SSC CGL Tier-2 30-November-2016 Maths

Instructions

For the following questions answer them individually

Question 1

Each member of a club contributes as much rupees and as much paise as the number of members of the club. If the total contribution is Rs. 2525, then the number of members of the club is

A 60

B 45

C 55

D 50

Answer: D

Question 2

- The numerator of a fraction is multiple of two numbers. One of the numbers is greater than the other by 2. The greater number is smaller than the denominator by 4. If the denominator 7+C (C > -7) is a constant, then the minimum value of the fraction is

A 5

B $\frac{1}{5}$

C -5

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

Answer: D

Question 3

A number when divided by the sum of 555 and 445 gives two times their difference as quotient and 30 as the remainder. The number is

A 220030

B 22030

C 1220

D 1250

Answer: A

Question 4

When a number x is divided by a divisor it is seen that the divisor = 4 times the quotient = double the remainder. If the remainder is 80 then the value of x is

A 6480

B 9680

C 8460

D 4680

Answer: A

Question 5

On dividing a certain number by 342 we get 47 as remainder. If the same number is divided by 18, what will be the remainder ?

A 15

B 11

C 17

D 13

Answer: B

Question 6

- The sum of three numbers is 252. If the first number is thrice the second and third number is two-third of the first, then the second number is

A 41

B 21

C 42

D 84

Answer: C

Question 7

The sum of squares of three positive integers is 323. If the sum of squares of two numbers is twice the third, their product is

A 255

B 260

C 265

D 270

Answer: A

Question 8

The sum of three numbers is 2, the 1st number is $\frac{1}{2}$ times the 2nd number and the 3rd number is $\frac{1}{4}$ times the 2nd number. The 2nd number is

A $\frac{7}{6}$

B $\frac{8}{7}$

C $\frac{9}{8}$

D $\frac{10}{9}$

Answer: B

Question 9

Three numbers are in Arithmetic Progression (AP) whose sum is 30 and the product is 910. Then the greatest number in the AP is

A 17

B 15

C 13

D 10

Answer: C

Question 10

Simplify $\sqrt[3]{-2197} \times \sqrt[3]{-125} \div \sqrt{\frac{27}{512}}$

A $\frac{492}{7}$

B $\frac{520}{3}$

C $\frac{554}{7}$

D $\frac{571}{5}$

Answer: B

Question 11

A canal of a village can be cleaned by 24 villagers in 12 days. The number of days in which 36 villagers can clean the canal is ?

A 18

B 8

C 72

D 16

Answer: B

Question 12

A and B can do a piece of work in 18 days, B and C in 24 days, A and C in 36 days. Working together they can do the work in

A 12 days

B 13 days

C 16 days

D 26 days

Answer: C

Question 13

Ramesh and Rahman can do a work in 20 and 25 days respectively. After doing collectively 10 days of work, they leave the work due to illness and Suresh completes rest of the work in 3 days. How many days Suresh alone can take to complete the whole work ?

A 32 days

B 28 days

C 29 days

D 30 days

Answer: D

Question 14

A can do as much work in 4 days as B can do in 5, and B can do as much work in 6 days as C in 7. In what time will C do a piece of work which A can do in a week ?

A $\frac{5}{24}$

B $\frac{4}{5}$

C $\frac{8}{15}$

D $\frac{6}{19}$

Answer: E

Question 15

A can do a piece of work in 10 days and B can do it in 12 days. They work together for 3 days. Then B leaves and A alone continues. 2 days after that C joins and the work is completed in 2 days more. In how many days can C do it, if he works alone ?

A 30 days

B 50 days

C 40 days

D 60 days

Answer: C

Question 16

The ratio of the amount of work done by (x-1) labours in (x+1) days and that done by (x+1) labours in (x+2) days is 5 : 6. Then the value of x is

A 16

B 15

C 17

D 14

Answer: A

Question 17

A book seller allowed 10% discount on printed price. He gets 30% commission from publisher. His profit in percent will be

A 20

B $28\frac{4}{7}$

C 25

D $26\frac{3}{7}$

Answer: B

Question 18

A dealer is selling an article at a discount of 5% on the Marked price. If the Marked price is 12% above the cost price and the article was sold for Rs. 532 then the cost price is (in Rs.)

A 500

B 525

C 505

D 520

Answer: A

Question 19

A shopkeeper increases the price of an object by 40% and then sells it at 25% discount on the marked price. If the selling price of such an object be Rs.2100, its cost price for the shopkeeper was ?

A 3000

B 1500

C 1750

D 2000

Answer: D

Question 20

The market price of an article is Rs.5000.But due to special offer a certain percent of discount is declared.Mr.X availed this opportunity and bought the aricle at reduced price he then sold it at RS.5000 there by made a profit of 11\frac{1}{9} percent.Then percentage of discount allowed was?

A 10

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

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

D $11\frac{1}{9}$

Answer: A

Question 21

- Find the fraction which bears the same ratio to $\frac{1}{27}$ that $\frac{3}{7}$ does to $\frac{5}{9}$

A $\frac{5}{9}$

B $\frac{1}{35}$

C $\frac{45}{7}$

D $\frac{7}{45}$

Answer: B

Question 22

The ratio of number of boys to the number of girls in a school of 432 pupils is 5 : 4. When some new boys and girls are admitted, the number of boys

A 12

B 14

C 24

D 20

Answer: C

Question 23

- If the three numbers in the ratio 3:2:5 be such that the sum of the squares is equal to 1862 then which number is the middle one

A 16

B 14

C 13

D 15

Answer: B

Question 24

Two bottles contain acid and water in the ratio 2 : 3 and 1 : 2 respectively. These are mixed in the ratio 1 : 3. What is the ratio of acid and water in the new mixture ?

A 7:13

B 11:57

C 23:37

D 1:3

Answer: A

Question 25

The ratio of the number of boys and girls in a school is 3:2. If 20% of the boys and 25% of the girls are scholarship holders, the percentage of the school students who are not scholarship holders is

A 56

B 78

C 70

D 80

Answer: B

Question 26

In two types of brass, the ratios of Copper to Zinc are 8:3 and 15:7 respectively. If the two types of brass be melted and mixed in the ratio 5:2 a new type of brass is obtained. The ratio of Copper to Zinc in this new type of brass is

A 3:2

B 2:3

C 3:4

D 5:2

Answer: D

Question 27

An hour-long test has 60 problems. If a student completes 30 problems in 25 minutes, then the required seconds he has taken on average for computing each of the remaining problems is

A 70 seconds

B 50 seconds

C 40 seconds

D 30 seconds

Answer: A

Question 28

A and B have their annual average income Rs. 80,000.B and C have their annual average income Rs. 75,000. C and A have their annual average income Rs. 78,000.The annual income of A is ?

A Rs.81000

B Rs.82000

C Rs.83000

D Rs.84000

Answer: C

Question 29

A car travels from A to B with 40 Km/h and returns from B to A with 60 Km/h. Its average speed during the whole journey is

A 48 km/h

B 50 km/h

C 45 km/h

D 60 km/h

Answer: A

Question 30

In the first 10 overs of a cricket game, the run rate was only 3.2. The run rate in the remaining 40 overs to reach the target of 282 runs is

A 6.4

B 6.3

C 6.25

D 6.5

Answer: C

Question 31

The average (arithmetic mean) amount of savings of ten students is Rs. 600. Three of the students have no savings at all and each of the others have at least Rs. 250 including Nihar, who has exactly Rs. 1300. The largest amount, in Rs., that any one student could have
is

A 3250

B 3450

C 3650

D 3850

Answer: B

Question 32

An army of 12000 consist of Europeans and Indians.The average height of a European is 5 Feet 10 inches and that od Indian is 5 feet 9 inchesand that of whole army is 5 feet $9\frac{3}{4}$ inches.Then the number of Indians in the army is?

A 3000

B 4000

C 5500

D 2700

Answer: A

Question 33

By what fraction selling price (S.P.) must be multiplied to get the cost price (C.P.) if the loss is 20% ?

A $\frac{4}{5}$

B $\frac{8}{5}$

C $\frac{5}{4}$

D $\frac{6}{5}$

Answer: C

Question 34

A,B and C together start a business. Three times the investment of A equals four times the Investment of B and the Capital of B is twice that of C. The ratio of share of each in the profit.

A 8:3:6

B 3:8:6

C 3:6:8

D 8:6:3

Answer: D

Question 35

- Ramesh sold a book at a loss of 30%. If he had sold it for Rs. 140 more, he would have made a profit of 40%. The cost price of the book is

A Rs. 280

B Rs. 200

C Rs. 260

D Rs. 300

Answer: B

Question 36

- A shopkeeper purchased 510 eggs at the rate of Rs. 20 per dozen. 30 eggs were broken on the way. In order to make a gain of 20%, he must sell the remaining eggs at the rate of

A Rs.22.50 per dozen

B Rs.25.50 per dozen

C Rs.26 per dozen

D Rs.26.50 per dozen

Answer: B

Question 37

A sell a watch to B at a loss of 12%.B makes a profit of $12\frac{1}{2}$ percent by selling watch to C .If A sells watch to B at cost of which c purchased it, then percentage of loss or profit of A will be?

A 1% loss

B 1% profit

C 2% loss

D 2% profit

Answer: A

Question 38

A man buys 3 type-I cakes and 6 type-II cakes for Rs. 900. He sells type-I cakes at a profit of 15% and type-II cakes at a loss of 10%. If his overall profit is

A 100,100

B 160,70

C 180,60

D 120,90

Answer: B

Question 39

A Number is increased by 20%. To get back to the orignal number, the increased number is to be reduced by

A 20%

B 21%

C $16\frac{2}{3}\%$

D $14\frac{1}{3}\%$

Answer: C

Question 40

A Village lost 12% of its goats in a flood and 5% of remainder died from diseases. If the number left now is 8360. What was the orignal number before the flood?

A 1000

B 10000

C 100000

D 8360

Answer: B

Question 41

A scored 72% in a paper with a maximum marks of 900 and 80% in another paper with a maximum marks of 700. If the result is based on the combined percentage of two papers, the combined percentage is

A 75.5%

B 76%

C 76.5%

D 77%

Answer: A

Question 42

An army lost 10% of its men in war, 10% of the remaining died due to disease and 10% of the rest were declared disabled. Thus the strength of the army was reduced to 7,29,000 active men. The original strength of the army was

A 1500000

B 1000000

C 1200000

D 1100000

Answer: B

Question 43

- A bus travels 150 Km in 3 hours and then travel next 2 hours at 60 Km/hr. Then the average speed of the bus will be

A 55 Km/hr

B 54 Km/hr

C 50 Km/hr

D 60 Km/hr

Answer: B

Question 44

A man can cover a certain distance in 3 hours 36 minutes if he walks at the rate of 5 Km/hr. If he covers the same distance on cycle at the rate of 24 Km/hr, then the time taken by him in minutes is

A 40

B 45

C 50

D 55

Answer: B

Question 45

Due to inclement weather, an air plane reduced its speed by 300 Km/ hr, and reached the destination of 1200 km late by 2hrs. Then the schedule duration of the flight was

A 1 hour

B 1.5 hour

C 2 hour

D 2.5 hour

Answer: C

Question 46

Three runners A,B and C run a race, with runner A finishing 12 meters ahead of runner B and 18 meters ahead of runner C, while runner B finishes 8 meters ahead of runner C. Each runner travels the entire distance at a constant speed. The length of the race is

A 36 Metres

B 48 Metres

C 60 Metres

D 72 Metres

Answer: B

Question 47

The compound interest on Rs. 4000 for 4 years at 10% per annum will be

A Rs.1856.40

B Rs.1600

C Rs.1856

D Rs.1756.60

Answer: A

Question 48

- A sum of Rs. 4000 is lent out in two parts, one at 8% simple interest and the other at 10% simple interest. If the annual interest is Rs. 352. The sum lent at 8% is 4000

A 2900

B 2200

C 2400

D 3100

Answer: C

Question 49

- If the difference of the compound interest and the simple interest on a sum of money for 3 years is Rs. 186. Find the sum of money, if the rate of interestin both case be 10%

A Rs.5500

B Rs.7200

C Rs.6500

D Rs.6000

Answer: D

Question 50

A sum of money is invested at 20% compound interest (compounded annually). It would fetch Rs. 723 more if interest is compounded half-yearly. The sum is

A Rs.15,000

B Rs.30,000

C Rs.20,000

D Rs.7,500

Answer: B

Question 51

The height of an equilateral triangle is 18 cm. Its area is

A $36\sqrt{3}$sq. m

B $108\sqrt{3}$sq. cm

C 108 sq. cm

D $96\sqrt{3}$ sq. m

Answer: B

Question 52

- If the sum of radius and height of a solid cylinder is 20 cm and its total surface area is 880 cm^2 then its volume is

A 1760 cm^3

B 8800 cm^3

C 2002 cm^3

D 4804cm^3

Answer: C

Question 53

A solid sphere and a solid hemisphere have the same total surface area. The ratio of their volumes is (Take, π=22/7)

A $3\sqrt{3}$: 4

B 4 : $3\sqrt{3}$

C 3 : $4\sqrt{3}$

D 1 : $12\sqrt{3}$

Answer: A

Question 54

- The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$ and its perimeter is 104 cm. The length of the longest side (in cm)

A 52

B 48

C 32

D 26

Answer: B

Question 55

- The four walls and ceiling of a room of length 25 m, breadth 12 m and height 10 m are to be painted. Painter A can paint 200 m^2 in 5 days, Painter B can paint 250 m^2 in 2 days. If A and B work together, they will finish the job in

A 6

B $6\frac{10}{33}$

C $7\frac{10}{33}$

D 8

Answer: B

Question 56

- The base of a right prism is a trapezium whose the length of parallel sides are 25 cm and 11 cm and the perpendicular distance between the parallell sides in 16 cm. If the height of the prism is 10 cm, then the volume of the prism is

A 1440 cu.cm

B 1540 cu.cm

C 2880 cu.cm

D 960 cu.cm

Answer: C

Question 57

The external and the internal radii of a hollow right circular cylinder of height 15 cm are 6.75 cm and 5.25 cm respectively. If it is melted to form a solid cylinder of height half of the orignal cylinder, then the radius of the solid cylinder is

A 6 cm

B 6.5 cm

C 7 cm

D 7.25 cm

Answer: A

Question 58

The length and breadth of a rectangular piece of a land are in a ratio 5:3. The owner spent Rs. 6000 for surrounding it from all sides at Rs.7.50 per metre. The difference between its length and breadth is

A 50 metres

B 100 metres

C 150 metres

D 250 metres

Answer: B

Question 59

The ratio between the area of a square and that of a circle, when the length of a side of the square is equal to that of the diameter of the circle, is (take $\pi=22/7$)

A 14 : 11

B 28 : 11

C 7 : 22

D 22 : 7

Answer: A

Question 60

- A piece of wire 132 cm long is bent successively in the shape of an equilateral triangle, a square and a circle. Then area will be longest in shape of

A Circle

B Equilateral triangle

C Square

D Equal in all the shapes

Answer: A

Question 61

If a cone is divided into two parts by drawing a plane through the midpoints of its axis, then the ratio of the volume of the 2 parts of the cone is

A 1 : 2

B 1 : 4

C 1 : 7

D 1 : 8

Answer: C

Question 62

Two regular polygons are such that the ratio between their number of sides is 1:2 and the ratio of measures of their interior angles is 3:4. Then the number of sides of each polygon are

A 10,20

B 4, 8

C 3, 6

D 5, 10

Answer: D

Question 63

- In an isosceles triangle, the length of each equal side is twice the length of the third side. The ratio of areas of the isosceles triangle and an equilateral triangle with same perimeter is

A $30\sqrt{5}$: 100

B $32\sqrt{5}$: 100

C $36\sqrt{5}$: 100

D $42\sqrt{5}$: 100

Answer: C

Question 64

A right circular cylinder is partially filled with water. Two iron spherical balls are completely immersed in the water so that the height of the water in the cylinder rises by 4 cm. If the radius of one ball is half of the other and the diameter of the cylinder is 18 cm, then the radii of the spherical balls are

A 6 cm and 12 cm

B 4 cm and 8 cm

C 3 cm and 6 cm

D 2 cm and 4 cm

Answer: C

Question 65

The whole surface area of a pyramid whose base is a regular polygon is 340 cm2 and area of its base is 100 cm2 . Area of each lateral face is 30 cm2 . Then the number of lateral faces is

A 8

B 9

C 7

D 10

Answer: A

Explanation:
total surface area = lateral surface area + area of base

340 = lateral surface area + 100

lateral surface area = 240

Area of each lateral surface area = 30

No of faces = $\frac{240}{30} = 8$

So, the answer would be option a)8

Question 66

If P = 99, then the value of P(P^2 + 3P + 3) is

A 9999

B 999999

C 99999

D 9999999

Answer: B

Explanation:
P(P^2 + 3P + 3)

= P($P^2 + 4P + 3 - P$)

= P[$(P + 1)(P + 3) - P$)]

Given that P=99, Substituting it in above equation, we get

= 99[$(99 + 1)(99 + 3) - 99$]

=99$(10200 - 99)$

=99(10101)=999999

Question 67

If x + $\frac{1}{x}$=c+ $\frac{1}{c}$ then find the value of x?

A C, $\frac{1}{c}$

B C,C^2

C C.2C

D 0,1

Answer: A

Explanation:
Solving the equation , you will get ,

x = $frac(c + 1)^2 2$, $frac(c - 1)^2 2$

Question 68

If the sum of squares of two real numbers is 41 and their sum is 9. Then the sum of cubes of these two numbers is

A 169

B 209

C 189

D 198

Answer: C

Explanation:
x + y = 9

$x^2 + y^2$ = 41

$(x + y)^2 = x^2 + y^2 + 2xy$

81 = 41 + 2xy

xy =20

x - y = $\sqrt{(x + y)^2 - 4xy}$ = 1

So, x=5 , y=4

$x^3 + y^3$ = $5^3 + 4^3$ = 189

So, the answer would be option c)189.

Question 69

A complete factorisation of $x^4 + 64$ is

A $(x^2+8)^2$

B $(x^2+8)(x^2-8)$

C $(x^2-4x+8)(x^2-4x-8)$

D $(x^2+4x+8)(x^2-4x+8)$

Answer: D

Explanation:

$x^4+64=(x^2+8)^2-(4x)^2$

=$((x^2+8)-4x)((x^2+8)+4x)$

=$(x^2+4x+8)(x^2-4x+8)$

So, the answer would be option d)$(x^2+4x+8)(x^2-4x+8)$

Question 70

If a+b=1, then $a^4+b^4-a^3-b^3-2a^2b^2+ab$

A 1

B 2

C 4

D 0

Answer: D

Explanation:

$a^4+b^4-a^3-b^3-2a^2b^2+ab$

= $a^4-2a^2b^2+b^4-a^3-b^3+ab$

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

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

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

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

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

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

=$(1)^2$-1

=0

Therefore, Option D is the right choice.

Question 71

If x^2 **+** y^2 **+ 6x + 5 = 4(x - y) then x - y is**

A 1

B -1

C 0

D 4

Answer: A

Explanation:

$x^2 + y^2 + 6x + 5 = 4(x - y)$

=$x^2 + y^2 + 2x + 4y + 5 = 0$

=$x^2 + \ 2x + 1 + \ y^2 \ + 4y + 4 = 0$

=$(x + 1)^2 + (y + 2)^2$ = 0

So , x= -1 , and y= -2

x - y = -1 + 2 =1

So, the answer would be option a)1.

Question 72

If a = 299, b = 298, c = 297 then the value of $2a^3 + 2b^3 + 2c^3 - 6abc$ **is**

A 5154

B 5267

C 5364

D 5456

Answer: C

Explanation:

$2a^3 + 2b^3 + 2c^3 - 6abc$,

Taking 2 common , and using , $(a^3 + b^3 + c^3 - 3abc) = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

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

=$2(894)(89401 + 88804 + 88209 - 89102 - 88506 - 88803)$

= $2 \times 894 \times 3$

=5364

So, the answer would be option c)5364.

Question 73

if x+ $\frac{1}{x}$**=**$\sqrt{3}$ **then the value of** $x^{18} + x^{12} + x^6 + 1$

A 0

B 1

C 2

D 3

Answer: A

Explanation:

Given that x+ $\frac{1}{x}$=$\sqrt{3}$

Squaring on both sides, we get

$(x + \frac{1}{x})^3 = (\sqrt{3})^3$

=> $x^3 + \frac{1}{x^3} + 3\sqrt{3} = 3\sqrt{3}$

=> $x^3 + \frac{1}{x^3} = 0$

=> $x^3 = -\frac{1}{x^3}$

=> $x^6 = -1$

Squaring on both sides

=> $x^{12} = 1$

$(x^6)^3 = (-1)^3 = -1$

Therefore,

$x^{18} + x^{12} + x^6 + 1 = -1 + 1 - 1 + 1 = 0$

Question 74

If x = 1 + $\sqrt{2}$+ $\sqrt{3}$, then the value of 2x^{4}- 8x^{3}- 5x^{2} + 26x - 28 is

A $2\sqrt{2}$

B $3\sqrt{3}$

C $5\sqrt{5}$

D $6\sqrt{6}$

Answer: D

Explanation:

x = 1 + $\sqrt{2}$+ $\sqrt{3}$

=> $(x-1)^2 = (\sqrt{2} + \sqrt{3})^2$

=> $x^2 + 1 - 2x = 5 + 2\sqrt{6}$

=> $x^2 - 2x = 4 + 2\sqrt{6}$ ---------- (1)

Squaring on both sides

=> $(x^2 - 2x)^2 = x^4 + 4x^2 - 4x^3 = 40 + 16\sqrt{6}$ ----- (2)

Now,

$2x^4 - 8x^3 - 5x^2 + 26x - 28 = 2(x^4 - 4x^3) - 5x^2 + 26x - 28$ --- (3)

Substituting values in (1) & (2) in equation (3), we get value as $6\sqrt{6}$

Question 75

If 2r =h+$\sqrt{r^2 + h^2}$ then ratio r:h ($r \neq 0$) is

A 1:2

B 2:3

C 4:3

D 3:5

Answer: C

Explanation:

2r =h+$\sqrt{r^2+h^2}$

=> 2r-h=$\sqrt{r^2+h^2}$

=> $(2r-h)^2$=(r^2+h^2)

=> $4r^2+h^2-4rh$=(r^2+h^2)

=> $3r^2$=4rh

=>3r=4h

=> r:h=4:3

Question 76

In an equilateral triangle ABC, G is the centroid. Each side of the triangle is 6 cm. The length of AG is

A $2\sqrt{2}$ cm

B $3\sqrt{2}$ cm

C $2\sqrt{3}$ cm

D $3\sqrt{3}$ cm

Answer: C

Explanation:
Side of equilateral triangle = 6 cm

Height = $\frac{\sqrt{3}}{2} \times = 3\sqrt{3}$

Centroid divided the height in the ratio of 2:1 .

AG = $\frac{2}{3} \times 3\sqrt{3}$

So, the answer would be option c)$2\sqrt{3}$ cm

Question 77

- PQ is a tangent to the circle at T. If TR = TS where R and S are points on the circle and $\angle RST = 65°$**, the** $\angle PTS$ **=**

A $65°$

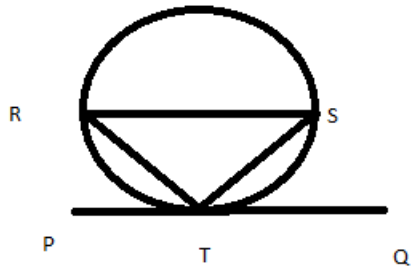
B $130°$

C $115°$

D $55°$

Answer: C

Explanation:



RT = TS

$\angle RTS = 180^\circ - 65^\circ - 65^\circ = 50^\circ$

$\angle RTP = 65^\circ$

$\angle PTS = \angle RTP + \angle RTS = 115^\circ$

So, the answer would be option c)115°

Question 78

In ΔABC, AC = BC and ∠ABC = 50°, the side BC is produced to D so that BC = CD then the value of ∠BAD is

A 80°

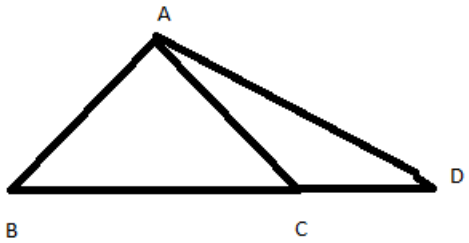
B 40°

C 90°

D 50°

Answer: C

Explanation:



AC = BC

$\angle ABC = \angle BAC = 50^\circ$

$\angle ACB = 180^\circ - 100^\circ = 80^\circ$

$\angle ACD = 180^\circ - 80^\circ = 100^\circ$

$\angle CAD = \angle CDA = \frac{80^\circ}{2} = 40^\circ$

$\angle BAD = \angle BAC + \angle CAD = 50^\circ + 40^\circ = 90^\circ$

So, the answer would be option c)90°

Question 79

In a circle, a diameter AB and a chord PQ (which is not a diameter) intersect each other at X perpendicularly. If AX : BX = 3 : 2 and the radius of the circle is 5 cm, then the length of chord PQ is

A $2\sqrt{13}$cm

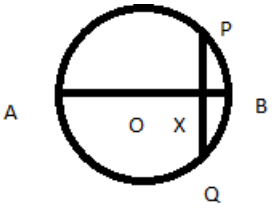
B $5\sqrt{3}$cm

C $4\sqrt{6}$ cm

D $6\sqrt{5}$ cm

Answer: C

Explanation:



$\frac{AX}{BX} = \frac{3}{2}$

$AX = \frac{3}{5} \times 10 = 6cm$

$BX = \frac{2}{5} \times 10 = 4cm$

$AX \times XB = PX^2$

$PX^2 = \sqrt{6 \times 4} = 2\sqrt{6}$

PQ = 2PX = $4\sqrt{6}$

So, the answer would be option c)$4\sqrt{6}$ cm

Question 80

ABC is a triangle, PQ is line segment intersecting AB in P and AC in Q and PQ II BC. The ratio of AP : BP = 3 : 5 and length of PQ is 18 cm. The length of BC is

A 28 cm

B 48 cm

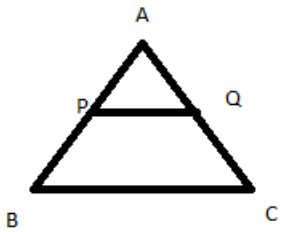
C 84 cm

D 42 cm

Answer: B

Explanation:

$\triangle APQ and \triangle ABC are similar triangles.$



By similarity theorem ,

$\frac{AP}{AB} = \frac{PQ}{BC}$

$\frac{AP}{AP+BP} = \frac{PQ}{BC}$

$\frac{3}{3+5} = \frac{18}{BC}$

BC = 48 cm

So, the answer would be option b)48 cm

Question 81

- If the parallel sides of a trapezium are 8 cm and 4 cm, M and N are the mid points of the diagonals of the trapezium, then length of MN is

A 12 cm

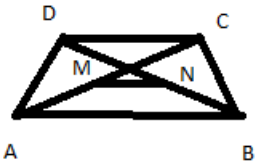
B 6 cm

C 1 cm

D 2 cm

Answer: D

Explanation:



The line segment joining the midpoints of the diagonals of a trapezium is parallel to each parallel sides and is equal to half the difference of these sides.

MN = $\frac{1}{2}(AB - CD) = \frac{1}{2}(8 - 4) = 2cm$

So, the answer would be option d)2 cm

Question 82

- ΔABC is isosceles having AB = AC and $\angle A = 40^\circ$. Bisectors PO and OQ of the exterior angles $\angle ABD$and $\angle ACE$ formed by producing BC on both sides, meet at O. Then the value of $\angle BOC$ is

A 70°

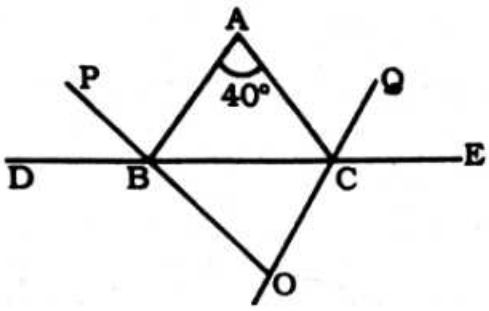
B 110°

C 80°

D 55°

Answer: A

Explanation:



AB=AC

Therefore, $\angle ABC = \angle ACB = \frac{140^\circ}{2} = 70^\circ$

Therefore, $\angle ABD = \angle ACE = 180^\circ - 70^\circ = 110^\circ$

Therefore, $\angle PBD = 55^\circ = \angle CBO$

$\angle QCE = \angle BCO = 55^\circ$

Therefore, $\angle BOC = 180^\circ - (2 \times 55^\circ) = 70^\circ$

Question 83

An equilateral triangle of side 6 cm is inscribed in a circle. Then radius of the circle is

A $2\sqrt{3}$cm

B $3\sqrt{2}$ cm

C $4\sqrt{3}$cm

D 3 cm

Answer: A

Explanation:
If the triangle is inscribed in a circle, then the circle is called as circumcircle.

We know that radius of circumcircle for any equilateral triangle = $\frac{side}{\sqrt{3}}$

=> $r = \frac{6}{\sqrt{3}}$

=> $r = 2\sqrt{3}$

Question 84

In a circle with centre O, AB is a diameter and CD is a chord which is equal to the radius OC. AC and BD are extended in such a way that they intersect each other at a point P, exterior to the circle. The measure of $\angle APB$ is

A 30°

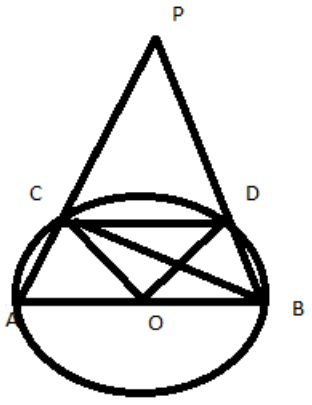
B 45°

C 60°

D 90°

Answer: C

Explanation:



$$\triangle OCD is an equilateral triangle ,

$\angle COD = 60^\circ$

$\angle CBD = \frac{1}{2}\angle COD = 30^\circ$

$\angle ACB = 90^\circ (\angle\ ACB is an angle of semicircle.\ )$

$\angle PCB = 90^\circ$

$\angle PBC = 180^\circ - 90^\circ - 30^\circ = 60^\circ$

So, the answer would be option c)60°

Question 85

Two chords AB and CD of a circle with centre O intersect at P. If $\angle APC = 40°$. Then the value of $\angle AOC + \angle BOD$ is

A $50°$

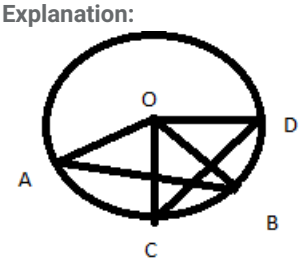
B $60°$

C $80°$

D $120°$

Answer: C

Explanation:



Arc AC subtends $\angle AOC$ at the centre and $\angle ABC$ at the circumference.

Similarly ,

$$\angle BOD = 2\angleBCD$$

=$$\angle AOC + \angle BOD$$

=2($$\angle ABC + \angle BCD$$)

= 2 $$\angle APC = 2\times 40\degree = 80\degree$$

So, the answer would be option c)$$80^\circ$$

Question 86

- If x tan $$60^\circ$$ + cos $$45^\circ$$ = sec $$45^\circ$$ then the value of $$x^{2}$$ + 1 is

A $$\frac{6}{7}$$

B $$\frac{7}{6}$$

C $$\frac{5}{6}$$

D $$\frac{6}{5}$$

Answer: B

Explanation:

Given that x tan $$60^\circ$$ + cos $$45^\circ$$ = sec $$45^\circ$$

We know that value of tan $$60^\circ$$ = $$ \sqrt{3}$$, cos $$45^\circ$$ = $$\frac {1}{\sqrt{2}}$$ and sec $$45^\circ$$ = $$\sqrt{2}$$

=> x$$ \sqrt{3}$$+ $$\frac {1}{\sqrt{2}}$$ = $$\sqrt{2}$$

=> x$$ \sqrt{6}$$ + 1= 2

=> x$$ \sqrt{6}$$ = 1

=> x= $$ \frac{1}{\sqrt{6}}$$

Therefore $$ x^2 + 1 $$ = $$\frac{1} {6} $$ + 1 = $$ \frac{7}{6} $$

Question 87

x, y be two acute angles, x + y < $$90^\circ$$ and sin(2x -$$20^\circ$$) = cos(2y + $$20^\circ$$), the value of tan(x + y) is

A $$\surd{3}$$

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

C 1

D 2+$$\surd{2}$$

Answer: C

Explanation:
The value of $$\sin\theta and \cos \theta are equal when \theta=45\degree$$

2x - 20 = 45 =>x = 32.5

2y + 20 =45 => y = 12.5

$$\tan(32.5+12.5) = \tan45\degree = 1$$

So, the answer would be option c)1

Question 88

If $$a^{2}sec^{2} x-b^{2} tan^{2} x$$=$$c^{2}$$ then the value of $$sec^{2} x+tan^{2} x $$ is equal to ($$ b^{2} \neq a^{2}$$)

A $$\frac{b^{2}-a^{2}+2C^{2}}{b^{2}+a^{2}}$$

B $$\frac{b^{2}+a^{2}-2C^{2}}{b^{2}-a^{2}}$$

C $$\frac{b^{2}-a^{2}-2C^{2}}{b^{2}+a^{2}}$$

D $$\frac{b^{2}-a^{2}}{b^{2}+a^{2}+2 C^{2}}$$

Answer: B

Explanation:
Given that $$a^{2}sec^{2} x-b^{2} tan^{2} x$$=$$c^{2}$$

=> $$a^{2}(1+tan^{2} x)-b^{2} tan^{2} x$$=$$c^{2}$$

=> $$a^2+tan^{2}x(a^2-b^2)=c^{2}$$

=> $$tan^{2}x=\frac{c^2-a^2}{a^2-b^2}$$

Therefore,

$$sec^{2} x+tan^{2} x $$

= $$1+2tan^{2}x$$

=$$1+2(\frac{c^2-a^2}{a^2-b^2})$$

=$$\frac{b^{2}+a^{2}-2C^{2}}{b^{2}-a^{2}}$$

Question 89

-(1 + sec $$20^\circ$$ + cot $$70^\circ$$)(1 - cosec $$20^\circ$$ + tan$$70^\circ$$) is equal to

A 0

B 1

C 2

D 3

Answer: C

Explanation:
(1 + sec $$20^\circ$$ + cot $$70^\circ$$)(1 - cosec $$20^\circ$$ + tan$$70^\circ$$)

= (1 + sec $$20^\circ$$ + tan $$20^\circ$$)(1 - cosec $$20^\circ$$ + cot$$20^\circ$$)

= (1 + $$\frac{1}{cos20^\circ}$$ + $$\frac{sin20^\circ}{cos20^\circ}$$)(1 - $$\frac{1}{sin20^\circ}$$ + $$\frac{cos20^\circ}{sin20^\circ}$$)

= ($$\frac{1+cos20^\circ+sin20^\circ}{cos20^\circ}$$)($$\frac{sin20^\circ-1+cos20^\circ}{sin20^\circ}$$)

= $$\frac{(cos20^\circ+sin20^\circ)^2-1}{cos20^\circ sin20^\circ}$$

= $$\frac{2cos20^\circ sin20^\circ}{cos20^\circ sin20^\circ}$$

=2

Question 90

If $$tan ^4\theta + tan^2\theta$$ = 1 then the value of $$cos^4\theta + cos^2\theta$$ is

A 2

B 0

C 1

D -1

Answer: C

Explanation:
Is it $$tan 4\theta or \tan^4\theta$$

Question 91

The value of 8$$(sin6\theta+cos6\theta)-(sin4\theta+cos4\theta)$$ is equal to

A 20

B -20

C -4

D 4

Answer: C

Question 92

An aeroplane flying horizontally at a height of 3 Km. above the ground is observed at a certain point on earth to subtend an angle of 60°. After 15 sec flight, its angle of elevation is changed to 30°. The speed of the aeroplane (taking √3 = 1.732) is

A 230.63 m/sec

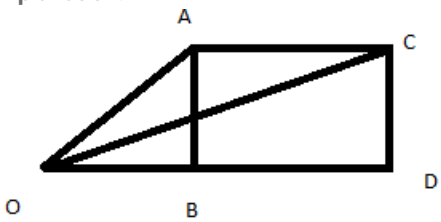
B 230.93 m/sec

C 235.85 m/sec

D 236.25 m/sec

Answer: B

Explanation:



AB = CD = 3000 m

A and C are positions of aeroplane.

$$\angle AOB$$

$$\angle AOB = 60\degree \angle COD = 30\degree$$

In $$\triangle OAB$$,

$$\tan 60\degree = \frac{AB}{OB}$$

=> $$\sqrt{3} = \frac{3000}{OB}$$

=>OB = $$\frac{3000}{\sqrt{3}} = 1000\sqrt{3}$$

In $$\triangle OCD$$,

$$\tan 30\degree = \frac{CD}{OD}$$

=> $$\frac{1}{\sqrt{3}} = \frac{3000}{OD}$$

=>CD = $$3000\sqrt{3} = 3000\sqrt{3}$$

BD = $$3000\sqrt{3} - 1000\sqrt{3} = 2000\sqrt{3}$$

Speed of aeroplane

=$$\frac{2000\sqrt{3}}{15}$$

= 230.93

So, the answer would be option b)230.93 m/sec.

Question 93

- If the angle of elevation of the sun decreases from $$45^\circ$$to $$30^\circ$$, then the length of the shadow of a pillar increases by 60m. The height of the pillar is

A 60($$\surd{3}$$+1) m

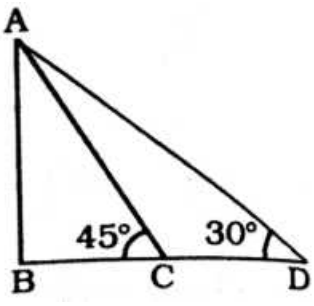
B 30($$\surd{3}$$-1) m

C 30($$\surd{3}$$+1) m

D 60(√$$\surd{3}$$-1) m

Answer: C

Explanation:



Let AB be the height of the pole = h m

CD = 60 m

In $$\triangle ABC$$,

$$\tan 45\degree = \frac{AB}{AC} =>1 = \frac{h}{BC} => BC = h m

In $$\triangle ABD$$,

$$\tan 30\degree = \frac{AB}{BD}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{h+60}$$

$$ h = \frac{60}{\sqrt{3} - 1} = 30(\sqrt{3} + 1)$$

So , the answer would be option c)30($$\surd{3}$$+1) m**Question 94**

- The angle of elevation of the top of a tower, vertically erected in the middle of a paddy field, from two points on a horizontal line through the foot of the tower are given to be α and β (α>β). The height of the tower is h unit. A possible distance (in the same unit) between the points is

A $$ \frac {h(cot\beta-cot\alpha)}{cos(\alpha+\beta)}$$

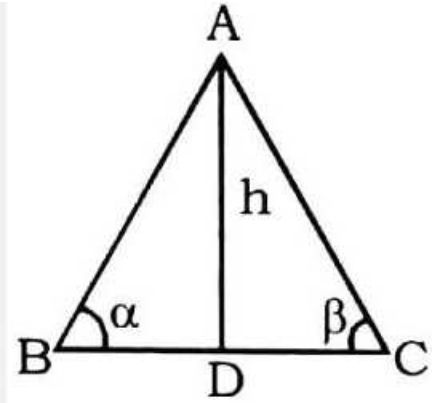
B $${h(cot\alpha-cot\beta)}$$

C $$ \frac {h(tan\beta-tan\alpha)}{tan\alpha tan\beta}$$

D $${h(cot\alpha+cot\beta)}$$

Answer: D

Explanation:



In $$\triangle ABD$$,

$$\tan \alpha = \frac{h}{BD}$$

BD = $$hcot\alpha$$

In $$\triangle ACD,

$$tan\beta = \frac{h}{CD}$$

CD = $$hcot\beta$$

BC = BD + CD

= h($$cot\alpha + cot\beta$$)

So, the answer would be option d)$${h(cot\alpha+cot\beta)}$$

Question 95

- The angle of elevation of the top of an unfinished pillar at a point 150 metres from its base is 30°. The height (in metres) that the pillar must be raised so that its angle of elevation at the same point may be 45°, is (takeing √3 = 1.732)

A 63.4

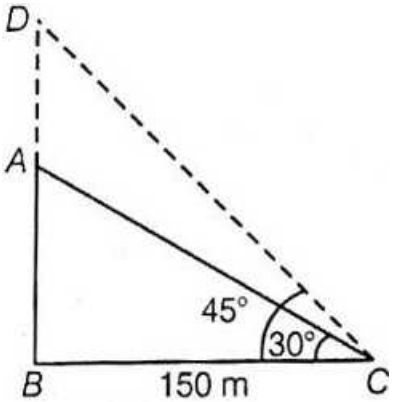
B 86.6

C 126.8

D 173.2

Answer: A

Explanation:



In $$\triangle ABC , \tan 30 \degree = \frac{AB}{BC}

$$\frac{1}{\sqrt{3}} = \frac{AB}{150}

AB = 86.6 m

In $$\triangle DBC , \tan 45 \degree = \frac{DB}{BC}

$$1 = \frac{AD + AB}{BC}

BC = AD + 86.6

AD = 150 -86.6 = 63.4

So, the answer would be option a)63.4

Question 96

What is the difference between the total sale of English newspapers and the total sale of Hindi newspapers in all the localities together.

A 7500

B 5600

C 6500

D 5700

Answer: C

Explanation:
Data Unavailable

Question 97

What is the average of difference of sales of Hindi and English newspapers in all localities ?

A 2000

B 2300

C 2100

D 2200

Answer: B

Explanation:
Data Unavailable

Question 98

What is the approximate sum of the ratios of sales of English and Hindi newspapers in all localities ?

A 4.5

B 5.75

C 6.36

D 7.82

Answer: C

Explanation:
Data Unavailable

Question 99

What is the ratio of average number of English newspapers from the localities B, C and E to the average number of Hindi newspapers from the localities A and D

A 10:9

B 9:10

C 11:9

D 9:11

Answer: A

Question 100

What is the ratio of the average number of sale of English newspapers in localities B and D together to the average sale of Hindi newspapers in all the localities ?

A 34 : 43

B 40: 33

C 33 : 40

D 43 : 33

Answer: D