SSC CGL Tier-2 2010 Maths

Instructions

For the following questions answer them individually

Question 1

A General, while arranging his men, who were 6000 in number, inthe form of a square,found that there were 71 men left over. How many were arranged in each row?

A 73

B 77

C 87

D 93

Answer: B

Question 2

A number, when divided successively by 4, 5 and 6, leaves remainders 2, 3 and 4 respectively. The least such number is

A 1

B 2

C 19

D 31

Answer: D

Question 3

A number, when divided by 296, gives 75 as the remainder. Ifthesamenumberis divided by 37 then the remainder will be

A 1

B 2

C 19

D 31

Answer: A

Question 4

The square root of $\frac{(0.75)^3}{1-0.75}+[0.75+(0.75)^2+1]$ **is**

A 1

B 2

C 3

D 4

Answer: B

Question 5

The sum and product of two numbers are 12 and 35 respectively. The sum of their reciprocals will be

A $\frac{1}{3}$

B $\frac{1}{5}$

C $\frac{12}{35}$

D $\frac{35}{12}$

Answer: C

Explanation:
let the 2 numbers be x and y

sum of 2 numbers , x + y = 12

product of 2 numbers, xy = 35

reciprocal of x and y are $\frac{1}{x} and \frac{1}{y}$ respectively

sum of their reciprocals = $\frac{1}{x} + \frac{1}{y}$

$= \frac{x+y}{xy}$

$= \frac{12}{35}$

Question 6

If $a^2 + b^2 + \frac{1}{a^2} + \frac{1}{b^2} = 4$ then the value of $a^2 + b^2$ will be

A 1

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

C 2

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

Answer: C

Question 7

If $(x + \frac{1}{x})^2 = 3$ then the value $x^3 + \frac{1}{x^3}$ is

A 3

B 2

C 1

D 0

Answer: D

Question 8

$\frac{0.1\times0.1\times0.1+0.02\times0.02\times0.02}{0.2\times0.2\times0.2+0.04\times0.04\times0.04}$ **is equal to**

A 0.125

B 0.250

C 0.500

D 0.855

Answer: A

Question 9

If x+ $\frac{1}{x}$ **=2 then the value of** x^{100} **+** $\frac{1}{x^{100}}$ **is**

A 2

B 0

C 1

D -2

Answer: A

Question 10

If $x^3+3\,x^2+3x$ **= 7, then x is equal to**

A 2

B $\sqrt[3]{6}$

C 1

D -1

Answer: C

Question 11

If 2x+ $\frac{2}{x}$ **=1 then the value of** $x^3+\frac{1}{x^3}$

A $\frac{13}{8}$

B $-\frac{11}{8}$

C $\frac{11}{8}$

D $-\frac{13}{8}$

Answer: B

Question 12

The greatest number among $\sqrt{5}, \sqrt[3]{4}, \sqrt[5]{2}, \sqrt[7]{3}$ is

A $\sqrt[3]{4}$

B $\sqrt[7]{3}$

C $\sqrt{5}$

D $\sqrt[5]{2}$

Answer: C

Question 13

$\sqrt[3]{(13.068)^2 - (13.392)^2}$ is equal to

A 0.6

B 0.06

C 1.8

D 2.6

Answer: C

Question 14

$\left[\frac{1}{1\times2} + \frac{1}{2\times3} + \frac{1}{3\times4} + \ldots\ldots \frac{1}{99\times100}\right]$ is equal to

A $\frac{1}{9900}$

B $\frac{99}{100}$

C $\frac{100}{99}$

D $\frac{1000}{99}$

Answer: B

Question 15

The sum of all the digits of the numbers from 1 to 100 is

A 5050

B 903

C 901

D 900

Answer: A

Explanation:

Sum of first 'n' natural numbers = $\frac{n(n+1)}{2}$

here n =100

substituting,

$\frac{100(100+1)}{2} = 5050$

Question 16

A shopkeeper sells sugerin such a way that the selling price of 950g of sugar is the same as the cost price of 1 kg of sugar. What is his gain per cent?

A $5\frac{5}{19}$

B $5\frac{1}{5}$

C 5

D $4\frac{1}{19}$

Answer: A

Explanation:

Selling price (SP), Cost price (CP)

SP of 950 g = CP of 1000 g

$\frac{SP}{CP} = \frac{1000}{950} = \frac{20}{19}$

gain % = $\frac{20-19}{19} \times 100 = \frac{100}{19}$

Question 17

A person bought a horse and a carriage for Rs. 20000. Later, he sold the horse at 20% profit and the carriage at 10% loss. Thus, he gained 2% inthe whole transaction. The cost price of the horse was

A Rs. 7200

B Rs. 7500

C Rs. 8000

D Rs. 9000

Answer: C

Explanation:

cost price of horse and carriage = 20000

assume CP for horse be x

then CP for carriage = 20000 - x

According to the question

$x \times \frac{120}{100} + (20000 - x) \times \frac{90}{100} = 20000 \times \frac{102}{100}$

solving,

1.2x + 0.9(20000 - x) = 20400

x = $\frac{2400}{0.3} = 8000$

Question 18

A sells an article to B at 15% profit. B sells it to C at 10% loss. If C pays Rs. 517.50 for it then A purchased it at

A 500

B 750

C 1000

D 1250

Answer: A

Explanation:
Selling price (SP) , Cost price (CP), Profit (P)

SP of A = 115

CP of B = 115

let original price for A be x

A sold item at 15% profit

Cost for B = 1.15x sold at 10% loss

Cost for C = $0.9(1.15x)$

C paid 517.5

517.5 = 0.9(1.15x)

$x = \frac{517.5}{0.9 \times 1.15} = 500$

Question 19

An article is sold at a certai fixed price. By selling it at $\frac{2}{3}$ of that price, one loses 10%. The gain per cent on selling it at the original price is

A 20

B $33\frac{1}{3}$

C $\frac{200}{9}$

D 40

Answer: C

Explanation:
Cost price (CP), Selling price (SP), Loss (L)

let original SP = x

new SP = $\frac{2}{3}x$

CP = $\frac{100}{100-L} \times SP$

given L =10%

CP = $\frac{100}{90} \times \frac{2x}{3} = \frac{20x}{27}$

SP = X

Gain = x - $\frac{20x}{27} = \frac{7x}{27}$

$7x$

gain % = $\frac{\frac{27}{20x}}{27} = \frac{7}{20} \times 100 = 35$

Question 20

A sells an aritticle to B for Rs. 45,000 losing 10% in the transaction. B sells it to C at a price which would have given a profit of 10% to A. By what per cent does B gain?

A $\frac{75}{2}$

B $\frac{100}{3}$

C $\frac{200}{9}$

D $\frac{150}{7}$

Answer: C

Explanation:
Cost price (CP), Selling price (SP), Profit (P)

A sells an aritticle to B for Rs. 45,000 losing 10%

therefore A's CP = $45000 \times \frac{100}{90} = 50000$

B sells it to C at profit of 10% to A.

therefore, B's CP = $50000 \times \frac{110}{100} = 55000$

B's CP = A's SP = 45000

B's P% = $\frac{10000}{45000} \times 100 = \frac{200}{9}$

Question 21

The cost price of an article is 80% of its marked price for sale. How much per cent does the tradesman gain after allowing a discount of 12% ?

A 20

B 12

C 10

D 8

Answer: C

Explanation:
Marked price (MP) , Cost price (CP) , Selling price (SP) , Discount(D)

Let MP = 100

CP = $\frac{80}{100} \times 100 = 80$

Discount = 12%

SP = $MP \times \frac{100-D}{100}$

= $100 \times \frac{88}{100}$

= 88

P % = $\frac{SP-CP}{CP} \times 100$

$= \frac{88-80}{80} \times 100$

= 10

Question 22

The cost price of an article is 80% of itsmarked price for sale. How much per cent does the tradesman gain after allowing a discount of 12% ?

A 10

B 7

C 6

D 5

Answer: A

Explanation:
Marked price (MP) , Cost price (CP) , Selling price (SP) , Discount(D)

Let MP = 100

CP = $\frac{80}{100} \times 100 = 80$

Discount = 12%

SP = $MP \times \frac{100-D}{100}$

= $100 \times \frac{88}{100}$

= 88

P % = $\frac{SP-CP}{CP} \times 100$

= $\frac{88-80}{80} \times 100$

= 10

Question 23

A merchant purchases a wristwatch for Rs.450 and fixes its list price in a such a waythat after allowing a discount of 10%, he earns a profit of 20%. Then the list price (in rupees) of the wristwatch is

A 500

B 600

C 750

D 800

Answer: B

Explanation:
Cost price (CP) Selling price (SP) List price (LP) Profit (P)

SP = $LP \times \frac{90}{100}$

$\frac{SP-CP}{CP} \times 100 = P$

Given CP = 450

$\frac{LP \times \frac{90}{100} - 450}{450} = \frac{1}{5}$

$\frac{LP \times 90}{100 \times 450} - 1 = \frac{1}{5}$

solving, LP = 600

Question 24

A reduction of 10% in the price of tea enables a dealer to purchase 25 kg more tea for Rs. 22500. What is the reduced price per kg of tea?

A 70

B 80

C 90

D 100

Answer: C

Explanation:
let the original price of tea = Rs x Kg

After reduction the price becomes = x - 10% of x = $\frac{9x}{10}$ / kg

Now

$\left(\frac{22500}{\frac{9x}{10}}\right) - \frac{22500}{x} = 25$

$22500\left(\frac{10}{9x} - \frac{1}{x}\right) = 25$

solving x = 100

hence new price = 90

Question 25

Ram donated 4% of his income to a charity and deposited 10% of the rest in a Bank. If now he has Rs. 8640 left with him, then his income is

A RS.12,500

B RS.12,000

C RS.10,500

D RS.10,000

Answer: D

Explanation:
let the income be 100

Ram donated 4% of his income to a charity = $\frac{4}{100} \times 100 = 4$

remaining = 96

deposited 10% of the rest in a Bank = $\frac{10}{100} \times 96 = 9.6$

saving = 100 - 13.6 = 86.4

86.4===100

1 ==== $\frac{100}{86.4}$

= $\frac{100}{86.4} \times 8640 = 10000$

Question 26

If the length of a rectangle is increased by 10% and its breadth is decreased by 10%, then its area

A decreases by 1%

B ncreases by 1%

C decreases by 2%

D remains unchanged

Answer: A

Explanation:
assume original length of rectangle = 100

original breadth = 100

original area = 10000

now length of a rectangle is increased by 10%

new length = $100 \times \frac{110}{100} = 110$

breadth is decreased by 10%

new breadth = $100 \times \frac{90}{100} = 90$

new area = $110 \times 90 = 9900$

% change in area = $\frac{10000-9900}{10000} \times 100 = \frac{100}{10000} \times 100 = 1\ \%$

Question 27

Three spherical balls of radius 1 cm, 2 cm and 3 cm are melted to form a single spherical ball. In the process, the loss of material is 25%. The radius of the new ball is

A 6 cm

B 5 cm

C 3 cm

D 2 cm

Answer: C

Explanation:
material lost = 25 % = $\frac{1}{4}$

remaining = $1 - \frac{1}{4} = \frac{3}{4}$

volume of sphere = $\frac{4}{3}\pi r^3$

volume of new ball = $\frac{3}{4} \times \frac{4}{3}\pi(r1^3 + r2^3 + r3^3)$

= $\pi(1^3 + 2^3 + 3^3)$

= $36\pi cm^3$

$\frac{4}{3}\pi r^3 = 36\pi$

solving r = 3 cm

Question 28

IfA : B=2 : 3,B: C=4: 5and C: D=5 : 9,then A : D is equalto

A 11:17

B 8:27

C 5:9

D 2:9

Answer: B

Explanation:

A : B

B : C

.....

2 : 3

4 : 5

.....

8 : 12 : 15 $[(2 \times 4 = 8)(3 \times 4 = 12)(3 \times 5 = 15)]$

5 : 9

.....

40 : 60 : 75 : 135 $[(8 \times 5 = 40)(12 \times 5 = 60)(15 \times 5 = 75)(15 \times 9 = 135)]$

== A : B : C : D

8 : 12 : 15 : 27

A : D = 8 : 27

Question 29

If the length of a rectangle is increased in the ratio 6 : 7 and its breadth is diminished in the ratio 5 : 4 then its area will be diminished in the ratio

A 17:16

B 15:14

C 9:8

D 8:9

Answer: B

Explanation:

let original length = 6l

original breadth = 5l

original area = 30 l^2

new length = 7l

new breadth = 4l

new area = 28 l^2

ratio = 30 l^2 : 28 l^2

= 15 :14

Question 30

7 years ago, the ages (in years) of A and B were in the ratio 4 : 5; and 7 years hence they will be in the ratio 5 : 6. The present age of B is

A 56

B 63

C 90

D 77

Answer: D

Explanation:
7 years ago, the ages of A and B were in the ratio 4x : 5x

7 years hence they will be in the ratio 5x : 6x

forming the equation

4x + 7 = 5x - 7

solving we get x = 14

therefore age of B 7 years ago = $14 \times 5 = 70$

present age of B = 70 + 7 = 77

Question 31

Two numbers are such that their difference,their sum and their product are in the ratio of 1 : 7 : 24. The product of the numbers is

A 24

B 36

C 48

D 60

Answer: C

Explanation:
let the numbers be x and y

x - y = a .....(1)

x + y = 7a .....(2)

xy = 24a.....(3)

solving (1) and (2)

we get x = 4a

substituting x = 4a in equation (2) we get y = 3a

$x \times y = 4a \times 3a = 12a^2$

from (3) $12a^2 = 24a$

solving a = 2

product of the numbers = xy = 24a = $24 \times 2 = 48$

Question 32

A, B, C are partners in a business. During a particular year,A received one third of the profit, B received one fourth of the profit and C received the remaining Rs. 5000. How much amount of money did A receive

A RS. 1000

B RS. 3000

C RS. 4000

D RS. 5000

Answer: C

Explanation:
let the profit be P

A, B, C are partners in a business

A received one third of the profit = $\frac{1}{3} \times P$

B received one fourth of the profit = $\frac{1}{4} \times P$

C received the remaining = $1 - (\frac{1}{3} + \frac{1}{4}) = \frac{5}{12}$

given $\frac{5}{12} \times P = 5000$

solving $P = \frac{5000 \times 12}{5} = 12000$

amount of money A receive = $\frac{12000}{3} = 4000$

Question 33

Three horses are tethered at 3 corners of a triangular plot of land having sides 20m, 30m and 40m each with a rope of length 7m.The area (in m^2) of the region of this plot, which can be grazed by the horses, is use ($\pi = \frac{22}{7}$)

A $\frac{77}{3}$

B 75

C 77

D 80

Answer: C

Explanation:
let A = $\theta 1^\circ$

B = $\theta 2^\circ$

C = $\theta 3^\circ$

area which can be grazed by 3 horses = sum of the areas of 3 sectors with central angles $\theta 1^\circ,\ \theta 2^\circ,\ \theta 3^\circ$ and each with radius , r = 7 m

== $(\pi r^2 \frac{\theta 1}{360} + \pi r^2 \frac{\theta 2}{360} + \pi r^2 \frac{\theta 3}{360}) m^2$

= $\frac{\pi r^2}{360}(A + B + C)$

A + B + C = 180 [sum of angles of triangle]

= $\frac{\pi r^2}{360} \times 180 = \frac{22}{7} \times 7 \times 7 \times \frac{180}{360}$

= 77 m^2

Question 34

A wire, when bent in the form of a square, encloses a region of area 121 cm^2 .If the same wire is bent in to the form of a circle, then the area of the circle is use ($\pi = \frac{22}{7}$)

A 150 cm^2

B 152 cm^2

C 154 cm^2

D 159 cm^2

Answer: C

Explanation:

Area of square = a^2

a = side of the square

given area of the square = 121 cm^2

solving, a =11

same wire is bent in to the form of a circle

therefore, perimeter of the square = perimeter of the circle

perimeter of the square = 4a = $4 \times a = 44cm$

44 = perimeter of the circle

$44 = 2 \times \frac{22}{7} \times r$

solving r = 7

area of the circle = πr^2

$= \frac{22}{7} \times 7^2$

= 154 cm^2

Question 35

The ratio of the area of a sector of a circle to the area of the circle is 1 : 4. If the area of the circle is 154 cm^2 , the perimeter of the sector is

A 20

B 25

C 36

D 40

Answer: B

Explanation:

area of the circle = $\pi r^2 = 154$

$\frac{22}{7} \times r^2 = 154$

on solving r =7

angle subtended by the sector at the centre = 90°

length of an arc = $\frac{\pi r\theta}{180}$

= $\frac{22}{7} \times 7 \times \frac{90}{180} = 11$

perimeter of sector = $2r + l = 2 \times 7 + 11 = 25$

Question 36

The length of the diagonal of a cube is 6 cm.The volume of the cube (in cm^3) is

A $18\sqrt{3}$

B $24\sqrt{3}$

C $28\sqrt{3}$

D $30\sqrt{3}$

Answer: B

Explanation:
let the length of the edge of the cube be a

diagonal of cube = $a\sqrt{3}$

given diagonal = 6cm

$a\sqrt{3} = 6$

$$ a = \frac{6}{\sqrt{3} = 2 \sqrt{3} $$

$Volume of cube = a^3$

V = $(2\sqrt{3})^3 = 24\sqrt{3}$

Question 37

If a sphere of radius r is divided into four identical parts, then the total surface area of the four parts is

A 4 πr^2 sq.units

B 2 πr^2 sq.units

C 8 πr^2 sq.units

D 3 πr^2 sq.units

Answer: C

Explanation:
Sphere of radius r is divided into 4 identical parts

Radius of each part = r units

Each part has 1 curvedsurface and 2 semicircular faces

TSA of each part = 1/4 of curved surface area of sphere + 2 area of semicircular face

TSA = $\frac{1}{4} \times 4\pi r^2 + 2 \times \frac{1}{2}\pi r^2 = 2\pi r^2$

TSA of 4 parts = $4 \times 2\pi r^2 = 8\pi r^2$

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Question 38

A sum of money, deposited at some rate percent per annum of compound interest, doubles itself in 4 years. In how many years will it become 16 times of itself at the same rate ?

A 16

B 12

C 10

D 8

Answer: A

Question 39

What is the difference between thecompound interest and simple interest on Rs. 4000 at 5% per annum for 2 years ?

A 10

B 11

C 20

D 100

Answer: A

Question 40

The simple and compound interests on a sum of money for 2 year are Rs. 8400 and Rs. 8652 respectively. The rate of interest per annum is

A 6 %

B 7.5 %

C 9 %

D 4.5 %

Answer: A

Question 41

A man can row against the current three fourth of a kilometre in 15 minutes and returns the same distance in 10 minutes. The ratio of his speed to that of the current is

A $3:5$

B $5:3$

C $1:5$

D $5:1$

Answer: D

Question 42

Two places A and B are 100 km apart on ahighway. One car starts fromAand another from B at the same time. If the cars travel in the same direction at a constant speed, they meet in 5 hours. If the cars travel towards each other, they meet in 1 hour. What is the speed of the carrunning faster ?

A 60 km/hr

B 50 km/hr

C 40 km/hr

D 32 km/hr

Answer: A

Question 43

A can complete apiece of work in 12 days. Bis 60% more efficientthanA. The number of days, that B will take to complete the same work, is

A 6

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

C 8

D $8\frac{1}{2}$

Answer: B

Question 44

Two pipes can fill an empty tank separately in 24 minutes and 40 minutes respectively and a third pipe can empty 30 gallons ofwater per minute. If all the three pipes are open, empty tank becomes full in one hour. The capacity of the tank (in gallons) is

A 800

B 600

C 500

D 400

Answer: B

Question 45

A batsman,in his 12^{th} innings, makes a score of 63 runs and there by increases his average score by 2. The average of his score after 12^{th} innings is

A 41

B 42

C 34

D 35

Answer: A

Explanation:
Assume total runs in 11 innings be 'x'

then the average score in 11 innings = 11x

score of 12th inning = 63

after 12th inning average score increased by 2

thus the average of 12 innings = $\frac{11x+63}{12} = x + 2$

on solving x = 39

therefore average score after 12th inning = 39 + 2 = 41

Question 46

The greatest number,that divides 43, 91 and 183 so as to leave the same remainder in each case, is

A 9

B 8

C 4

D 3

Answer: C

Explanation:
3 numbers are 43,91,183

largest number is 183

smallest number is 43

subtract smallest number from both the highest number

so 183 - 43 = 140

91 - 43 = 48

91 is smaller than 183, so subtract 91 from 183

183 - 91 = 92

now we have 3 numbers 140,48,92

so HCF of 140,48,92 = 4

thus the greatest number,that divides 43, 91 and 183 so as to leave the same remainder in each case, is 4

Question 47

$\sqrt{16+6\sqrt{7}}-\sqrt{16-6\sqrt{7}}$ **is eual to**

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{4}$

D $\frac{1}{5}$

Answer: A

Question 48

The sum of the areas of the 10 squares of the lengths of who sides are 20 cm, 21 cm, ... 29 cm respectively is

A 6085 cm^2

B 8555 cm^2

C 2470 cm^2

D 11025 cm^2

Answer: A

Explanation:
sides of the 10 squares are 20,21,22,.....,29 respectively

area of the square = $side^2$

area of the 10 squares are $20^2, 21^2, 22^2, ..., 29^2$ = sum of squares of first 29 natural numbers - sum of squares of first 19 natural numbers

sum of squares of first n natural numbers = $\frac{n(n+1)(2n+1)}{6}$

sum of squares of first 29 natural numbers = $\frac{29(29+1)(2\times29+1)}{6} = \frac{29\times30\times59}{6} = 8555$

sum of squares of first 19 natural numbers = $\frac{19(19+1)(2\times19+1)}{6} = \frac{19\times20\times39}{6} = 2470$

area of the 10 squares are $20^2, 21^2, 22^2, ..., 29^2$ = 8555 - 2470 = 6085

Question 49

The square root of $\frac{9.5\times0.0085\times18.9}{0.0017\times1.9\times2.1}$ **is**

A 15

B 45

C 75

D 225

Answer: A

Explanation:
$\frac{95\times85\times189}{17\times19\times21} = 225$

$\sqrt{225} = 15$

Question 50

If $2x + \frac{1}{3x} = 6$**,then** $3x + \frac{1}{2x}$ **is equal to**

A 4

B 8

C 9

D 12

Answer: C

Question 51

If $x = \left(\sqrt{2}-1\right)^{-\frac{1}{2}}$ **then the value of** $\left(x^2 - \frac{1}{x^2}\right)$ **is**

A 2

B $-2\sqrt{2}$

C $2\sqrt{2}$

D $-\sqrt{2}$

Answer: A

Explanation:

$x = \left(\sqrt{2}-1\right)^{-\frac{1}{2}} = \sqrt{\frac{1}{\sqrt{2}-1}}$

$x^2 = \frac{1}{\sqrt{2}-1}$

$\frac{1}{x^2} = \frac{\sqrt{2}-1}{1}$

$x^2 - \frac{1}{x^2} = \frac{1}{\sqrt{2}-1} - \frac{\sqrt{2}-1}{1}$

solving = 2

Question 52

$\frac{3}{4}\left(1+\frac{1}{3}\right)\left(1+\frac{2}{3}\right)\left(1-\frac{2}{5}\right)\left(1+\frac{6}{7}\right)\left(1-\frac{12}{13}\right)$ **is equal to**

A $\frac{2}{13}$

B $\frac{1}{7}$

C $\frac{1}{6}$

D $\frac{1}{5}$

Answer: B

Explanation:

$\frac{3}{4} \times \frac{4}{3} \times \frac{5}{3} \times \frac{3}{5} \times \frac{13}{7} \times \frac{1}{13} = \frac{1}{7}$

Question 53

$\frac{(0.87)^3+(0.13)^3}{(0.87)^2+(0.13)^2-(0.87)\times(0.13)}$ **is equal to**

A $\frac{1}{2}$

B 2

C 1

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

Answer: C

Explanation:

using identity $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

here a = 0.87

b = 0.13

$\frac{(0.87)^3+(0.13)^3}{(0.87)^2+(0.13)^2-(0.87)\times(0.13)} = \frac{(0.87+0.13)(0.87)^2+(0.13)^2-(0.87)\times(0.13)}{(0.87)^2+(0.13)^2-(0.87)\times(0.13)} = 0.87 + 0.13 = 1$

Question 54

If $x^2 + y^2 - 2x + 6y + 10 = 0$, then the value of $(x^2 + y^2)$ is

A 4

B 6

C 8

D 10

Answer: D

Question 55

The largest among the numbers $\sqrt{7} - \sqrt{5}, \sqrt{5} - \sqrt{3}, \sqrt{9} - \sqrt{7}, \sqrt{11} - \sqrt{9}$ is

A $\sqrt{7} - \sqrt{5}$

B $\sqrt{5} - \sqrt{3}$

C $\sqrt{9} - \sqrt{7}$

D $\sqrt{11} - \sqrt{9}$

Answer: B

Question 56

If $x^{\frac{1}{3}} + y^{\frac{1}{3}} = z^{\frac{1}{3}}$, then $(x + y - z)^3 + 27xyz$ is equal to

A 0

B 1

C -1

D 27

Answer: A

Question 57

If $\sqrt{7\sqrt{7\sqrt{7\sqrt{7....}}}} = (343)^{y-1}$**, then y is equal to**

A $\frac{2}{3}$

B 1

C $\frac{4}{3}$

D $\frac{3}{4}$

Answer: C

Explanation:

$\sqrt{7\sqrt{7\sqrt{7\sqrt{7....}}}} = x$

$x = \sqrt{7}x$

$x^2 = 7x$

$x^2 - 7x = 0$

x=0,7

neglect 0 x = 7

now $7 = (343)^{y-1}$

$(343)^{\frac{1}{3}} = (343)^{y-1}$

$\frac{1}{3} = y - 1$

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

Question 58

If $a^2 = 2$**, then** $(a + 1)$ **is equal to**

A $a - 1$

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

C $\frac{a+1}{3-2a}$

D $\frac{a-1}{3-2a}$

Answer: D

Question 59

The missing term in the sequence 2, 3, 5, 7,11, ... 17, 19 is

A 16

B 15

C 14

D 13

Answer: D

Explanation:
2, 3, 5, 7,11, 13,17, 19

all are consecutive prime numbers

Question 60

The wrong number in the sequence 8, 13, 21, 32, 47, 63, 83 is

A 32

B 47

C 63

D 83

Answer: B

Explanation:
8, 13, 21, 32, 47, 63, 83

8 + 5 = 13

13 + 8 = 21 (5 + 3 = 8)

21 + 11 = 32 (8 + 3 = 11)

32 + 14 = 46 (11 + 3 = 14)

46 + 17 = 63 (14 + 3 =17)

63 + 20 = 83 (17 + 3 = 20)

Here wrong term is 47

Question 61

When the price of a toy was increased by 20%,the number of toys sold was decreased by 15%.What was its effect on the total sales of the shop?

A 2% increase

B 2% decrease

C 4% increase

D 4% decrease

Answer: A

Explanation:
$priceoftoys \times numberoftoys = totalsalesoftheshop$

Assume that initial price of the toy = 100

Assume number of toys = 100

then total sales = $100 \times 100 = 100$

price of a toy was increased by 20% , new price = $100 \times \frac{120}{100} = 120$

number of toys sold was decreased by 15%, new number = $100 \times \frac{85}{100} = 85$

then new sales = $120 \times 85 = 10200$

effect on the total sales of the shop = $\frac{10200-10000}{10000} \times 100 = \frac{200}{10000} \times 100 = 2$

thus 2% increase

Question 62

A person sold a horse at a gain of 15%. Had he bought it for 25% less and sold it for Rs. 60 less, he would havemade a profit of 32%. The cost price of the horse was

A Rs. 370

B Rs. 372

C Rs. 375

D Rs. 378

Answer: C

Question 63

A sells an article to B at a gain of 25% B sells it to C at a gain of 20% and C sells it to D at a gain of 10%. If D pays Rs. 330 for it, how much did it cost to A ?

A Rs.200

B Rs.250

C Rs.275

D Rs.290

Answer: A

Explanation:
Cost price (CP), Selling price (SP), Gain (G)

Assume CP of A was 100

Then CP for B = 100 +25% of 100

$= 100 + \frac{25}{100} \times 100$

= 125

CP for C = 125 + 20% of 125

$= 125 + \frac{20}{100} \times 125$

= 150

CP for D = 150 + 10% of 150

$= 150 + \frac{10}{100} \times 150$

= 165

But D pays Rs 330

therefore, 165 = 330

$1 = \frac{330}{165}$

$100 = \frac{330}{165} \times 100 = 200$

CP for A = 200

Question 64

By selling an article for Rs. 21, a man lost such that the percentage loss was equal to the costprice. The cost price of the article was

A Rs. 30 or Rs. 70

B Rs. 35 or Rs. 60

C Rs. 45

D Rs. 50

Answer: A

Explanation:
Cost price (CP), Selling price (SP), Loss (L)

Given that SP = 21

Assume CP = X

L = CP - SP

% loss was equal to the CP , $\frac{CP-SP}{CP} = CP$

Substituting,

$\frac{x-21}{x} = \frac{x}{100}$

On solving,

$x^2 = 100x - 2100$

$x^2 - 70x - 30x + 2100 = 0$

x(x-70) - 30(x - 70) = 0

(x - 30)(x - 70) = 0

x = Rs 30 or Rs 70

Question 65

Half of the 100 articles sold at a profit of 20% and the rest at a profit of 40%. If all the articles had been sold at a profit of 25%, the total profit would have been Rs. 100 less than earlier profit. The cost price of each article was

A Rs.10

B Rs.15

C Rs.20

D Rs.30

Answer: C

Explanation:
Assume cost price of each article be 'x'

According to question,

50 articles sold at a profit of 20% = $\frac{50x \times 120}{100}$

50 articles sold at a profit of 40% = $\frac{50x \times 140}{100}$

If all the articles sold at 25% = $\frac{100x \times 125}{100}$, the total profit would have been Rs. 100 less than earlier profit.

Substituting,

$\frac{50x \times 120}{100} + \frac{50x \times 140}{100} - \frac{100x \times 125}{100} = 100$

60x + 70x - 125x = 100

130x - 125x =100

5x = 100

x = $\frac{100}{5} = 20$

Question 66

The market price of a clock is Rs. 3200. It is to be sold at Rs. 2448 at two successive discounts. If the first discount is 10%, then the second discount is

A 5%

B 10%

C 15%

D 20%

Answer: C

Explanation:

Selling price (SP) , Marked price (MP), Discount %(D)

Given MP = 3200

SP = 2448

1st D% = 10%

Assume 2nd D% = x%

$MP \times \frac{100-10}{100} \times \frac{100-x}{100} = 2448$

Substituting,

$3200 \times \frac{90}{100} \times \frac{100-x}{100} = 2448$

On solving

100 - x = 85

x = 15%

Thus 2nd D% = 15%

Question 67

Adealer marks his goods 30%above his cost price and then allows 15% discount on it. What is the cost price of an article on which he gains Rs. 84 ?

A Rs. 800

B Rs. 560

C Rs. 373.33

D Rs. 280

Answer: A

Explanation:
Cost price (CP), Selling price (SP) , Marked price (MP), Profit (P)

Assume CP = 100

MP = $CP \times \frac{130}{100} = 100 \times \frac{130}{100} = 130$

SP = $MP \times \frac{100-15}{100} = 130 \times \frac{85}{100} = 110.5$

When CP = 100 gain,P= 110.5 - 100 = 10.5

But here gain = 84

then it must be equal to

10.5 = 84

$1 = \frac{84}{10.5} = 8$

Therefore CP = $100 \times 8 = 800$

Question 68

A shopkeeper wishes to give 5%commission on the marked price of an article but also wants to earn a profit of 10%. If his cost price is Rs. 95, then the marked price is

A Rs.100

B Rs.110

C Rs.120

D Rs.130

Answer: B

Explanation:
Cost price(CP) = 95

Selling price(SP) = $MP \times \frac{95}{100}$

Profit = 10 %

$\frac{SP-CP}{CP} \times 100 = 10$

Substituting,

$\frac{MP \times \frac{95}{100}}{95} = \frac{11}{10}$

Solving, MP = 110

Question 69

Krishnamurthy earns Rs. 15000 per month and spends 80% of it. Due to pay revision,his monthly income has increased by 20%, but due to price rise, he has to spend 20% more. His new savings are

A Rs. 3400

B Rs. 3000

C Rs. 3600

D Rs. 4000

Answer: C

Explanation:
Initial income = Rs 15000

Initial expenditure = $15000 \times \frac{80}{100}$

= 12000

New income = $15000 \times \frac{120}{100}$

= 18000

New expenditure = $12000 \times \frac{120}{100}$

= 14400

New savings = 18000 - 14400

= 3600

Question 70

Two numbers are respectively $12\frac{1}{2}\%$ and 25% more than a third number. The first number is how much per cent of the second number ?

A 90

B 87.5

C 25

D 12.5

Answer: A

Explanation:
Given that there are 2 numbers x and y

They are 12.5% and 25% higher than 3rd number z respectively

So,

$x = [1 + (\frac{12.5}{100})]z = 1.125z$.....(1)

$y = [1 + (\frac{25}{100})]z = 1.25z$ .....(2)

Therefore from (1) and (2)

$(\frac{x}{y}) \times 100 = (\frac{1.125z}{1.25z}) \times 100$

= $(0.9) \times 100$

= 90 %

Question 71

Population of a town increases 2.5%annuallybut is decreasedby0.5%everyyear due to migration. What will be the percentage of increase in 2 years?

A 5

B 4.04

C 4

D 3.96

Answer: B

Explanation:
Net % increase in population = (2.5 - 0.5) = 2%

Let original population = 100

Population of town after 2 yrs = $100 \times \frac{102}{100} \times \frac{102}{100}$

= 104.04

Now % increase in population = $\frac{4.04}{100} \times 100$

= 4.04%

Question 72

72% of the students of a certain class took Biology and 44% took Mathematics. If each student took at least one of Biology or Mathematics and 40 students took both of these subjects, the total number of students in the class is

A 200

B 240

C 250

D 320

Answer: C

Explanation:
% of students took biology = 72%

% of students took mathematics = 44%

% of students took both subjects = (72 + 44) - 100

= 16%

According to the question

let the total number of students be N

Then, 16% of N = 40

On solving, N=250

Question 73

Rs. 1050 are divided among A, B and C in such a way that the share of A is $\frac{2}{5}$ of the combined share of B and C. A will get

A RS.200

B RS.300

C RS.320

D RS.420

Answer: B

Explanation:
Rs. 1050 are divided among A, B and C

share of B and C = x

share of A = 1050 - x

$1050 - x = \frac{2}{5} \times x$

$1050 = \frac{7x}{5}$

On solving x =750

Share of A = 1050 - 750 = 300

Question 74

The sides of a right-angled triangle forming right angle are in the ratio 5 : 12. If the area of the triangle is 270 cm ^{2}, then the length of the hypotenuse is

A 39 cm

B 42 cm

C 45 cm

D 51 cm

Answer: A

Explanation:
length of base = 5x

length of height = 12x

area = $\frac{1}{2} \times 5x \times 12x = 270$

$30 \times x^2 = 270$

x = 3

base = $5 \times 3 = 15$

height = $12 \times 3 = 36$

We know that for a right angled triangle, $hypotenuse^2 = side^2 + side^2$

$h^2 = b^2 + l^2$

= $15^2 + 36^2$

= 225 + 1296

= 1521

$h = \sqrt{1}521 = 39$

Question 75

Two numbers are in the ratio 5 : 6. If their H.C.F is 4, then their L.C.M. will be

A 90

B 96

C 120

D 150

Answer: C

Explanation:
We know that LCM = HCF $\times (producto fratio)$

= $4 \times (5 \times 6)$

= 120

Question 76

If $a+b+c=1$ and $ab+bc+ca=\frac{1}{3}$ then $a:b:c$ is

A $1:2:2$

B $2:1:2$

C $1:1:1$

D $1:2:1$

Answer: C

Question 77

A and B enter into partnership with capitals in the ratio 5 : 6. At the end of 8 months A withdraws his capital. They received profits in the ratio 5 : 9. B invested the capital for

A 6 months

B 8 months

C 10 months

D 12 months

Answer: D

Explanation:

$Profitratio[P]=Investmentratio[I]\times Timeperiod[T]$

A and B enter into partnership with capitals in the ratio 5 : 6

Investment ratio of A = 5

Investment ratio of B = 6

A withdraws his capital after 8 months

Therefore, time period of A = 8 months

Assume time period of B as 'n'

Ratio of profit = $ratioofinvestment\times ratiooftimeperiod$

Profit recieved by A and B in the ratio 5:9

$\frac{Profitratio of A}{Profitratio of B}=\frac{Ia\times Ta}{Ib\times Tb}$

Substituting,

$\frac{5\times 8}{6\times n}=\frac{5}{9}$

Solving, n= 12 months

Question 78

What is the length of the radius of the circumcircle of the equilateral triangle, the length of whose side is $6\sqrt{3}$ cm ?

A $6\sqrt{3}$ cm

B 6 cm

C 5.4 cm

D $3\sqrt{6}$ cm

Answer: B

Explanation:

Area of an equilateral triangle = $\frac{\sqrt{3}}{4} \times a^2$

a = side of the triangle

length of the radius of a circumcircle in an equilateral triangle

$R = \frac{abc}{4 \times area of equilateral triangle}$

$R = \frac{6\sqrt{3} \times 6\sqrt{3} \times 6\sqrt{3}}{4 \times \frac{\sqrt{3}}{4} \times 6\sqrt{3} \times 6\sqrt{3}}$

= 6

Question 79

If the measure of a diagonal and the area of a rectangle are 25 cm and 168 cm ^{2} respectively, what is the length of the rectangle ?

A 31 cm

B 24 cm

C 17 cm

D 7 cm

Answer: B

Explanation:

Let the length and breadth of the rectangle be 'l' and 'b' respectively. Let 'd' be the diagonal of the rectangle.

$d^2 = l^2 + b^2$

$l^2 + b^2 = 625$

$l \times b = 168$

$(l + b)^2 = l^2 + b^2 + 2lb$

Substituting,

$(l + b)^2 = 625 + 2 \times 168 = 961$

l + b = 31.....(1)

$(l - b)^2 = l^2 + b^2 - 2lb$

Substituting,

$(l - b)^2 = 625 - 2 \times 168 = 289$

l - b = 17.....(2)

On solving (1) and (2)

l = 24

Question 80

The number of coins, each ofradius 0.75 cm and thickness 0.2 cm, to bemelted to make a right circular cylinder of height 8 cm and radius 3 cm, is

A 640

B 600

C 500

D 480

Answer: A

Explanation:
We know that Volume of a cylinder = $\pi r^2 h$

let the number of coins be n

$n \times \frac{22}{7} \times 0.75 \times 0.75 \times 0.2 = \frac{22}{7} \times 3 \times 3 \times 8$

$n = \frac{22 \times 3 \times 3 \times 8 \times 7}{7 \times 22 \times 0.75 \times 0.75 \times 0.2}$

On solving, n = 640

Question 81

If the radius of a sphere is increased by 2 m, its surface-area is increased by 704 m ^{2}. What is the radius of the original sphere?(Use $\pi = \frac{22}{7}$)

A 16 m

B 15 m

C 14 m

D 13 m

Answer: D

Explanation:
We know that surface area of a sphere = $4\pi r^2$

According to the question,

$4\pi(r+2)^2 - 4\pi r^2 = 704$

$(r+2)^2 - r^2 = \frac{704}{4\pi}$

$r^2 + 4r + 4 - r^2 = \frac{704}{4\pi}$

Use value of $\pi = \frac{22}{7}$

On solving r = 13

Question 82

A right circular cylinderis circumscribing a hemisphere such that their bases are common. The ratio of their volumes is

A $1:3$

B $1:2$

C $2:3$

D $3:4$

Answer: C

Explanation:
Volume of cylinder = $\pi r^2 h$

here h = r bases are common

Volume of hemisphere = $\frac{2}{3}\pi r^3$

Ratio , $\frac{2}{3}\pi r^3 : \pi r^2 r$

= 2 : 3

Question 83

A man invested $\frac{1}{3}$ of his capital at 7%, $\frac{1}{4}$ at 8% and the remaining at 10% rate of simple interest. If his annual income from interests is Rs. 561, the capital invested was

A RS.6000

B RS.5600

C RS.6600

D RS.7200

Answer: C

Explanation:
Let total capital be x

According to the question

$$\frac{\frac{x}{3}\times 7\times 1}{100} + \frac{\frac{x}{4}\times 8\times 1}{100} + \frac{(1-\frac{1}{3}-\frac{1}{4})\times x\times 10}{100} = 561$$

$$\frac{7x}{3\times 100} + \frac{8x}{4\times 100} + \frac{5x\times 10}{12\times 100} = 561$$

On solving, x = 6600

Question 84

The compound interest on Rs. 6250 at 12% per annum for 1 year, compounded halfyearly is

A Rs. 772.50

B Rs. 772

C Rs. 672.50

D Rs. 672

Answer: A

Explanation:
Principal amount = 6250

Half yearly r = $\frac{12}{2} = 6$

t = 2 years

6% of 6250 = $6250 \times \frac{6}{100} = 375$

Amount = 6250 + 375 = 6625

6% of 6625 = $6625 \times \frac{6}{100} = 397.5$

Amount = 6625 + 397.5 = 7022.5

Compound interest = 7022.5 - 6625 = 772.5

Question 85

A sum of money lent at compound interest amounts to Rs. 1460 in 2 years and to Rs. 1606 in 3 years.The rate of interest per annum is

A 12%

B 11%

C 10.5%

D 10%

Answer: D

Question 86

If A travels to his school from his house at the speed of 3 km/hr. then he reaches the school 5 minutes late. If he travels at the speed of 4 km/hr, he reaches the school 5 minutes earlier than school time. The distance of his school from his house is

A 1 km

B 2 km

C 3 km

D 4 km

Answer: B

Explanation:
Let assume distance from house to school be x

When A travels at 3 km/hr he takes $\frac{x}{3}$ hrs to reach school

When A travels at 4 km/hr he takes $\frac{x}{4}$ hrs to reach school

$\frac{x}{3} - \frac{x}{4} = 10$

On solving x = 2 km

Question 87

A train travelling with a speed of 60 km/hr catches another train travelling in the same direction and then leaves it 120 m behind in 18 seconds. The speed of the second train is

A 26 km/hr

B 35 km/hr

C 36 km/hr

D 63 km/hr

Answer: C

Explanation:
Speed of 2nd train be S m/sec

And 60 km/hr = $60 \times \frac{5}{18} = \frac{50}{3} m/sec$

As trains are traveling in same distance then,

Relative distance = $\frac{50}{3} - S = \frac{120}{18}$

On solving, S = 10 m/sec

Speed of 2nd train = $10 \times \frac{18}{5} = 36km/hr$

Question 88

A and B together can complete a piece of work in 12 days and B and C together in 15 days. If A is twice as good a workman as C, then in how many days will be alone complete the same work ?

A 30

B 25

C 24

D 40

Answer: D

Question 89

4 men and 6 women together can complete a work in 8 days while 3 men and 7 women together can complete it in 10 days. 20 womenworking together will complete it in

A 36 days

B 32 days

C 24 days

D 20 days

Answer: D

Explanation:
(4m + 6w)8 = (3m + 7w)10

32m + 48w = 30m + 70w

32m -30m = 70w - 48w

2m = 22w

$\frac{1}{11} = \frac{w}{m}$

Total work done = $(4 \times 11 + 6 \times 1) \times 8 = 400$

work done =$efficiency \times time$

$time = \frac{400}{20} = 20days$

Question 90

The average of two numbers A and B is 20, that of B and C is 19 and of C and A it is 21. What is the value of A?

A 24

B 22

C 20

D 18

Answer: B

Explanation:
average of two numbers A and B is 20

sum of two numbers A and B = $20 \times 2 = 40$

average of two numbers B and C is 19

sum of two numbers B and C = $19 \times 2 = 38$

average of two numbers C and A is 21

sum of two numbers C and A = $21 \times 2 = 42$

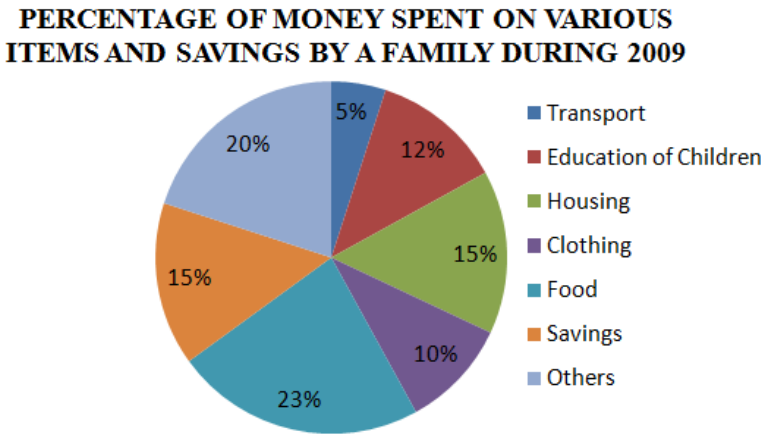
2(A + B + C) = 120

A + B + C = 60

A = 60 - 38 = 22

Instructions

The pie chart given below, shows the expenditure on various items and savings of a family during the year 2009. Study the pie chart and answer these questions.



Question 91

If the total income of the family for the year 2009 was Rs. 1,50,000 then the difference between the expenditures on housing and transport was

A Rs. 15,000

B Rs. 10,000

C Rs. 12,000

D Rs. 7500

Answer: A

Explanation:
percentage of money spent on housing = 15%

percentage of money spent on transport = 5%

difference in percentage = 10%

total income = 150000

$\frac{10}{100} \times 150000 = 15000$

Question 92

Maximum expenditure of the family other than on food, was on

A Housing

B Clothing

C Others

D Education of children

Answer: C

Explanation:
maximum expenditure of family on food = 23%

then 20% of money spent on others

Question 93

The savings of the family for the year were equalto the expenditure on

A Food

B Housing

C Education of children

D Clothing

Answer: B

Explanation:
percentage of amount spent on savings and housing are same = 15%

Question 94

The percentage of the income which was spent on clothing, education of children and transport together is

A 17

B 20

C 22

D 27

Answer: D

Explanation:
percentage of the income spent on clothing = 10%

percentage of the income spent on education of children = 12%

percentage of the income spent on transport = 5%

percentage of the income which was spent on clothing, education of children and transport together = 27%

Question 95

If the total income of the family was Rs.1,50,000 then the money spent on food was

A Rs. 20,000

B Rs. 23,000

C Rs. 30,000

D Rs. 34,500

Answer: D

Explanation:
total income of the family = Rs.1,50,000

money spend on food = $\frac{23}{100} \times 150000$

= 34500

Instructions

Study the bar diagram and answer these questions.

Question 96

The number of persons killed in coal minesin 2006 was what per cent of those killed in industrial accidents in that year ?

A 4

B 25

C 36

D 300

Answer: B

Explanation:
$\frac{300}{1200} \times 100$

$= \frac{300}{12} = \frac{100}{4} = 25$

Question 97

In which year, minimum number of persons were killed in industrial accidents and coal mines together?

A 2006

B 2007

C 2008

D 2009

Answer: D

Explanation:
In 2009, minimum number of persons were killed in industrial accidents and coal mines together

minimum number of persons were killed in industrial accidents and coal mines together = 1000

Question 98

In which year, maximum number of persons were killed in industrial accidents other than those killed in coal mines?

A 2006

B 2007

C 2008

D 2009

Answer: A

Explanation:
In 2006, maximum number of persons were killed in industrial accidents other than those killed in coal mines

maximum number of persons killed in industrial accidents = 1200

Question 99

In which years, minimum number of persons were killed in coalmines other than those killed in industrial accidents?

A 2006

B 2007

C 2008

D 2009

Answer: B

Explanation:
In 2007 minimum number of persons were killed in coalmines other than those killed in industrial accidents

The minimum number of persons killed in coal mines is 150

Question 100

In a year, on average, how many personswere killed in industrial accidents and coal mines together ?

A 121.25

B 1212

C 1212.5

D 1000

Answer: C

Explanation:

Average persons were killed in industrial accidents = $\frac{1200+900+1100+800}{4}$

= $\frac{4000}{4} = 1000$

Average persons were killed in coal mines = $\frac{300+150+200+200}{4}$

= $\frac{850}{4} = 212.5$

Total = 1000 + 212.5 = 1212.5