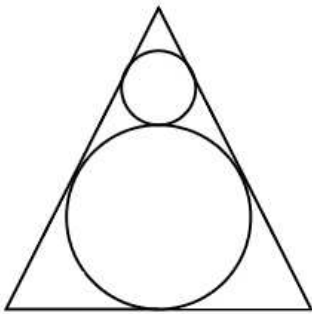
A 1 : 4

B 1 : 2

C 1 : 8

D 1 : 16

    Answer: D

Question 27

In the given figure, ABC is an equilateral triangle. Two circles of radius 4 cm and 12 cm are inscribed in the triangle. What is the side (in cm) of an equilateral triangle?

A $\frac{32}{\sqrt{3}}$

B $32\sqrt{3}$

C $\frac{64}{\sqrt{3}}$

D $64\sqrt{2}$

    Answer: E

Question 28

In the given figure. SX is tangent. SX = OX = OR. If QX = 3 cm and PQ = 9 cm, then what is the value (in cm) of OS ?
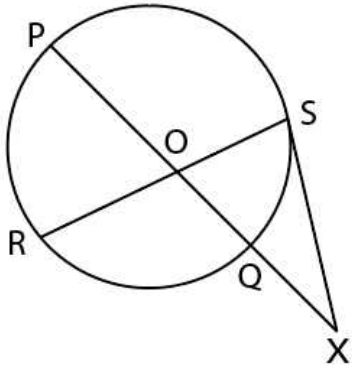
A   6

B   5

C   4

D   3

Answer: D

Question 29

PAB and PCD are two secants to a circle. If PA = 10 cm, AB = 12 cm and PC = 11 cm, then what is the value (in cm) of PD?

A   18

B   9

C   20

D   12

Answer: C

Explanation:
Secant intersects the circle at 2 points A & B.

PCD secant intersects the circle at 2 points C & D

& if 2 secants are drawn from an external point to a circle , the property is..

PA x PB = PD x PC

=> 10 * 22 = PD * 11

=> 220 = 11 PD

=> PD = 20 cm

C is correct choice.

Question 30

Triangle PQR is inscribed in a circle such that P, Q and R lie on the circumference. If PQ is the diameter of the circle and $\angle PQR = 4$°, then what is the value (in degrees) of $\angle QPR$?

A   40

B 45

C 50

D 55

 Answer: C

Explanation:
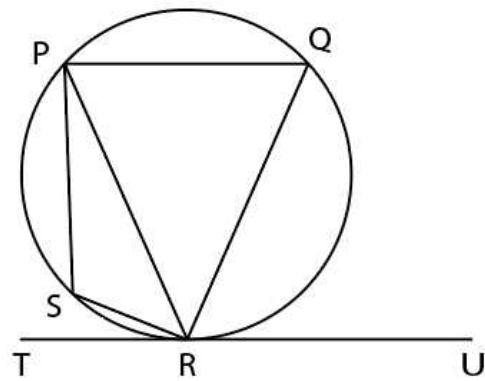
As PQ is the diameter of the triangle, angle PRQ is 90°.

So, angle PRQ+angle PQR+angle RPQ=180°.

So,angle QPR=180°-40°-90°=50°.

C is correct choice.

Question 31

In the given figure, $\angle QRU = 72°$, $\angle TRS = 15°$ and $\angle PSR = 95°$, then what is the value (in degrees) of $\angle PQR$?

A 85

B 95

C 75

D 90

 Answer: B

Question 32

What can be the maximum number of common tangent which can be drawn to two non-intersecting circles?

A 2

B 4

C 3

D 6

 Answer: B

Explanation:

If two circles are not intersected,then it can have 2 common tangents on upper side of the circle and 2 crossed common tangents to them .

So, a maximum of total of 4 common tangents possible.

B is correct choice.

Question 33

Triangle PQR is inscribed in the circle whose radius is 14 cm. If PQ is the diameter of the circle and $PR = 10$ cm, then what is the area of the triangle PQR?

A 196

B $30\sqrt{19}$

C $40\sqrt{17}$

D $35\sqrt{21}$

Answer: B

Explanation:
As PQ is diameter ,then triangle PQR is right angle triangle.

So,$QR = \sqrt{(28^2 - 10^2)} = \sqrt{684} = 6\sqrt{19}$.

So, area of PQR=(1/2)×PR×QR

=(1/2)×10×6√19=30√19.

B is correct choice.

Question 34

PQR is a right angled triangle in which $PQ = QR$. If the hypotenuse of the triangle is $20cm$, then what is the area (in cm^2) of the triangle PQR?

A $100\sqrt{2}$

B 100

C $50\sqrt{2}$

D 50

Answer: B

Explanation:
Let say, PQ=QR=x.

So, $x^2 + x^2 = 20^2$

so, x=10√2 .

So, area of PQR=(1/2)×10√2×10√2=100 cm^2

B is correct choice.

Question 35

$PQRS$ is a square whose side is $20cm$. By joining opposite vertices of $PQRS$ are get four triangles. What is the sum of the perimeters of the four triangles?

A $40\sqrt{2}$

B $80\sqrt{2} + 80$

C $40\sqrt{2} + 40$

D $40\sqrt{2} + 80$

Answer: B

Explanation:
Side of square is 20 cm.

So, diagonal of square is 20√2 cm.

So,to calculate perimeter of triangle,we get to count each diagonal 2 times and 4 sides only one time .

So, required perimeter=4×20+4×20√2

=(80+80√2) cm.

B is correct choice.

Question 36

If $ABCDEF$ is a regular hexagon, then what is the value (in degrees) of $\angle AEB$?

A 15

B 30

C 45

D 60

Answer: B

Explanation:
Sum of angles of a polygon = (n - 2)180

   n = number of sides

Sum of angles of a hexagon is 720°, since it is a regular hexagon each interior angle has measure 120°

Quadrilateral ABEF contains half the angle measure of the hexagon; its interior angle measure = 360°

angle AFE = 120° (angle of hexagon ABCDEF)

triangle AFE is isosceles; angle FAE = angle FEA = 30°
      sum of angles of triangle = 180°

angle FAE + angle EAB = 120°; **therefor angle EAB = 90°**

angle ABE is one half of 120° = 60°

angle ABE + angle EAB + angle AEB = 180°
      therfor angle AEB = 30°
B is correct choice.

Question 37

$ABCD$ **is square and** CDE **is an equilateral triangle outside the square. What is the value (in degrees) of** $\angle BEC$**?**

A 15

B 30

C 25

D ^{10}

Answer: A

Explanation:
Triangle CDE is equilateral triangle.

So,CE=CD=BC .

So, For triangle BCE, CE=BC .

So, triangle BCE is a isosceles triangle .

So, angle CBE=angle CEB.

Now,angle BCD=90° and angle ECD=60°.

So, angle BCE=90°+60°=150°.

So, 2× angle BEC=180°-150°=30°.

So, angle BEC= 15°.

A is correct choice.

Question 38

There is a circular garden of radius 21 metres. A path of width 3.5 metres is constructed just outside the garden. What is the area (in metres^2) of the path?

A 50.05

B 57.56

C 52.12

D 56.07

E None of this.

Answer: E
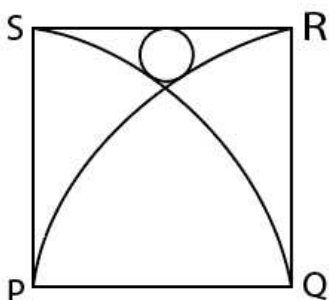
Explanation:
Area of circular garden=πr^2=π×21×21

=1386 .

Area of the garden with the path=$\pi(21+3.5)^2$=1886.50.

So,area of path=1886.5-1386=500.50.

E is correct choice.

Question 39

In the given figure, $PQRS$ is a square whose side is $8cm$. PQS and QPR are two quadrants. A circle is placed touching both the quadrants and the square as shown in the figure. What is the area (in cm^2) of the circle ?

A $\frac{13}{17}$
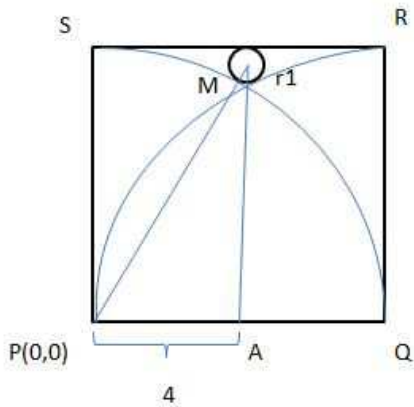
B $\frac{11}{14}$

C $\frac{19}{31}$

D $\frac{15}{19}$

Answer: B

Explanation:
We can construct the image in following way :

Let say, r_1 is radius of smaller circle.

PS=PQ=PM is the radius of PQS sector.

So, PM=8 cm.

From the above picture we can say that ,

AP=8/2=4 cm.

So,

$(8 - r_1)^2 + 4^2 = (8 + r_1)^2$.

or, $(64 - 16r_1 + r_1^2) + 16 = (64 + 16r_1 + r_1^2)$.

or, $32r_1 = 16$.

or, $r_1 = \frac{1}{2}$.

So, Area of smaller circle=$\pi \times \left(\frac{1}{2}\right)^2 = \frac{22}{7} \times \frac{1}{2} \times \frac{1}{2} = \frac{11}{14}\ cm^2$.

B is correct choice.

Question 40

The base of a prism is in the shape of an equilateral triangle. If the perimeter of the base is $18cm$ and the height of the prism is $20cm$ then what is the volume (in cm^3) of the prism?

A $60\sqrt{3}$

B $30\sqrt{6}$

C $60\sqrt{2}$

D $180\sqrt{3}$

Answer: D

Explanation:
Side of equilateral triangle=(18/3)=6 cm.

So, Area of base of prism=(√3/4)×36=9√3 .

So, volume of prism

$$= 20 \times 9\sqrt{3} = 180\sqrt{3}cm^3.$$

D is correct choice.

Question 41

The height of a cone is $24cm$ and the area of the base is $154cm^2$. What is the curved surface area (in cm^2) of the cone?

A   484

B   550

C   525

D   515

   Answer: B

Explanation:
Let say radius of base is r cm.

So, $\pi r^2 = 154$

or, r=7.

So, slant height$= \sqrt{(7^2 + 24^2)}$=25 cm.

So, curved surface area=πrl=(22/7)×7×25

$= 550cm^2.$

B is correct choice.

Question 42

A right circular solid cylinder has radius of base $7cm$ and height is $28cm$. It is melted to form a cuboid such that the ratio of its side is 2 : 3 : 6. What is the total surface area (in cm^2) cuboid?

A $\sqrt{\frac{2156}{3}}$

B $\sqrt{\frac{2156}{9}}$

C $\sqrt{\frac{2148}{3}}$

D $\sqrt{\frac{2048}{3}}$

E   None of this.

   Answer: E

Explanation:
Volume of cylinder= $\pi \times (r)^2 \times h = \frac{22}{7} \times 7^2 \times 28 = 4312\ cm^2$.

Let say, sides of cuboid 2k,3k and 6k.

So, $2k \times 3k \times 6k = 4312$.

or, $k^3 = \frac{4312}{36} = \frac{1078}{9}$.

or, $k = \sqrt{\sqrt{\frac{1078}{9}}}$.

So, Total Surface Area= $2\left(3k \times 2k + 2k \times 6k + 3k \times 6k\right) = 2\left(6k^2 + 12k^2 + 18k^2\right) = 72k^2$.

or, SA= $72\left(\sqrt{\sqrt{\frac{1078}{9}}}\right)^2$.

E is correct choice.**Question 43**

A right circular cylinder is formed. A = sum of total surface area and the area of the two bases. B = the curved surface area of this

cylinder. If A : B = 3 : 2 and the volume of cylinder is 4312 cm^3, then what is the sum of area (in cm^2) of the two bases of this cylinder?

A   154

B   308

C   462

D   616

   Answer: B

Question 44

A solid sphere has a radius 21 cm. It is melted to form a cube. 20% material is wasted in this process. The cube is melted to form hemisphere. In this process 20% material is wasted. The hemisphere is melted to form two spheres of equal radius. 20% material was also wasted in this process. What is the radius (in cm) of each new sphere?

A $4.2(\sqrt[3]{2})$

B $2.1(\sqrt[3]{2})$

C $2.1(\sqrt[3]{4})$

D $4.2(\sqrt[3]{4})$

   Answer: B

Explanation:
According to question,

$4/3 \times \pi \times 21^3 \times (1 - 20/100) \times (1 - 20/100) \times (1 - 20/100) = 2 \times 4/3 \times \pi r^3$

Where, r = radius of two new spheres formed,

$\Rightarrow 21^3 \times (1 - 20/100) \times (1 - 20/100) \times (1 - 20/100) = 2 \times \pi r^3$

$\Rightarrow 21^3 \times (4/5) \times (4/5) \times (4/5) = 2 \times r^3$

$\Rightarrow 21^3 \times 4/5 \times 4/5 \times 2/5 = r^3$

$r = 2.1\sqrt[3]{2}$.

B is correct choice.

Question 45

A solid hemisphere has radius 14 cm. It is melted to form a cylinder such that the ratio of its curved surface area and total surface area is 2 : 3. What is the radius (in cm) of its base?

A $\dfrac{10}{\sqrt[3]{3}}$

B $\dfrac{14}{\sqrt[3]{3}}$

C $\dfrac{7}{\sqrt[3]{3}}$

D $\dfrac{21}{\sqrt[3]{3}}$

Answer: B

Explanation:

Let say, radius of base of cylinder is r and height is h .

So, $\dfrac{2\pi rh}{2\pi r(r+h)} = \dfrac{2}{3}$.

or, $\dfrac{h}{(r+h)} = \dfrac{2}{3}$.

or, $3h = 2r + 2h$.

or, $r = \dfrac{h}{2}$.

According to question,

$\pi r^2 h = \dfrac{2}{3}\pi\left(14^3\right)$.

or, $\left(\dfrac{h}{2}\right)^2 h = \dfrac{2}{3}\left(14^3\right)$.

or, $h^3 = \dfrac{8}{3} 14^3$.

or, $h = 28\sqrt[3]{\dfrac{1}{3}}$.

So, $r = \dfrac{h}{2} = \dfrac{14}{\sqrt[3]{3}}$.

B is correct choice.

Question 46

A cuboid has dimensions $8cm \times 10cm \times 12cm$. It is cut into small cubes of side $2cm$. What is the percentage increase in the total surface area?

A 286.2

B 314.32

C 250.64

D 386.5

Answer: D

Explanation:

Surface area of cuboid=2(8×12+12×10+8×10)=592 .

Let say it cutted into n number of small cubes.

Then according to question:

$n \times 2^3 = 8 \times 12 \times 10$

or, n=120.

So, Total surface area of all cubes

$= 120 \times 6 \times 2^2$=2880.

So, percentage increase in Total surface area=((2880-592)/592)×100=386.4%.

D is correct choice.

Question 47

A pyramid has a square base. The side of square is $12cm$ and height of pyramid is $21cm$. The pyramid is cut into 3 parts by 2 cuts parallel to its base. The cuts are at height of $7cm$ and $14cm$ respectively from the base. What is the difference (in cm^3) in the volume of top most and bottom most part?

A 872

B 944

C 786

D 918

Answer: E

Question 48

What is the value of $\dfrac{\{(\sin 4x+\sin 4y)[(\tan 2x-2y)]\}}{(\sin 4x-\sin 4y)}$ **?**

A $\tan 2(2x+2y)$

B $\tan^2$

C $\cot(x-y)$

D $\tan(2x+2y)$

Answer: D

Explanation:

$\dfrac{\{(\sin 4x+\sin 4y)[(\tan 2x-2y)]\}}{(\sin 4x-\sin 4y)}$

$= \dfrac{2\times\sin\left(\frac{4x+4y}{2}\right)\times\cos\left(\frac{4x-4y}{2}\right)(\tan 2x-2y)}{2\times\cos\left(\frac{4x+4y}{2}\right)\times\sin\left(\frac{4x-4y}{2}\right)}$.

$= \tan(2x+2y).\cot(2x-2y).\tan(2x-2y)$.

$= \tan(2x+2y)$.

D is correct choice.

Question 49

What is the value of $\dfrac{(32\cos^6 x-48\cos^4 x+18\cos^2 x-1)}{[4\sin x\cos x\sin(60-x)\cos(60-x)\sin(60+x)\cos(60+x)]}$ **?**

A $4\tan 6x$

B $4\cot 6x$

C $8\cot 6x$

D $8\tan 6x$

Answer: C

Explanation:

We know :

$\cos (2X) = 2\cos^2 X - 1$.

Now replace X=3x :

$\cos 6X = 2\cos^2 3X - 1$.

Again, we know : $\cos 3X = 4\cos^3 X - 3\cos X$.

So, $\cos 6X = 2\left(4\cos^3 X - 3\cos X\right)^2 - 1$.

or, $\cos 6X = 2\left(16\cos^6 X + 9\cos^2 X - 24\cos^3 X \cos X\right) - 1$.

or, $\cos 6X = 32\cos^6 X + 18\cos^2 X - 48\cos^4 X - 1$.

Now,

$4sin(60 - x).sinx.sin(60 + x)$

$= 4(sin60.cosx - cos60sinx).sinx.(sin60.cosx + cos60sinx)$

$= 4\left(\frac{\sqrt{3}}{2}.\cos x - \sin x \times \frac{1}{2}\right).\sin x.\left(\frac{\sqrt{3}}{2}.\cos x + \sin x \times \frac{1}{2}\right)$

$= 4sinx.(3/4.cos^2x - sin^2x \times 1/4)$

$= sinx.(3cos^2x - sin^2x)$

$= sinx[cos^2x - sin^2x + 2.cos^2x]$

$= sinx.[cos^2x - sin^2x] + cosx.2sinx.cosx$

$= sinx.cos2x + cosx.sin2x$

$= sin(x + 2x)$

$= sin3x$

Similarly, $4\cos x.\cos (60 + x).\cos (60 - x) = \cos 3x$.

So, $\left[\frac{(32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1)}{4\sin x\cos x\sin(60-x)\cos(60-x)\sin(60+x)\cos(60+x)}\right]$

$= \frac{4\times2\times\cos 6x}{2\times\sin 3x\times\cos 3x}$

$= 8\cot 6x$.

C is correct choice.

Question 50

What is the value of $\left[\frac{2\cot \times \frac{(p-A)}{2}}{1+\tan^2 \times \frac{(2p-A)}{2}}\right]$?

A $2\sin^2 \frac{A}{2}$

B $\cos A$

C $\sin A$

D $2\cos^2 \frac{A}{2}$

Answer: C

Question 51

If $\tan\theta + \sec\theta = \frac{(x-2)}{(x+2)}$, then what is the value of $\cos\theta$?

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

B $\frac{(2x^2-4)}{(2x^2+4)}$

C $\frac{(x^2-4)}{(x^2+4)}$

D $\frac{(x^2-2)}{(x^2+2)}$

Answer: C

Explanation:

$\tan\theta + \sec\theta = \frac{(x-2)}{(x+2)}$

we know, $(\tan\theta + \sec\theta)(\sec\theta - \tan\theta) = 1$.

So, $(\sec\theta - \tan\theta) = \frac{x+2}{x-2}$.

So, $2\sec\theta = \frac{x+2}{x-2} + \frac{x-2}{x+2} = \frac{x^2+4x+4+x^2-4x+4}{x^2-4} = \frac{2(x^2+4)}{x^2-4}$.

or, $\cos\theta = \frac{x^2-4}{x^2+4}$.

So, C is correct choice.

Question 52

What is the value of (cos 40° - cos 140°)/(sin 80° + sin 20°)?

A $2\sqrt{3}$

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

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

D $\sqrt{3}$

Answer: B

Explanation:
Solve the numerator,

⇒ cos 40° - cos140° = - 2 sin[(140° + 40°)/2] × sin[(40° - 140°)/2]

⇒ cos 40° - cos140° = 2 sin[(140° + 40°)/2] × sin[(140° - 40°)/2]

⇒ cos 40° - cos 140° = 2sin90°.sin50°

⇒ cos 40° - cos 140° = 2sin50°

Solve the denominator,

sin 80° + sin 20° = 2 sin[(80° + 20°)/2] × cos[(80° - 20°)/2]

⇒ sin 80° + sin 20° = 2sin50°.cos30°

⇒ sin80° + sin20° = 2sin50° × (√3/2)

Replacing the respective value in the given equation:

(cos40° - cos140°)/(sin80° + sin20°) = (2sin50°)/(2sin50° × √3/2) = 2/√3

B is correct choice.

Question 53

What is the value of $\frac{[1-\tan(90-\theta)+\sec(90-\theta)]}{[\tan(90-\theta)+\sec(90-\theta)+1]}$?

A $\cot\left(\frac{\theta}{2}\right)$

B $\tan\left(\frac{\theta}{2}\right)$

C $\sin\theta$

D $\cos\theta$

Answer: B

Explanation:

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

$= \frac{[1-\cot\theta+\operatorname{cosec}\theta]}{[\cot\theta+\operatorname{cosec}\theta+1]}$.

$= \frac{\sin\theta-\cos\theta+1}{\sin\theta+1+\cos\theta}$.

Now,

$\sin\theta+1-\cos\theta = \frac{2\tan\frac{\theta}{2}+1+\tan^2\frac{\theta}{2}-1+\tan^2\frac{\theta}{2}}{1+\tan^2\frac{\theta}{2}}$

And,

$\sin\theta+1+\cos\theta = \frac{2\tan\frac{\theta}{2}+1+\tan^2\frac{\theta}{2}+1-\tan^2\frac{\theta}{2}}{1+\tan^2\frac{\theta}{2}}$

So,

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

$= \frac{2\tan\frac{\theta}{2}\left(1+\tan\frac{\theta}{2}\right)}{2\left(\tan\frac{\theta}{2}+1\right)}$.

$= \tan\frac{\theta}{2}$.

B is correct choice.

Question 54

What is the value of $\frac{[\sin(90-A)+\cos(180-2A)]}{[\cos(90-2A)+\sin(180-A)]}$?

A $\sin\left(\frac{A}{2}\right)\cos A$

B $\cot\left(\frac{A}{2}\right)$

C $\tan\left(\frac{A}{2}\right)$

D $\sin A\cos\left(\frac{A}{2}\right)$

Answer: C

Explanation:

$\frac{[\sin(90-A)+\cos(180-2A)]}{[\cos(90-2A)+\sin(180-A)]}$

$= \frac{[\cos A-\cos 2A]}{[\sin(2A)+\sin(A)]}$.

$$= \frac{2.\sin\frac{3A}{2}.\sin\frac{A}{2}}{2.\sin\frac{3A}{2}.\cos\frac{A}{2}}.$$
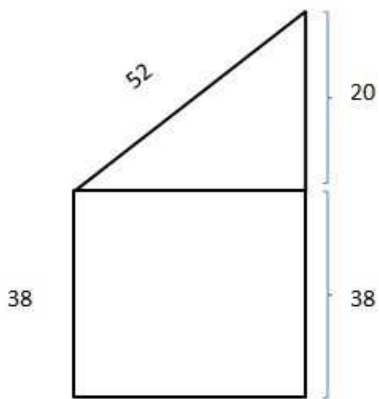
$$= \tan\frac{A}{2}.$$

C is correct choice.

Question 55 The distance between the tops of two building 38 metres and 58 metres high is 52 metres. What will be the distance (in metres)
between two buildings?

A 46

B 42

C 44

D 48

Answer: D

Explanation:
We can draw following picture from the given data :

So, distance between two buildings = $\sqrt{52^2 - 20^2} = 48\,m$.
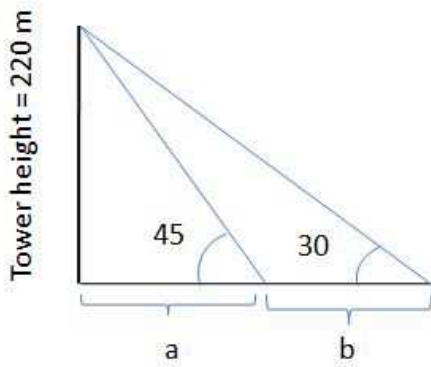
D is correct choice.

Question 56

The angles of elevation of the top of a tree 220 meters high from two points lie on the same plane are $30°$ and $45°$. What is the distance (in metres) between the two points?

A 193.22

B 144.04

C 176.12

D 161.05

Answer: D

Explanation:
We can draw following picture :

So, $\tan 30° = \frac{222}{a+b}$.

or, $a + b = 220\sqrt{3}$.

And, $\tan 45° = \frac{220}{a}$.

or, $a = 220$.

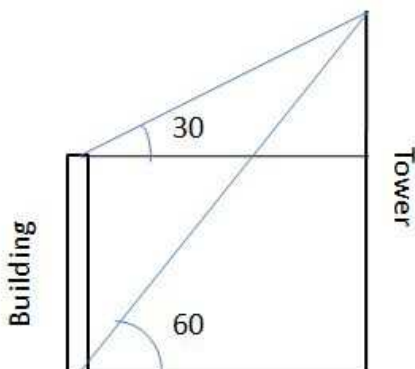So, Distance between these two points = $220\left(\sqrt{3} - 1\right) = 161.05$.

D is correct choice.

Question 57

The angles of elevation of the top of a tower 72 metre high from the top and bottom of a building are $30°$ and $60°$ respectively. What is the height (in metres) of building?

A 42

B $20\sqrt{3}$

C $24\sqrt{3}$

D 48

 Answer: D

Explanation:

Let say, height of building is x meter.

So, Distance between Building and Tower = $\frac{72}{\tan 60°} = \frac{72}{\sqrt{3}} = 24\sqrt{3}$.

Now, we can say that :

$\frac{(72-x)}{24\sqrt{3}} = \tan 30°$.

or, $\frac{(72-x)}{24\sqrt{3}} = \frac{1}{\sqrt{3}}$.

or, $x = 72 - 24 = 48$.

D is correct choice.

Instructions

The table given below shows the number of students who were absent and percentage of students who were present in the given two examinations from five different schools. The table also shows the percentage of students who were present in the Biology and Physics examination respectively.

School	Absent	Present (in %)	Biology (in %)	Physics (in %)
K	83300	65	32	68
L	101520	60	29	71
M	113520	40	30	70
N	60830	65	42	58
O	24003	55	25	75

Question 58

What is the difference between the number of students who were present in Physics and Biology examination from school N?

A 21150

B 14352

C 18075

D 24250

Answer: C

Explanation:

Difference of students in Physics and Biology in N= $\frac{60830}{0.35} \times 0.65 \times (0.58 - 0.42) = 18075$.

C is correct choice.

Question 59

Number of students who were present in Physics examination from school M is what percent of number of students who were absent from school M, L and O?

A 22.48

B 29.28

C 9.09

D 13.4

E None of this.

Answer: E

Explanation:

Required Percentage = $\frac{\left(\frac{113520}{0.6} \times 0.4 \times 0.7\right)}{(113520 + 101520 + 24003)} \times 100 = 22.16$ %.

E is correct choice.

Question 60

What is the average of the number of the students who were present in Physics examination from school N, K and L?

A 109635

B 84632

C 74365

D 67894

E None of this.

    Answer: E

Explanation:

Physics Students Present :

N= $\frac{60830}{0.35} \times 0.65 \times 0.58 = 65522$.

K= $\frac{83300}{0.35} \times 0.65 \times 0.68 = 105196$.

L= $\frac{101520}{0.4} \times 0.6 \times 0.71 = 108118$.

So, total = 278836 .

E is correct choice.

Question 60

What are the total number of students who were present in the Biology examination from all the schools together?

A 193462

B 249048

C 326438

D 211738

E None of this.

    Answer: E

Explanation:

Biology Students :

K= $\frac{83300}{0.35} \times 0.65 \times 0.32 = 45696$.

L = $\frac{101520}{0.40} \times 0.6 \times 0.29 = 44161$

M= $\frac{113520}{0.60} \times 0.4 \times 0.30 = 22704$.

N= $\frac{60830}{0.35} \times 0.65 \times 0.42 = 47447$.

O= $\frac{24003}{0.45} \times 0.55 \times 0.25 = 7334$.

So, Total students in Biology = 167342 .

E is correct choice.

Question 62

If the number of students who were present in the Physics examination from school A is 250% of the difference of the number of the students who were present in Physics and Biology examination, from school K, then what is the ratio of the number of students who were present from school L to number of students who were present in Physics examination from school A?

A 5079 : 4631

B 1692 : 1547

C 1547 : 4631

D 1692 : 2345

Answer: B

Explanation:

Total number of students in K= $\frac{83300}{0.35} = 238000$.

Students present in K= $238000 \times 0.65 = 154700$.

So, difference in Present in Physics and Biology in K= $154700 \times (0.68 - 0.32) = 55692$.

So, Present in physics in A= $55692 \times 2.5 = 139230$.

Total students present in L= $\frac{101520}{0.40} \times 0.6 = 152280$.

So, required ratio = $\frac{152280}{139230} = \frac{1692}{1547}$.

B is correct choice.

Instructions

For the following questions answer them individually

Question 63

A jar contains a blend of a fruit juice and water in the ratio 5 : x. When 1 litre of water is added to 4 litres of the blend the ratio of fruit juice to water becomes 1 : 1. What is the value of x?

A 3

B 1

C 2

D 4

Answer: A

Explanation:

In 4 ltr :

Fruit juice =$4 \times \frac{5}{5+x} = \frac{20}{5+x}$.

And, Water = $4 \times \frac{x}{5+x} = \frac{4x}{5+x}$.

According to question ,

$\frac{\frac{20}{5+x}}{\frac{4x}{5+x}+1} = \frac{1}{1}$.

or, $\frac{20}{5+x} = \frac{4x}{5+x} + 1$.

or, $20 - x = 5 + 4x$.

or, $x = \frac{15}{5} = 3$.

So, A is correct choice.

Question 64

An alloy contains copper and tin in the ratio 3 : 2. If 250 gm of copper is added to this alloy then the copper in it becomes double the quantity of tin in it. What is the amount (in gm) of tin in the alloy?

A 250

B 750

C 1000

D 500

Answer: D

Explanation:
Let say, copper and tin are 3k and 2k.

So, according to question,

3k+250=2×2k.

or, k=250.

So, tin was =500 gm.

D is correct choice.

Question 65

A starts a cement trading business by investing Rs 5 lakhs. After 2 months, B joins the business by investing Rs 10 lakhs and then 4 months after B joined C too joins them by investing Rs 20 lakhs. 1 year after A started the business they make Rs 3,50,000 in profit. What is B's share of the profit (in Rs)?

A 75000

B 1,25,000

C 1,50,000

D 1,00,000

Answer: B

Explanation:
Ratio of profit of A,B and C

=(5×12:10×10:20×6)=(60:100:120)

=3:5:6.

B will get=(5×350000/14)=125000

B is correct choice.

Question 66

A, B and C invest in a business in the ratio 3 : 6 : 5. A and C are working partners. Only B is a sleeping partner hence his share will be $\frac{3}{4^{th}}$ of what it would have been if he were a working partner. If they make Rs 50,000 profit, half of which is reinvested in the business and the other half is distributed between the partners, then how much does C get (in Rs)?

A 20000

B 6000

C 10000

D 9000

Answer: C

Explanation:

Original ratio of their profit is =(3:6×3/4:5)

=(12:18:20)=(6:9:10).

So, C will get =25000×10/25=1000.

C is correct choice.

Question 67

A can do a work in 21 days and B in 42 days. If they work on it together for 7 days, then what fraction of work is left?

A $\frac{1}{3}$

B $\frac{1}{4}$

C $\frac{2}{3}$

D $\frac{1}{2}$

Answer: D

Explanation:

A will do in 7 days =(7/21)=1/3.

B will do in 7 days =(7/42)=1/6.

So, work left =(1-1/3-1/6)=3/6=1/2.

D is correct choice.

Question 68

A can paint a house in 55 days and B can do it in 66 days. Along with C, they did the job in 12 days only. Then, C alone can do the job in how many days?

A 24

B 44

C 33

D 20

Answer: D

Explanation:

According to question,

(1/55+1/66+1/c)=1/12.

or, 1/c=(1/12)-(1/55)-(1/66)=

(55-12-10)/660=(1/20).

Ao, C will do in 20 days .

D is correct choice.

Question 69

A, B and C together can finish a task in 12 days. A is twice as productive as B and C alone can do the task in 36 days. In how many days can A and B do the task if C goes on leave?

A 10

B 20

C 15

D 18

    Answer: D

Explanation:

Let say, B can do in x days .

So, A can do in (x/2) days.

So, (1/x+2/x+1/36)=1/12.

or, (1/x+2/x)=(1/12-1/36)=1/18.

So, A and B can do the full work in 18 days.

D is correct choice.

Question 70

A, B and C can together do a job in 9 days. C alone can do the job in 36 days. In how many days can A and B do 50% of the job working together?

A 6

B 12

C 9

D 15

    Answer: A

Explanation:

A,B and C together can do in 1 day (1/9) part of the job .

So, A and B can do in 1 day (1/9-1/36)=(1/12) part of the job.

So, they together can do 50% of the job in (12/2)= 6 days.

A is correct choice.

Question 71

Giving two successive discounts of 25% is equal to giving one discount of _____%.

A 43.75

B 56.25

C 50

D 45

    Answer: A

Explanation:

Resultant discount is =(1-0.75×0.75)×100

=43.75 %.

A is correct choice.

Question 72

If a watch is being sold at Rs 7,225 which is marked at Rs 8,500, then what is the discount (in %) at which the watch is being sold?

A   24

B   15

C   25

D   20

   Answer: B

Explanation:
Discount is = (8500-7225)/8500×100

=(1275/8500)×100=15 %.

B is correct choice.

Question 73

On a machine there is 10% trade discount on the marked price of Rs 2,50,000. But the machine is sold at Rs 2,16,000 after giving a cash discount. How much is this cash discount (in %)?

A   5

B   4

C   6

D   7

   Answer: B

Explanation:
After trade discount price became=0.90×250000=225000 Rs.

let say he gave a x Rs of cash discount.

So, 2250000-x=216000.

So, x=9000.

So, percentage of cash discount was =

(9000/225000)×100=4 %.

B is correct choice.

Question 74

A trader marks up his goods by 120% and offers 30% discount. What will be the selling price (in Rs) if the cost price is Rs 750?

A   1225

B   1080

C   1280

D   1155

   Answer: D

Explanation:

According to question,

S.P=750×2.20×0.70=1155 Rs.

D is correct choice.

Question 75

Sanjay's test marks in two subjects, English and Hindi are in the ratio 7 : 11. If he got 20 marks more in Hindi than in English, what are his marks in English?

A 35

B 55

C 45

D 65

Answer: A

Explanation:

Let say,he got in English 7k and in Hindi 11k.

So, 11k=7k+20.

or, 4k=20.

or, k=5.

So, he got 7×5=35 in English.

A is correct choice.

Question 76

The ratio of present ages of Simi and Seema is 5 : 4. After 9 years the ratio of their ages will be 8 : 7. What is Simi's present age (in years)?

A 12

B 15

C 24

D 21

Answer: B

Explanation:

Let say, Simi and Seema's present age is 5k and 4k.

So, (5k+9)/(4k+9)=8/7 .

or, 35k+63=32k+72 .

or, 3k=9.

or, k=3 .

Simi's present age=5×3=15.

B is correct choice.

Question 77

Find the third proportional to 6 and 12.

A 18

B 9

C 24

D 15

    Answer: C

Explanation:

Let the third proportional is X.

So, (6/12)=(12/x)

or, x=12×12/6=24.

So, C is correct choice.

Question 78

According to the will the wealth of Rs 21,25,000 was to be divided between the son and the daughter in the ratio $\frac{7}{6} : \frac{5}{3}$. How much did the son get (in Rs)?

A 8,75,000

B 12,50,000

C 10,00,000

D 11,25,000

    Answer: A

Explanation:

Son:Daughter=(7/6):(5/3)=7:10.

So, son will get= 2125000×7/17=875000.

A is correct choice.

Question 79

If Rs 25,000 is to be divided between A, B and C in the ratio $\frac{1}{10} : \frac{1}{6} : \frac{1}{15}$, then how much will C get (in Rs)?

A 5000

B 7500

C 10000

D 12500

    Answer: A

Explanation:

A:B:C= (1/10):(1/6):(1/15)=3:5:2.

So, C will get=25000×2/10=5000.

A is correct choice.

Question 80

Rizwan has a box in which he kept red and blue marbles. The red marbles and blue marbles were in the ratio 5 : 4. After he lost 5 red marbles the ratio became 10 : 9. How many marbles does he have now?

A   81

B   86

C   76

D   91

   Answer: C

Explanation:

Red marble/Blue marble=5/4 .

Let say ,he has 5k red marbles and 4k blue marbles .

So, Now ,

(5k-5)/4k=10/9 .

or, 45k-45=40k.

or, k=9 .

Now he has = (5k+4k-5)=(45+36-5)=76.

C is correct choice.

Question 81

The average weight of L, M and N is 93 kg. If the average weight of L and M be 89 kg and that of M and N be 96.5 kg, then the weight (in kg) of M is _____.

A   92

B   86

C   101

D   95

   Answer: A

Explanation:
$L + M + N = 93 \times 3 = 279$.

$L + M = 89 \times 2 = 178$.

And, $N + M = 96.5 \times 2 = 193$.

So, $L + N + 2M = 193 + 178 = 371$.

So, $M = (L + N + 2M) - (L + M + N) = 371 - 279 = 92$.

A is correct choice.

Question 82

Mahesh buys 3 shirts at an average price of Rs 1250. If he buys 2 more shirts at an average price of Rs 1450 what will be the average price (in Rs) of all the 5 shirts he buys?

A   1370

B   1330

C 1310

D 1390

Answer: B

Explanation:

Average price of 5 shirts = $\frac{1250 \times 3 + 1450 \times 2}{5} = 1330 \ Rs.$

B is correct choice.

Question 83

In a one day match of 50 overs in an innings the Team A had a run rate of 6.1 runs per over. Team B is playing and 10 overs are left and the required run rate to tie the match is 6.5 per over. What is Team B's score now?

A 235

B 230

C 240

D 225

Answer: C

Explanation:

B requires $50 \times 6.1 = 305$ runs to win .

Let say, first 40 overs they had x as run rate .

So, $40x + 10 \times 6.5 = 305$

or, $40x = 240$.

So, B's score now =240 .

C is correct choice.

Question 84

Average of all even numbers between 222 and 250 is _____.

A 234

B 232

C 236

D 230

Answer: C

Explanation:

There are total 15 even numbers present between 222 and 250 .

Total of them = $\frac{15}{2} (222 + 250) = 3540$.

So, Average of them = $\frac{3540}{15} = 236$.

C is correct choice.

Question 85

A vendor buys bananas at 7 for Rs 6 and sells at 6 for Rs 7. What will be the result?

A 36.1% loss

B 26.5% profit

C 36.1% profit

D 26.5% loss

    Answer: C

Explanation:
C.P=$\frac{6}{7}$.

S.P= $\frac{7}{6}$.

So, Gain= $\frac{\left(\frac{7}{6}-\frac{6}{7}\right)}{\frac{6}{7}} \times 100 = 36.10 \%$

C is correct choice.

Question 86

A miner sells a diamond to a trader at a profit of 40% and the trader sells it to a customer at a profit of 25%. If the customer pays Rs 56 lakhs to buy the diamond, what had it cost the miner (in Rs lakhs)?

A 30

B 28

C 25

D 32

    Answer: D

Explanation:
C.P = $\frac{56}{1.25 \times 1.40} = 32$ lakh Rs.

D is correct choice.

Question 87

A grocer had 1600 kgs of wheat. He sold a part of it at 20% profit and the rest at 12% profit, so that he made a total profit of 17%. How much wheat (in kg) did he sell at 20% profit?

A 600

B 1000

C 800

D 1200

    Answer: B

Explanation:
Let the cost price of per kg wheat is x Rs. and he sells y kg at 20% profit.

So, $y \times x \times 0.20 + (1600 - y) \times x \times 0.12 = 0.17 \times 1600 \times x$

or, $0.20y + (192 - 0.12y) = 272$.

or, $y = \frac{272-192}{0.08} = 1000$.

B is correct choice.

Question 88

A used two-wheeler dealer sells a scooter for Rs 46,000 and makes some loss. If he had sold it for Rs 58,000 his profit would have been double his loss. What was the cost price (in Rs) of the scooter?

A 52000

B 54000

C 48000

D 50000

Answer: D

Explanation:
Let the cost price is x Rs.

So, $58000 - x = 2 \times (x - 46000)$

or, $58000 - x = 2x - 92000$

or, $3x = 58000 + 92000$

or, $x = 50000$.

D is correct choice.

Question 89

0.08% of 120% of 50,000 is equal to _____.

A 480

B 48

C 4800

D 4.8

Answer: B

Explanation:
$0.08\% \times 120\% \times 50000 = 60000 \times 0.08\% = 48$.

B is correct choice.

Question 90

When a number is increased by 24, it becomes 115% of itself. What is the number?

A 160

B 250

C 100

D 200

Answer: A

Explanation:

$x + 24 = 1.15x$.

or, $x = \dfrac{24}{0.15} = 160$.

A is correct choice.

Question 91

Two numbers are 40% and 80% lesser than a third number. By how much percent is the second number to be enhanced to make it equal to the first number?

A 100

B 33.3

C 66.6

D 200

    Answer: D

Explanation:

Let the third no. be x

Then , 1st no. = x - 40x/100 = 60x/100

2nd no. = x - 80x/100 = 20x/100

1st no. : 2nd no. = 60x/100 : 20x /100 => 3:1

Required % = (2/1) × 100 = 200%

D is correct choice.

Question 92

Price of diesel increased from Rs 45/litre to Rs 50/litre. How much should the consumption of diesel be reduced (in %) so as to increase expenditure by only 5%?

A 5.5

B 5

C 4

D 4.5

    Answer: A

Explanation:

Expenditure (E) = Consumption (C) × Price (P)

Before the price increased,

E = C_1 × 45 ----(1)

After the price increased,

Expenditure increased by 5% = 1.05E

1.05E = C_2 × 50 ----(2)

On dividing equation (1) by (2)

⇒ 1/1.05 = (C_1/C_2) × 45/50

⇒ C_1/C_2 = 200/189

Required cut in consumption = (200 -189)/200 × 100

⇒ Required cut in consumption = 11/2 = 5.5%

A is correct choice.

Question 93

A plane flies a distance of 1800 km in 5 hours. What is its average speed in meters/second?

A 200

B 10

C 20

D 100

  Answer: D

Explanation:

Average speed= $\frac{1800}{5} \frac{km}{h} = \frac{1800 \times 1000}{5 \times 3600} \frac{m}{sec} = 100 \frac{m}{sec}$.

D is correct choice.

Question 94

If a boat goes upstream at a speed of 24 km/hr and comes back the same distance at 40 km/hr. What is the average speed (in km/hr) for the total journey.

A 32

B 30

C 31

D 33

  Answer: B

Explanation:

Average speed= $\frac{2 \times Distance}{\frac{Distance}{24} + \frac{Distance}{40}} = \frac{2 \times Distance \times 120}{(5+3)Distance} = 30 \frac{km}{h}$.

B is correct choice.

Question 95

Two bikers A and B start and ride at 75 km/hr and 60 km/hr respectively towards each other. They meet after 20 minutes. How far (in km) were they from each other when they started?

A 60

B 45

C 30

D 15

  Answer: B

Explanation:

In 20 min they will go total = $\frac{75}{60} \times 20 + \frac{60}{60} \times 20 = 25 + 20 = 45 \, km$.

B is correct choice.

Question 96

Excluding stoppages, the speed of a bus is 80 kmph and including stoppages, it is 60 kmph. For how many minutes does the bus stop per hour?

A 12

B 15

C 18

D 20

Answer: B

Explanation:
in 1 hour bus run for 60 km including stoppage.

So, Bus will run at 80 km/h speed for = $\frac{60}{80} \times 60 = 45 \ min$.

So, in 1 hour it will definitely stop for =60-45=15 mins .

B is correct choice.

Question 97

In 2 years at simple interest the principal increases by 8%. What will be the compound interest earned (in Rs) on Rs 10 lakhs in 2 years at the same rate?

A 86000

B 81600

C 90000

D 94000

Answer: B

Explanation:
According to question ,

$$P\left(1 + \frac{2r}{100}\right) = 1.08P$$

or, $r = 4\,\%$.

So, C.I = $\left\{10\left(1.04\right)^2 - 10\right\} lakh = 81600 \, Rs.$

B is correct choice.

Question 98

If the compound interest for the 3rd and 4th year on a certain principal is Rs 125 and Rs 135 respectively, what is the rate of interest (in %)?

A 9

B 10

C 8

D 12

Answer: C

Explanation:
Interest for 4- years= ₹ 135
Interest for 3- years= ₹ 125.
Therefore interest for ₹ 125 for 1- year =₹10
So interest for ₹ 100 for 1- year =(10/125) x100 = ₹8
Therefore rate of interest= 8% .
C is correct choice.

Question 99

A certain bank offers 8% rate of interest on the 1st year and 9% on the 2nd year in a certain fixed deposit scheme. If Rs 17,658 are received after investing for 2 years in this scheme, then what was the amount (in Rs) invested?

A 16000

B 15000

C 15500

D 16500

Answer: B

Explanation:
According to question,

17658 = P(1 + 8/100)(1 + 9/100)

⇒ 17658 = P × 108/100 × 109/100

⇒ P = Rs. 15000

∴ The amount invested = Rs. 15000

B is correct choice.

Question 100

What is the difference (in Rs) in Compound interest earned in 1 year on a sum of Rs 25,000 at 20% per annum compounded semi-annually and annually?

A 125

B 250

C 500

D 375

Answer: B

Explanation:
Semi C.I = $25000 \left(1 + \frac{10}{100}\right)^{1 \times 2} - 25000 = 5250\ Rs.$

And, Annual C.I = $25000 \left(1 + \frac{20}{100}\right)^{1} - 25000 = 5000\ Rs.$

So, their difference is = 5250-5000= 250 Rs .

B is correct choice.