Instructions

For the following questions answer them individually

Question 1

How many three digit numbers are there in which all the digits are odd?

A 100

B 125

C 500

D 250

Answer: B

Explanation:
1,3,5,7,9 are the odd digits
as all the digits are to be odd
In a three digit number each place can be filled with 5 numbers i.e either 1,3,5,7 or 9
and so 5*5*5=125 numbers

Question 2

If the sum of ten different positive integers is 100, then what is the greatest possible number among these 10 numbers?

A 45

B 91

C 55

D 64

Answer: C

Explanation:
Given that sum of 10 different positive numbers so first 9 natural numbers can be taken and so
sum=1+2+....9
=9*10/2
=45
Total sum=100
Required number=100-45
=55

Question 3

If N = 0.369369369369… and M = 0.531531531531…, then what is the value of $\left(\frac{1}{N}\right) + \left(\frac{1}{M}\right)$?

A $\frac{11100}{2419}$

B $\frac{111}{100}$

C $\frac{1897}{3162}$

D $\frac{2419}{11100}$

Answer: A

Explanation:

N = 0.369369369369…

1000N=369.369….

999N=369

N=369/999

M = 0.531531531531…

1000M=531.531…

999M=531

M=531/999

$\left(\dfrac{1}{N}\right) + \left(\dfrac{1}{M}\right) = \left(\dfrac{999}{369}\right) + \left(\dfrac{999}{531}\right)$

$\dfrac{11100}{}$

= 2419

Question 4

If $A = \dfrac{0.216+0.008}{0.36+0.04-0.12}$ and $B = \dfrac{0.729-0.027}{0.81+0.09+0.27}$, then what is the value of $(A^2 + B^2)^2$?

A 0.8

B 1

C 1.4

D 2.2

Answer: B

Explanation:

$A = \dfrac{0.216+0.008}{0.36+0.04-0.12}$

$A = \dfrac{0.224}{0.28}$

=0.8

$B = \dfrac{0.729-0.027}{0.81+0.09+0.27}$

$B = \dfrac{0.702}{1.17}$

=0.6

$(A^2 + B^2)^2$=0.36+0.64=1

Question 5

If $A = \dfrac{1}{1\times2} + \dfrac{1}{1\times4} + \dfrac{1}{2\times3} + \dfrac{1}{4\times7} + \dfrac{1}{3\times4} + \dfrac{1}{7\times10}$ … upto 20 terms, then what is the value of A?

A $\dfrac{379}{308}$

B $\dfrac{171}{140}$

C $\dfrac{379}{310}$

D $\dfrac{420}{341}$

Answer: D

Explanation:

$A = \frac{1}{1\times2} + \frac{1}{1\times4} + \frac{1}{2\times3} + \frac{1}{4\times7} + \frac{1}{3\times4} + \frac{1}{7\times10} \ldots$ upto 20 terms

It has two series i.e $\frac{1}{1\times2} + \frac{1}{2\times3} + \frac{1}{3\times4} + \ldots \frac{1}{10\times11}$ and

$\frac{1}{1\times4} + \frac{1}{4\times7} + \frac{1}{7\times10} + \ldots \frac{1}{28\times31}$

$= 1 - \frac{1}{2} + \frac{1}{2} + \frac{1}{3} + \ldots \frac{1}{10} - \frac{1}{11} + \frac{1}{3}\left(1 - \frac{1}{4} + \frac{1}{4} + \ldots \frac{1}{28} - \frac{1}{31}\right)$

=(1-(1/11))+(1/3)(1-(1/31))

=10/11 +10/31
=420/31

Question 6

If $56 \times 75 \times 60 \times 84 \times 210 = 2^p \times 3^q \times 5^r \times 7^s$, then what is the value of $\begin{bmatrix} (p+q) \\ s \end{bmatrix} + r$?

A 6

B 8

C 12

D 10

Answer: B

Explanation:
Writing each of the numbers in terms of prime factors we have
=7*2*2*2*3*5*5*2*2*5*3*2*2*3*7*5*3*2*7
=$2^8 * 3^4 * 5^4 * 7^3$
p=8 q=4 r=4 s=3
= $\begin{bmatrix} (p+q) \\ s \end{bmatrix} + r$
=4+4
=8

Question 7

If $A = 3\frac{1}{4} \times 4\frac{1}{4} \div 34 - \frac{47}{32} + \frac{47}{16}$ and $B = 2\frac{1}{2} \times 5\frac{1}{2} \div 55 - \frac{11}{10}$, then what is the value of $A - B$?

A $\frac{5}{8}$

B 1

C 0

D $\frac{109}{40}$

Answer: D

Explanation:
$A = 3\frac{1}{4} \times 4\frac{1}{4} \div 34 - \frac{47}{32} + \frac{47}{16}$
$A = 3\frac{1}{4} \times \frac{1}{8} - \frac{47}{32} + \frac{47}{16}$
$A = 3\frac{1}{4} \times \frac{1}{8} + \frac{47}{32}$
$A = \frac{13}{32} + \frac{47}{32}$
$A = \frac{15}{8}$
$B = 2\frac{1}{2} \times 5\frac{1}{2} \div 55 - \frac{11}{10}$
$B = 2\frac{1}{2} \times \frac{1}{10} - \frac{11}{10}$

$$B = \frac{1}{4} - \frac{11}{10}$$
$$B = \frac{-17}{20}$$
A-B=(15/8)+(17/20)
=109/40

Question 8

What is the sum of all natural numbers between 100 and 400 which are divisible by 13?

A   5681

B   5334

C   5434

D   5761

   Answer: A

Explanation:
13*8=104
13*30=390
So sum =104+117+.....390
a=104
l=390
number of terms=((390-104)/13)+1
=22+1
=23
Sum=n(a+l)/2
=23(390+104)/2
=247*23
=5681

Question 9

If the least common multiple of two numbers, 1728 and K is 5184, then how many values of K are possible?

A   11

B   8

C   6

D   7

   Answer: D

Explanation:
Lcm 0f 1728 and K is 5184
$1728 = 2^6 * 3^3$
$5184 = 2^6 * 3^4$
So K can be $2^0 * 3^4, 2^1 * 3^4, 2^2 * 3^4, 2^3 * 3^4, 2^4 * 3^4, 2^5 * 3^4 \, and \, 2^6 * 3^4$
So total of 7 values

Question 10

If $(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$, then what is the value of x?

A   34

B 35

C 33

D 33.5

   Answer: A

Explanation:
$(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$
$(3 * 3^{33})(2 * 2^{33}) = 6^x$
$(3^{34})(2^{34}) = 6^x$
$6^{34} = 6^x$
x=34

Question 11

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

$I. (65)^{\frac{1}{6}} > (17)^{\frac{1}{4}} > (12)^{\frac{1}{3}}$
$II. (17)^{\frac{1}{4}} > (65)^{\frac{1}{6}} > (12)^{\frac{1}{3}}$
$III. (12)^{\frac{1}{3}} > (17)^{\frac{1}{4}} > (65)^{\frac{1}{6}}$

A Only I

B Only III

C Only II

D None of these

   Answer: B

Explanation:
$(65)^{\frac{1}{6}}, (17)^{\frac{1}{4}}, (12)^{\frac{1}{3}}$
$(12)^{\frac{1}{3}} = (144)^{\frac{1}{6}}$
So $(144)^{\frac{1}{6}} > (65)^{\frac{1}{6}}$
$(65)^{\frac{1}{6}} = (4225)^{\frac{1}{12}}$
$(17)^{\frac{1}{4}} = (4913)^{\frac{1}{12}}$
Therefore $(12)^{\frac{1}{3}} > (17)^{\frac{1}{4}} > (65)^{\frac{1}{6}}$

Question 12

If $P = 7 + 4\sqrt{3}$ and $PQ = 1$, then what is the value of $\left(\frac{1}{P^2}\right) + \left(\frac{1}{Q^2}\right)$?

A 148

B 189

C 194

D 204

   Answer: C

Explanation:
$\left(\frac{1}{P^2}\right) + \left(\frac{1}{Q^2}\right) = \left(\frac{P^2 + Q^2}{P^2 Q^2}\right)$
$= \left(\frac{(P+Q)^2 - 2PQ}{P^2 Q^2}\right)$

$P = 7 + 4\sqrt{3}$

$Q = 1/P$

$Q = 7 - 4\sqrt{3}$

P+Q=14

$(P + Q)^2$=196

PQ=1

$\left(\dfrac{(P+Q)^2 - 2PQ}{P^2Q^2}\right)$=196-2

=194

Question 13

If $x = (\sqrt{5}) + 1$ and $y = (\sqrt{5}) - 1$, then what is the value of $\left(\dfrac{x^2}{y^2}\right) + \left(\dfrac{y^2}{x^2}\right) + 4[\left(\dfrac{x}{y}\right) + \left(\dfrac{y}{x}\right)] + 6$?

A 31

B $23\sqrt{5}$

C $27\sqrt{5}$

D 25

Answer: D

Explanation:

question can be rewritten in the form of

$\dfrac{(x^2+y^2)^2 - 2x^2y^2}{(xy)^2} + 4\left(\dfrac{(x+y)^2 - 2x^2y^2}{x^2y^2}\right) + 6$

xy=4

x+y=$2\sqrt{5}$

$(x^2 + y^2)^2 - 2x^2y^2$=$12^2 - 2(16)$

=144-32

=112

$(xy)^2$=4^2=16

$\left(\dfrac{(x+y)^2 - 2x^2y^2}{x^2y^2}\right)$=12/4

=3

$\dfrac{(x^2+y^2)^2 - 2x^2y^2}{(xy)^2} + 4\left(\dfrac{(x+y)^2 - 2x^2y^2}{x^2y^2}\right) + 6$=(112/16)+4(3)+6

=7+12+6

=25

Question 14

If $x = 2 + \sqrt{3}, y = 2 - \sqrt{3}$ and $z = 1$, then what is the value of $\left(\dfrac{x}{yz}\right) + \left(\dfrac{y}{xz}\right) + \left(\dfrac{z}{xy}\right) + 2\left[\left(\dfrac{1}{x}\right) + \left(\dfrac{1}{y}\right) + \left(\dfrac{1}{z}\right)\right]$?

A 25

B 22

C 17

D 43

Answer: A

Explanation:

$x = 2 + \sqrt{3}, y = 2 - \sqrt{3}$

$(1/x) = (2 - \sqrt{3})$
$(1/y) = (2 + \sqrt{3})$

$\left(\frac{x}{yz}\right) = (2 + \sqrt{3})/(2 - \sqrt{3})$

$= (2 + \sqrt{3})^2$

$\left(\frac{y}{xz}\right) = (2 - \sqrt{3})/((2 + \sqrt{3}))$

$= (2 - \sqrt{3})^2$

$\left(\frac{z}{xy}\right) = 1$

$\left(\frac{x}{yz}\right) + \left(\frac{y}{xz}\right) + \left(\frac{z}{xy}\right) + 2\left[\left(\frac{1}{x}\right) + \left(\frac{1}{y}\right) + \left(\frac{1}{z}\right)\right]$

$= (2 + \sqrt{3})^2 + (2 - \sqrt{3})^2 + 1 + 2(2 - \sqrt{3} + 2 + \sqrt{3} + 1)$
=14+1+2(5)
=14+1+10
=245

Question 15

A root of equation $ax^2 + bx + c = 0$ (where a, b and c are rational numbers) is $5 + 3\sqrt{3}$. What is the value of $\frac{(a^2+b^2+c^2)}{(a+b+c)}$?

A $\frac{35a}{3}$

B $\frac{37a}{3}$

C $\frac{-105a}{11}$

D $\frac{-105a}{13}$

   Answer: C

Explanation:
$ax^2 + bx + c = 0$ has $5 + 3\sqrt{3}$ and so the other root is $5 - 3\sqrt{3}$ since these roots occur in pairs
sum of the roots= $5 + 3\sqrt{3} + 5 - 3\sqrt{3}$
=10
Product of the roots=$(5 + 3\sqrt{3})(5 - 3\sqrt{3})$
=-2
Sum of the roots=-b/a
Product of the roots=c/a
-b/a=10
b=-10a c/a=-2
c=-2a
$\frac{(a^2+b^2+c^2)}{(a+b+c)}$

$= \frac{(a^2+(-10a)^2+(-2a)^2)}{(a-10a-2a)}$

$= \frac{(105(a)^2)}{(-11a)}$

$= \frac{(-105(a))}{(11)}$

Question 16

If $x = \binom{a}{b} + \binom{b}{a}$, $y = \binom{b}{c} + \binom{c}{b}$ and $z = \binom{c}{a} + \binom{a}{c}$, then what is the value of $xyz - x^2 - y^2 - z^2$?

A   -4

B   2

C   -1

D   -6

Answer: A

Question 17

If $\left[a + \left(\frac{1}{a}\right)\right]^2 - 2\left[a - \left(\frac{1}{a}\right)\right] = 12$, then which of the following is a value of 'a'?

A $-8 + \sqrt{3}$

B $-8 - \sqrt{3}$

C $-8 + \sqrt{5}$

D   None of these

Answer: D

Question 18

If $x^2 - 4x + 1 = 0$, then what is the value of $x^9 + x^7 - 194x^5 - 194x^3$?

A   4

B   -4

C   1

D   -1

Answer: B

Question 19

If $x + y = 3$, then what is the value of $x^3 + y^3 + 9xy$?

A   15

B   81

C   27

D   9

Answer: C

Explanation:
x+y=3
Cubing on both sides

$x^3 + 3xy(x + y) + y^3 = 27$
$x^3 + 3xy(3) + y^3 = 27$
$x^3 + 9xy + y^3 = 27$

Question 20

$A = \frac{(x^8-1)}{(x^4+1)}$ and $B = \frac{(y^4-1)}{(y^2+1)}$. If $x = 2$ and $y = 9$, then what is the value of $A^2 + 2AB + AB^2$?

A 96475

B 138000

C 132425

D 138912

    Answer: B

Explanation:
$A = \frac{(x^8-1)}{(x^4+1)}$ and $B = \frac{(y^4-1)}{(y^2+1)}$
$A = (x^4 - 1)$
$B = (y^2 - 1)$
For x=2 ,A=15
For y=9,B=80
$A^2 + 2AB + AB^2$=225+2400+(15)(9025)
=2625+135375
=138000

Question 21

If $x - 4y = 0$ and $x + 2y = 24$, then what is the value of $\frac{(2x+3y)}{(2x-3y)}$?

A $\frac{9}{5}$

B $\frac{11}{5}$

C $\frac{13}{7}$

D $\frac{9}{7}$

    Answer: B

Explanation:
Given x-4y=0
x=4y
x+2y=24
6y=24
y=4
x=16
$\frac{(2x+3y)}{(2x-3y)} = \frac{(2*(16)+3*(4))}{(2*(16)-3*(4))}$
=44/20
=11/5

Question 22

If $\left(\frac{x}{a}\right) + \left(\frac{y}{b}\right) = 3$ and $\left(\frac{x}{b}\right) - \left(\frac{y}{a}\right) = 9$, then what is the value of $\frac{x}{y}$?

A $\frac{(b+3a)}{(a-3b)}$

B $\frac{(a+3b)}{(b-3a)}$

C $\frac{(1+3a)}{(a+3b)}$

D $\frac{(a+3b^2)}{(b-3a^2)}$

   Answer: A

Explanation:
$\left(\frac{x}{a}\right) + \left(\frac{y}{b}\right) = 3$
bx+ay=3ab
3bx+3ay=9ab
$\left(\frac{x}{b}\right) - \left(\frac{y}{a}\right) = 9$
ax-by=9ab
3bx+3ay=ax-by
3bx-ax=-by-3ay
x(3b-a)=y(-b-3a)
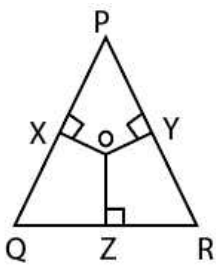y/x =(a-3b)/(3a+b)
x/y=(3a+b)(a-3b)

Question 23

In the given figure, OX, OY and OZ are perpendicular bisectors of the three sides of the triangle. If $\angle QPR = 65°$ and $\angle PQR = 60°$, then what is the value (in degrees) of $\angle QOR + \angle POR$?

A   250

B   180

C   210

D   125

   Answer: A

Question 24

In a triangle PQR, $\angle PQR = 90°$, PQ = 10 cm and PR = 26 cm, then what is the value (in cm) of inradius of incircle?

A   9

B 4

C 8

D 6

Answer: B

Explanation:
We know area of a triangle=r*s
it is a right angled triangle and phytogerean triplet of 5,12,13 i.e 10,24 and 26
So given two sides are 10 and 26 and so third side is 24
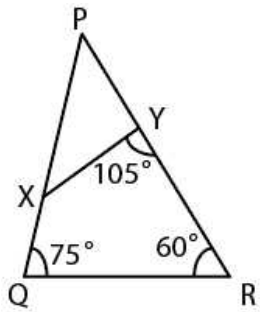Area of the triangle=(1/2)bh
(1/2)*24*10
=120 sq cm
S=(a+b+c)/2
=60/2
=30
Therefore r=120/30
=4 cm

Question 25

In the given figure, if $\frac{QR}{XY} = \frac{14}{9}$ and $PY = 18$ cm, then what is the value (in cm) of PQ ?

A 28

B 18

C 21

D 24

Answer: A

Question 26

In a triangle PQR, PX, QY and RZ be altitudes intersecting at O. If PO = 6 cm, PX = 8 cm and QO = 4 cm, then what is the value (in cm) of QY?

A 6.3

B 5.8

C 6

D 7

Answer: D

Question 27

A line cuts two concentric circles. The lengths of chords formed by that line on the two circles are 4 cm and 16 cm. What is the difference (in cm^2) in squares of radii of two circles?

A   240

B   120

C   60

D   90

Answer: C

Question 28

In the given figure, a circle touches the sides of the quadrilateral $PQRS$. The radius of the circle is 9 cm. $\angle RSP = \angle SRQ = 60°$ and $\angle PQR = \angle QPS = 120°$. What is the perimeter (in cm) of the quadrilateral ?
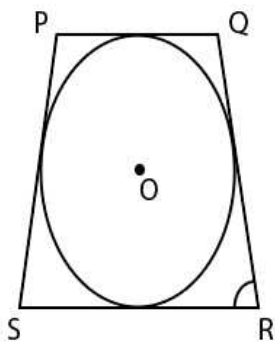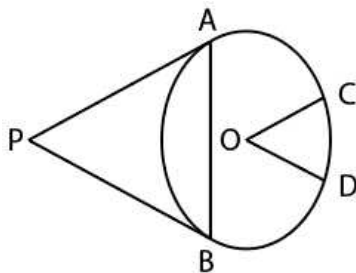

A $36\sqrt{3}$

B $24\sqrt{3}$

C $48\sqrt{3}$

D   32

Answer: C

Question 29

In the given figure, from the point P two tangents PA and PB are drawn to a circle with centre O and radius 5 cm. From the point O, OC and OD are drawn parallel to PA and PB respectively. If the length of the chord AB is 5 cm. then what is the value (in degrees) of $\angle COD$?

A   90

B   120

C 150

D 135

Answer: B

Question 30

In the given figure, AB is a diameter of the circle with centre O and XY is the tangent at a point C. If $\angle ACX = 35°$. then what is the value (in degrees) of $\angle CAB$?
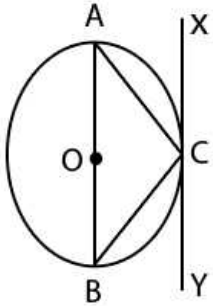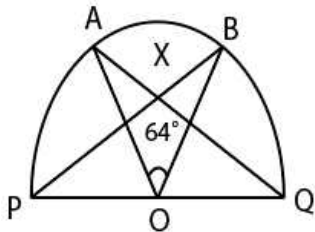

A 45

B 35

C 55

D 65

Answer: C

Question 31

In the given figure. PQ is a diameter of the semicircle $PABQ$ and O is its center. $\angle AOB = 64°$. BP cuts AQ at X. What is the value (in degrees) of $\angle AXP$?

A 36

B 32

C 58

D 54

Answer: C

Question 32

In the given figure. E and F are the centers of two identical circles. What is the ratio of area of triangle AOB to the area of triangle DOC?
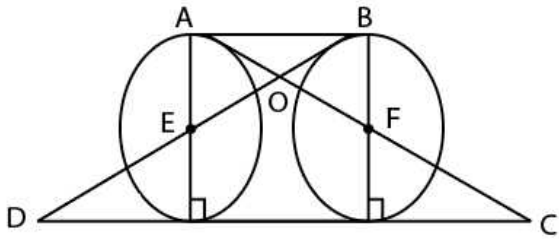
A $1:3$

B $1:9$

C $1:8$

D $1:4$

Answer: B

Question 33

In the given figure, in a right angle triangle ABC, $AB = 12cm$ and $AC = 15cm$. A square is inscribed in the triangle. One of the vertices of square coincides with the vertex of triangle. What is the maximum possible area (in cm^2) of the square?
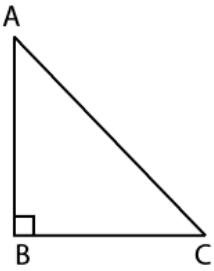
A $\frac{1296}{49}$

B 25

C $\frac{1225}{36}$

D $\frac{1225}{64}$

Answer: A

Question 34

In the given figure, $PQRS$ is a square of side 8 cm. $\angle PQO = 60°$. What is the area (in cm^2) of the triangle POQ?

A $32\sqrt{3}$

B $24[(\sqrt{3}) - 1]$

C $48[(\sqrt{3}) - 1]$

D $16[3 - (\sqrt{3})]$

     Answer: D

Question 35

In the given figure. two squares of sides 8 cm and 20 cm are given. What is the area (in cm^2) of the shaded part?
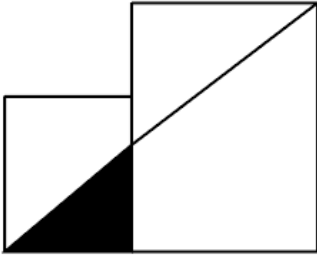
A $\frac{120}{7}$

B $\frac{160}{7}$

C $\frac{80}{7}$

D $\frac{240}{13}$

     Answer: B

Question 36

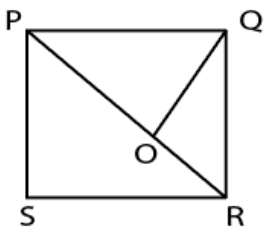The area of a regular hexagon is equal to the area of the square. What is the ratio of the perimeter of the regular hexagon to the perimeter of square?

A $\sqrt{6\sqrt{3}} : \sqrt{3\sqrt{6}}$

B $2\sqrt{3} : \sqrt{6\sqrt{2}}$

C $\sqrt{6\sqrt{3}} : 2$

D $\sqrt{6\sqrt{3}} : 2\sqrt{3}$

     Answer: D

Question 37

In the given figure, $ABCDEF$ is a regular hexagon of side 12 cm. P, Q and R are the mid points of the sides AB, CD and EF respectively. What is the area (in cm^2) of triangle PQR?
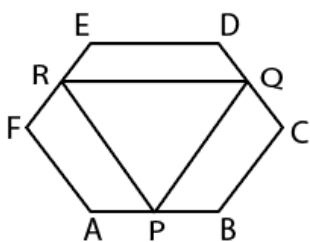
A $27\sqrt{6}$

B $81\sqrt{3}$

C $54\sqrt{3}$

D $54\sqrt{6}$

Answer: B

Question 38

A man is running at the speed of 20 km/hr. What is time (in seconds) taken by man to cover one round of a circular garden of radius 350 metres?

A 412

B 336

C 396

D 376

Answer: C

Explanation:
Circumference of the circular garden =$2\pi r$
=2*(22/7)*350
=2200 meters
i.e 2.2 kilometers
Speed=20 km/hr
Time=distance/speed
=2.2/20 hrs
=(2.2/20)*60*60 seconds
=396

Question 39

In the given figure, four identical semicircles are drawn in a quadrant. XA = 7 cm. What is the area (in cm^2) of shaded region?
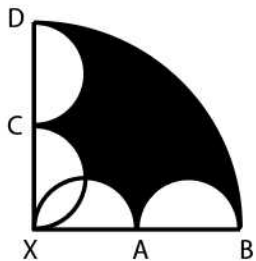
A 70

B 140

C 77

D 84

Answer: D

Question 40

A regular hexagonal base prism has height 8 cm and side of base is 4 cm. What is the total surface area (in cm^2) of the prism?

A $54(3 + \sqrt{3})$

B $36(3 + \sqrt{3})$

C $48(4 + \sqrt{3})$

D $24(4 + \sqrt{3})$

Answer: C

Question 41

A cube is placed inside a cone of radius 20 cm and height 10 cm, one of its face being on the base of the cone and vertices of opposite face touching the cone. What is the length (in cm) of side of the cube?

A 5

B 6

C 8

D 9

Answer: C

Question 42

A cylinder of radius 4.5 cm and height 12 cm just fits in another cylinder completely with their axis perpendicular. What is the radius (in cm) of second cylinder?

A 5

B 6

C 15

D 7.5

Answer: D

Question 43

A right circular cylinder has height 28 cm and radius of base 14 cm. Two hemispheres of radius 7 cm each are cut from each of the two bases of the cylinder. What is the total surface area (in cm^2) of the remaining part?

A 3842

B 4312

C 3296

D 4436

Answer: B

Question 44

Two spheres of equal radius are taken out by cutting from a solid cube of side $(12 + 4\sqrt{3})$ cm. What is the maximum volume (in cm^3) of each sphere?

A   1077.31

B   905.14

C   966.07

D   1007.24

Answer: B

Question 45

Three toys are in a shape of cylinder, hemisphere and cone. The three toys have same base. Height of each toy is $2\sqrt{2}$ cm. What is the ratio of the total surface areas of cylinder, hemisphere and cone respectively?

A $4 : 3 : [(\sqrt{2}) + 1]$

B $4 : 3 : [2 + (\sqrt{2})]$

C $4 : 3 : 2\sqrt{2}$

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

Answer: A

Explanation:
Total surface area of a cylinder=$2\pi r(r + h)$
Total surface area of a cone=$\pi r(l + r)$
Total surface area of a hemisphere=$2\pi r^{2}$
they all have same base and so same radius.let r=1 cm
$l^{2}=r^{2}+h^{2}$
$l^{2}=1+$

Question 46

A solid cube is cut into 27 identical cubes. What is the percentage increase in the total surface area?

A   150

B   200

C   300

D   250

Answer: B

Explanation:
Let the original length of each side of cube=3l
Surface area of the sphere=$6*(3l)^{2}$
=$54(l)^{2}$
Now length of each smaller cube=l
Total surface area of 27 cubes=$27*6*(l)^{2}$
=162$(l)^{2}$
percentage change in the surface area=((162$(l)^{2}$-$54(l)^{2}$)/$54(l)^{2}$)*100

Question 47

A regular square pyramid has side of its base 20 cm and height 45 cm is melted and recast into regular triangular pyramids of equilateral base of side 10 cm and height $$10\surd3$$ cm. What are the total numbers of regular triangular pyramid?

A 24

B 20

C 27

D 28

   Answer: A

Question 48

What is the value of $$[(\sin 7x - \sin 5x) \div (\cos 7x + \cos 5x)] - [(\cos 6x - \cos 4x) \div (\sin 6x + \sin 4x)]$$?

A 1

B $$2 \tan x$$

C $$\tan 2 x$$

D $$\tan (\frac{3x}{2})$$

   Answer: B

Question 49

What is the value of $$[(\cos^3 2\theta + 3 \cos 2\theta) \div (\cos^6 \theta - \sin^6 \theta)]$$?

A 0

B 1

C 4

D 2

   Answer: C

Question 50

What is the value of $$\tan \left(\frac{\pi}{4} + A\right) \times \tan \left(\frac{3\pi}{4} + A\right)?$$

A 1

B 0

C $$\cot \frac{A}{2}$$

D -1

   Answer: D

Question 51

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

A 0

B 1

C $$\cosec \theta$$

D $$\sec \theta$$

   Answer: B

Question 52

What is the value of sin $$(630$$° + $$A) + \cos A$$?

A $$\frac{\surd3}{2}$$

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

C 0

D $$\frac{2}{\surd3}$$

   Answer: C

Question 53

What is the value of $$[(\sin 59$$° $$\cos 31$$° + $$\cos 59$$° $$\sin 31$$°) $$\div$$ ($$\cos 20$$° $$\cos 25$$° - $$\sin 20$$° $$\sin 25$$°$$)]$$?

A $$\frac{1}{\surd2}$$

B $$\frac{2}{\surd2}$$

C $$\surd3$$

D $$\surd2$$

   Answer: D

Explanation:

sinAcosb + sinBcosA= sin(A+B)

cosAcosB - cosAcosB= cos(A+B)

So, $$\sin(A+B)\div cos(A-B)=sin(59+31)\div cos(25+20)$$= $$sin 90\div cos 45$$= $$1\div1\div\sqrt{2}=\sqrt{2}$$

Therefore, **Option D** is correct.

Question 54

What is the value of $$\cos (90 - B) \sin (C - A) + \sin (90 + A) \cos (B + C) - \sin (90 - C) \cos (A + B)$$?

A 1

B $$\sin (A + B - C)$$

C $$\cos (B + C - A)$$

D 0

    Answer: D

Question 55

Two trees are standing along the opposite sides of a road. Distance between the two trees is 400 metres. There is a point on the road between the trees. The angle of depressions of the point from the top of the trees are 45° and 60°. If the height of the tree which makes 45°angle is 200 metres, then what will be the height (in metres) of the other tree?

A 200

B $$200\surd3$$

C $$100\surd3$$

D 250

    Answer: B

Question 56

A tower stands on the top of a building which is 40 metres high. The angle of depression of a point situated on the ground from the top and bottom of the tower are found to be 60° and 45° respectively. What is the height (in metres) of tower?

A $$20\surd3$$

B $$30(\surd3 + 1)$$

C $$40(\surd3 - 1)$$

D $$50(\surd3 - 1)$$

    Answer: C

Question 57

From a point P, the angle of elevation of a tower is such that its tangent is $$\frac{3}{4}$$. On walking 560 metres towards the tower the tangent of the angle of elevation of the tower becomes $$\frac{4}{3}$$. What is the height (in metres) of the tower?

A 720

B 960

C 840

D 1030

    Answer: B

Instructions

Read the information given in the table below and answer the questions:

The table below shows the sales of milk in six different states as a percentage of total sales. In each state only two milkmen A and B sell the milk. The table below shows the sales of salesman A as percentage of total sale of milk in each state. The total sales of milk is 200000 litres.

State	Sales of Milk	Sales by Salesman
P	24%	65%
Q	10%	80%
R	17%	50%
S	13%	70%
T	22%	60%
U	14%	80%

Question 58

What are the average sales of milk (in litres) by the salesmen A in all the given states?

A   21866.67

B   26466.6

C   19200

D   26000

Answer: A

Question 59

What is the respective ratio of sales of milk in state P and Q by salesmen B and the sales of milk in state R and T by salesmen A?

A   52 : 109

B   104 : 217

C   52 : 31

D   31 : 57

Answer: B

Question 60

What will be the central angle (in degrees) formed by the average sale of milk in state Q, T and S together?

A   112.6

B   72

C   36

D   54

Answer: D

Question 61

What will be difference (in litres) in the sale of milk in state T by salesmen B and the total sale of milk in state R and S together?

A   17600

B   42400

C 38800

D 19000

Answer: B

Question 62

What is the difference (in litres) between the sale of milk in state R by salesmen A and the sale of milk in the same state by the salesmen B?

A 2000

B 0

C 12000

D 8000

Answer: B

Instructions

For the following questions answer them individually

Question 63

A beaker contains acid and water in the ratio 1 : x. When 300 ml of the mixture and 50 ml of water are mixed, the ratio of acid and water becomes 2 : 5. What is the value of x?

A 2

B 1

C 3

D 4

Answer: A

Question 64

A mixture is composed of 11 parts of pure milk and 2 parts of water. If 35 litres of water were added to the mixture then the new mixture will contain twice as much pure milk as water, then how many litres of pure milk does the original mixture contain?

A 110

B 55

C 220

D 70

Answer: A

Question 65

A starts a taxi service by investing Rs 25 lakhs. After 3 months, B joins the business by investing Rs 40 lakhs then 4 months after B joined, C too joins them by investing Rs 50 lakhs. One year after A started the business they make Rs 2,73,000 in profit. What is C's share of the profit (in Rs)?

A 1,00,000

B 1,25,000

C 75,000

D 1,50,000

Answer: C

Explanation:

Ratio= $$25\times12 months:40\times9 months:50\times5 months$$

C's share of the profit (in Rs)= $$(50\times5\times273000)\div(25\times12+40\times9+50\times5)$$= Rs.75000

Therefore, **Option C** is correct.

Question 66

A, B and C invest in a business in the ratio 4 : 5 : 7. C is a sleeping partner, so his share of profits will be half of what it would have been if he were a working partner. If they make Rs 36,000 profit of which 25% is reinvested in the business, how much does B get (in Rs)?

A 7560

B 10800

C 8640

D 9200

Answer: B

Question 67

A can do a work in 36 days and B in 12 days. If they work on it together for 3 days, then what fraction of work is left?

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

B $$\frac{1}{3}$$

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

D $$\frac{1}{5}$$

Answer: A

Explanation:

A & B total working unit is LCM of 36 & 12= 36 units.

A's working unit in a day=$$36\div36$$= 1 unit

B's working unit in a day=$$36\div12$$= 3 unit

Total work done by both in 3days= $$(1+3)\times3$$= 12 units.

Remaining work= (36-12)units= 24 units.

Fraction of work left= $$24\div36$$= $$2\div3$$

Therefore, **Option A** is correct.

Question 68

A can paint a house in 45 days and B can do it in 15 days. Along with C, they did the job in 5 days only. Then, C alone can do the job in how many days?

A   12

B   9

C   15

D   8

Answer: B

Question 69

A,B and C together can finish a task in 7.5 days. C is thrice as productive as A and B alone can do the task in 15 days. In how many days can A and C do the job if B goes on leave?

A   30

B   10

C   20

D   15

Answer: D

Question 70

A, B and C can do job in 9, 12 and 36 days respectively if they worked alone. A leaves after they have worked together for 3 days. In how many days can B and C do the rest of the job?

A   3

B   4

C   5

D   6

Answer: A

Explanation:
A, B, C working together units is LCM of 9, 12, 36= 36 units

A can work $$36\div9$$= 4 units in a day.

B can work $$36\div12$$= 3 units in a day.

C can work $$36\div36$$= 1 units in a day.

A, B, C 3 days work= $$4\times3+3\times3+1\times3$$= 24 units.

Remaining work is to be done by B & C= (36-24)units= 12 units.

Total days taken by B & C together to complete the work after A leaves= $$12\div(3+1)$$= 3 days.

Therefore, **Option A** is correct.

Question 71

Giving two successive discounts of 40% is equal to giving one discount of _____%.

A 80

B 96

C 64

D 72

   Answer: C

Explanation:

Successive discount= $$2x-(x^{2}\div100)$$

So, by using above formula, putting x= 40, we get,

Successive discount= 64%

Therefor, **Option C** is correct.

Question 72

If a website is selling smartphone at Rs 18,000 which is marked at Rs 25,000, then what is the discount (in %) at which the smartphone is being sold?

A 25

B 22

C 28

D 20

   Answer: C

Explanation:

Discount in price of smartphone= Rs.(25000-18000)= Rs.7000

% discount given= $$7000\times100\div25000$$= 28%

Therefore, **Option C** is correct.

Question 73

If on an item there is 12% discount on the marked price of Rs 10,000 but the item is sold at Rs 8,360 only then what additional discount (in %) did the customer get?

A 6

B 7

C 5

D 8

   Answer: C

Explanation:

CP after first discount= (100-12)% of Rs.10,000= Rs.8800

But the item is sold at Rs 8,360,

So, additional discount offered= $$(8800-8360)\times100\div8800$$= 5%

Therefore, **Option C** is cprrect.

Question 74

A shopkeeper marks up his wares by 125% and offers 25% discount. What will be the selling price if the cost price (in Rs) is Rs 640?

A   1080

B   1000

C   920

D   860

   Answer: A

Explanation:

Marked Price= (100+125)%= 225% of Rs.640= Rs.1440

Discount offered= 25%

So, Selling Price= (100-25)% of Rs.1440= Rs.1080

Therefore, **Option A** is correct.

Question 75

Priya's marks in History and Geography are in the ratio 5 : 7. If she got 14 marks more in Geography than in History, what are her History marks?

A   49

B   42

C   56

D   35

   Answer: D

Explanation:

Assuming, marks in History= x and in Geography= y

Ratio of their marks= $$x\div y=5\div7$$ .....(i)

Since she got 14 marks more in Geography than in History,

So, (y-14)= x   .....(ii)

Solving equation (i) & (ii) we get, x= 35 and y= 49

Therefore, **Option D** is correct.

Question 76

The ratio of present ages of Rahul and his sister is 3 : 4. Before 10 years the ratio of their ages was 13:19. What is Rahul's present age (in years)?

A   36

B   48

C   42

D   54

   Answer: A

Explanation:

Assuming, present age of Rahul= x years and his sister= y years.

So, Present ratio= $$x\div y= 3\div4$$ .....(i)

Before 10 years the ratio of their ages

=$$(x-10)\div (y-10)= 13\div19$$ ......(ii)

Solving equation (i) & (ii),

We get, x=36 years and y=48 years.

Therefore, **Option A** is correct.

Question 77

What is the third proportional to 9 and 15?

A   30

B   27

C   36

D   25

  Answer: D

Explanation:

Let the third proportional be x.

9:15::15:x

$$9\div15=15\div x$$

Solving we get x= 25

Therefore, **Option D** is correct.

Question 78

According to the will, the wealth of Rs 11,50,000 was to be divided between the son and the daughter in the ratio $$\frac{2}{3} : \frac{5}{4}$$. How much share did the son get (in Rs lakhs)?

A   5

B   6

C   7

D   4

  Answer: D

Explanation:

LCM of the denominators i.e 3,4=12

Therefore, New ratio= $$\frac{2}{3}\times12 : \frac{5}{4}\times12$$= 8:15

So, B's share= $$8\div(8+15)\times1150000$$= Rs. 4 lakhs.

Therefore, **Option D** is correct.

Question 79

If Rs 7,800 is to be divided between A, B and C in the ratio $$\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$$, then how much share will B get (in Rs)?

A 3600

B 1800

C 2400

D 1200

    Answer: C

Explanation:
LCM of the denominators of $$\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$$

i.e. LCM of 2,3,4= 12

Therefore, new ratio=$$\frac{1}{2}\times12 : \frac{1}{3}\times12 : \frac{1}{4}\times12$$ = 6:4:3

So, B's share= $$4\div(6+4+3)\times7800$$= 2400.

Therefore, **Option C** is correct.

Question 80

Bunty had candies and chewing gums in his sweet box in the ratio 7 : 13. After he has eaten 8 candies and 11 chewing gums the ratio became 1 : 2. How many candies does he have now?

A 65

B 35

C 54

D 27

    Answer: D

Explanation:
Assuming, number of candies= x & number of chewing gums= y

Initial ratio= $$x\div y$$ =$$7\div13$$.

Therefore, $$x=(7\times y)\div13$$ .....(i)

After he has eaten 8 candies and 11 chewing gums,

Ratio= $$(x-8)\div(y-11)=1\div2$$ ......(ii)

Putting the value x in equation (ii),

We get, x=35 & y=65.

Candies he has now= 35-8= 27.

Therefore, **Option D** is correct.

Question 81

The average weight of P, Q and R is 71 kg. If the average weight of P and Q be 66 kg and that of Q and R be 76.5 kg, then the weight (in kg) of Q is.

A 60

B 72

C 81

D 75

Answer: B

Explanation:

Total Weight of P,Q & R= $(P+Q+R)\div3=71$

Therefore,P+Q+R= 213   ......(i)

Total weight of P & Q= $(P+Q)\div2=66$

Therefore, P+Q= 132   ....(ii)

Total weight of Q & R= $(Q+R)\div2=76.5$

Therefore,Q+R= 153   ....(iii)

Solving equation (i) & (ii), we get, R= 81

Solving equation (i) & (iii), we get, P= 60

Putting the value of P & R in equation (i),

We get, Q= 72.

Therefore, **Option B** is the correct answer.

Question 82

Rita buys 5 sarees at an average cost of Rs 2250. If she buys three more sarees at an average cost of Rs 2750, what will be the average (in Rs) of all the sarees she buys?

A 2437.5

B 2500

C 2450

D 2332.5

Answer: A

Question 83

In a one day match of 50 overs in an innings the team A had a run rate of 5.3 runs per over. Team B is playing and 5 overs are left and the required run rate to tie the match is 7.2 per over to match the score of Team A. What is team B's score?

A 265

B 238

C 254

D 229

Answer: D

Question 84

Average of all even numbers between 104 and 148 is _____.

A 128

B 130

C 124

D 126

Answer: D

Question 85

A vendor buys bananas at 4 for Rs 3 and sells at 3 for Rs 4. What will be the result?

A 43.75% profit

B 77.7% loss

C 77.7% profit

D 43.75% loss

Answer: C

Question 86

A wholesaler sells a watch to a retailer at a profit of 8% and the retailer sells it to a customer at a profit of 12%. If the customer pays Rs. 8,448 what had it cost (approximately) to the wholesaler (in Rs)?

A 6984

B 6082

C 7120

D 7022

Answer: A

Question 87

A trader had 2000 kgs of rice. He sold a part of it at 10% profit and the rest at 16% profit, so that he made a total profit of 14.2%. How much rice (in kg) did he sell at 10% profit?

A 1400

B 600

C 800

D 1000

Answer: B

Question 88

A used car dealer sells a car for Rs 7.6 lakhs and makes some loss. If he had sold it for Rs 9.2 lakhs his profit would have been thrice his loss. What was the cost price of the car (in Rs lakhs)?

A 8.5

B 8.75

C 8.25

D 8

   Answer: D

Question 89

0.09% of 25% of 1200 is equal to_____.

A 0.27

B 2.7

C 27

D 270

   Answer: A

Question 90

When a number is increased by 20, it becomes 116% of itself. What is the number?

A 100

B 250

C 125

D 400

   Answer: C

Question 91

Two numbers are 50% and 75% 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 50

B 25

C 75

D 100

   Answer: D

Question 92

Price of petrol increased from Rs 60/liter to Rs 75/liter. How much should the consumption of petrol be reduced (in %) so as to increase expenditure by only 10%?

A 12

B 20

C 15

D 18

   Answer: A

Question 93

A train has to cover a distance of 900 km in 25 hours. What should be its average speed in meters/second?

A 20

B 10

C 18

D 36

   Answer: B

Question 94

If a boat goes upstream at a speed of 18 km/hr and comes back the same distance at 30 km/hr. What is the average speed (in km/hr) for the total journey?

A 22.5

B 24

C 20.5

D 25

   Answer: A

Question 95

Two cyclists A and B start cycling at 21 km/hr and 24 km/hr towards each other. They meet after 1 hour and 12 minutes. How far (in km) were they from each other when they started?

A 48

B 42

C 54

D 36

   Answer: C

Question 96

Excluding stoppages, the speed of a bus is 60 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?

A 12

B 9

C 15

D 10

Answer: C

Question 97

If in 3 years at simple interest the principal increases by 15%. What will be the approximate compound interest earned (in Rs lakhs) on Rs 15 lakhs in 3 years at the same rate?

A 7.81

B 2.87

C 2.36

D 3.38

Answer: C

Question 98

If the amount received at the end of 2nd and 3rd year at compound Interest on a certain Principal is Rs 9,600 and Rs 10,272 respectively, what is the rate of interest (in %)?

A 7

B 8

C 6

D 5

Answer: A

Question 99

A invested an amount of x rupees in a bank for 2 years which gave 5% interest in year 1 and 6% interest in year 2. The amount received after 2 years is Rs 24,486. What is the value of x?

A 23000

B 22500

C 22000

D 21500

Answer: C

Question 100

What is the difference (in Rs) in Compound interest earned in 1 year on a sum of Rs 10,000 at 40% per annum compounded quarterly and annually?

A 461

B 346

C 463

D 641

Answer: D