I WILL WIN

NOT IMMEDIATELY, BUT DEFINITELY.

50 DAYS SUCCESS SERIES OF SSLC MATHEMATICS

(ACCORDING TO REVISED SYLLABUS)

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UNIT:-01

ARITHMETIC PROGRESSIONS

1. ……. of the following list of numbers is an A.P.

A) 1,3,6,8---- B) 1,4,9---- C) 2,4,8,16---- D) 1,3,5,7----

Ans:- D) 1,3,5,7----

2.The n^{th} term of an A.P whose first term 'a' and common difference 'd' is…..

A) a+(n+1) d B) a+(n−1)d C) a−(n+1)d D) a−(n−1)d

Ans:- B) a+(n−1)d

3.The common difference of the A.P 2, 0, −2, −4,……is……..

A) 0 B) 2 C) −2 D) −4

Ans:- C) −2

4.In an A.P if $S_{10} = 35$ and $S_9 = 28$ find a_{10}.

Ans:- $a_{10}=S_n-S_{n-1}=S_{10}-S_{10-1}=S_{10}-S_9=35-28=7$

5. Find the sum of first 25 odd natural numbers.

Ans:- $S_n = \frac{n}{2}(a + a_n)$,The first term a = 1,The common difference d = 2

n = 25 $=\frac{1250}{2}$ = 625

6.Which term of the A.P 3,8,13,18,…….. is 78 .

Ans:- a = 3, d = 8 – 3 = 5, an = 78, n =?

$a_n = a + (n – 1) d$,78 = 3+(n—1)(5) = 3 + 5n – 5 = 5n – 2,5n = 78 + 2 ∴ n = $\frac{80}{5}$∴ n = 16

7. How many two-digit numbers which are divided by 3.

Ans:- We know, first two digit number divisible by 3 is 12 and last two digit number divisible by 3 is 99. Thus, we get 12,15,18,...,99 which is an AP.

Here, a=12,d=3 ,Let there be n terms. Then, a_n=99,a+(n−1)d=99,12+(n−1)3=99.

n=29+1=30,Therefore, two digit numbers divisible by 3 are 30.

8. If 10 times the 10th term of an A.P is equal to 15 times the 15th term. Show that 25th term of the A.P is zero.

Ans:- $10a_{10} = 15a_{15}$,10[a + (10 – 1)d] = 15[a + (15 – 1)d],10[a + 9d] = 15[a + 14d]

2[a + 9d] = 3[a + 14d] [Dividing by 5 on both sides] ,2a + 18d = 3a + 42d

2a - 3a = 42d - 18d, - a = 42d – 18d, -a = 24d a = - 24d →(1)

25^{th} term : an = a + (n - 1)d,

a_{25} = a + (25 - 1)d = a + 24d = -24d + 24d [From eq 1]

a_{25} = 0 (zero).

UNIT:-01

ARITHMETIC PROGRESSIONS

1. The value of 'x' if 7, x, 23 are in A.P is……..

A) 30 B) 18 C) 15 D) 9

Ans:- C) 15

2. If the n^{th} term of an A.P is $a_n = 8-3n$, then its common difference is…..

A) −5 B) −3 C) 3 D) 5

Ans:- B) −3

3. The 13^{th} term of an A.P whose first term and common difference respectively are $\frac{3}{2}$ and $\frac{2}{3}$ is……..

A) $\frac{6}{5}$ B) $\frac{11}{2}$ C) $\frac{17}{2}$ D) $\frac{19}{2}$

Ans:- D) $\frac{19}{2}$

4. Find the common difference of the A.P 1, −1, −3, −5……..

Ans:- $d=a_2-a_1=-1-1=-2$

5. Write the formula used to find the sum of first 'n' terms of the A.P whose first term 'a' and common difference 'd'.

Ans:- $S_n=\frac{n}{2}[a+(n-1)d]$

6. In an A.P first term is 'K' and common difference is 'm'. Find its $(n-3)^{rd}$ terms.

Ans:- k+(n-4)m

7. Find the 20^{th} term from the last term of the A.P 3,8,13,……..253.

Ans:- $a_n=253$, $d=-5$

$\therefore a_{20}=253+19d=253-19(5)=253-95=158$

8. The sum of three terms of an A.P is 21 and the product of the first and third term exceeds the second term by 6. Find the sum of 20 terms of the A.P.

Ans:- Sum of three terms of an A.P. is 21. Let the three terms in AP are (a - d), a, (a + d).

$(a - d) + a + (a + d) = 21$, $3a = 21$, $a = \frac{21}{3}$, $a = 7 \rightarrow (1)$

$(a - d)(a + d) = a + 6$, $a^2 - d^2 = a + 6$, $7^2 - d^2 = 7 + 6$ [From eq.1, a = 7]

$49 - d^2 = 13$, $d^2 = 36$, $d = \sqrt{36}$, $d = \pm 6$.

If d = 6,then First term (a–d) = 7 – 6 = 1,Third term (a + d) = 7 + 6 = 13,Second term a = 7

If d = - 6 , then First term, (a – d) = 7 – (-6) = 7 + 7 = 13,

Third term (a + d) = 7 + (-6) = 7 - 6 = 1, Second term a = 7.

UNIT:-01

ARITHMETIC PROGRESSIONS

1. The result obtained on making half the sum of 7^{th} and 9^{th} term of an A.P is…….

A) 6^{th} term B) 8^{th} term C) 10^{th} term D) 12^{th} term

Ans:- B) 8^{th} term

2. In an A.P the first term is 'm' and common difference is 2m then its 5^{th} term is…….

A) 5m B) 8m C) 9m D) 10m

Ans:- C) 9m

3. In an A.P first term is 'a' and common difference is 'd' the correct relation in the following is…….

A) $a_6 = a_4 + 4d$ B) $a_8 = a_5 + 3d$ C) $a_{10} = a_3 + 4d$ D) $a_5 = a_3 + d$

Ans:- B) $a_8 = a_5 + 3d$

4. The interior angles of a triangle are in A.P in which the first term and common differences are equal. Find the measure of bigger angle if the smaller one is 30^0.

Ans:- The bigger angle=a+2d=30+2x30=30+60=90^0

5. Find the sum of first 10 terms of an A.P in which the half of the sum of first and last term is 80.

Ans:- $S_n=\frac{n}{2}[a+l] =\frac{10}{2}[a+l] =5x160 =800$

6. If 2x, x + 10, 3x + 2 are in an A.P. Find the value of x.

Ans:- 2x, x+10, 3x+2 are in A.P$\Longrightarrow$(x+10) - 2x = (3x+2) - (x+10) [the common difference]

$\Longrightarrow$ -x + 10 = 2x - 8$\Longrightarrow$ 3x = 18 $\Longrightarrow$ x = 6

7. In an A.P if an = 5 – 2n. Find the sum of first 30 terms.

Ans:-a_1=5–2(1)=5-2=3 a_2=5-2(2)=5-4=1 a_3=5-2(3)=5-6=-1,a=3,d=1-3=-2

$S_{30}=\frac{n}{2}$ [2a+(n-1)d] $=\frac{30}{2}$ [2(3)+29(-2)]=15[6-58]=15x-52= -780

8. The third term of an A.P is 8 and the 9th term of the A.P exceeds three times the third term by 2. Find the sum of its first 19 terms.

Ans:- a_3=8, $a_1 + 2d = 8 \longrightarrow (1)$

$a_9 = 3 \times a_3 + 2$,$a_9 = 3 \times 8 + 2$, $a_9 = 24 + 2$,$a_9 = 26$,

$a_1 + 8d = 26 \longrightarrow (2)$

Solving equation 1 and equation 2 by elimination method, $a_1 + 8d = 26$,$a_1 + 2d = 8$,

$6d = 18$,$d = \frac{18}{6} = 3$, $a_1 + 2 \times 3 = 8$ $a_1 + 6 = 8$ $a_1 = 8 - 6 = 2$

$S_n=\frac{n}{2}[2a_1+(n-1)d]$,$S_{19} = \frac{19}{2}$ ($2 \times 2 + (19 - 1) \times 3$) ,$S_{19} = 9.5 \times (4 + 54) = 551$.

UNIT:-01

ARITHMETIC PROGRESSIONS

I. Choose the correct answer along with the serial for the following multiple choice questions.

1. The common difference of the arithmetic progression 3, 13, 23, 33,……..is

A) 8 B) 9 C) 10 D) 11

2. The arithmetic progression whose first term is 26 and common difference -7 is……

A) 26, 19, 13, 7… B) 26,18,11,4, …… C) 26,19,12,5,… D) 26,18,12,5,...

3. The arithmetic progression 17, 12, 7, 2,…….It's n^{th} term is…….

A) 12+5n B) 5n-22 C) 22-5n D) 22n-5

4. In an arithmetic progression a_1=13, a_9=61 then the common difference is……

A) 8 B) 6 C) 4 D) 2

5. ……term is the first negative term in an arithmetic progression24, 21, 18,……

A) 8^{th} B) 9^{th} C) 10^{th} D) 12^{th}

II. Solve the problems.

6. Which term of an arithmetic progression 8, -4, -16, -28,……is -880.

7. Find the 15^{th} term of an Arithmetic progression whose 6^{th} term is -10 and 10^{th} term is -26.

8. Find the 14^{th} term of an Arithmetic progression 10, -5, -20,…….620.

9. Find the sum 4+12+20+ , ……+100.

10. Find the sum of all odd natural numbers less than 100.

11. If 2+4+6+8+,…… =10100, then find the total number of terms.

12. A cricket council organizing the cricket tournament once in four years since 1975, has conducted it in 2019. Find its chronological order.

13. A student saves 5 Rs in first week, 10 Rs in second week, 15 Rs in third week ,. . . . of his pocket money. If he continues in this order what is the total amount at the end of 15 weeks.

14. Find the sum of all 3 digit numbers, which are divisible by 5.

15. Find three numbers of the A.P whose sum is 24 and sum of their squares is 200.

16. Divide 32 into four parts which are in A.P such that the product of extremes to the product of means is 7:15. Find the four parts.

17. The sum of three terms of an A.P is 21 and the product of the first and third term exceeds the second term by 6. Find the sum of 20 terms of the A.P.

UNIT:-02

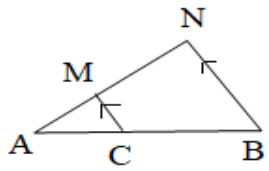
TRIANGLES

1. The measures representing the sides of a right-angled triangle are……

A) 2,3,5 B) 6,8,10 C) 8,4,6 D) 6,8,9

Ans:- B) 6,8,10

2. If Δ ABN ~ Δ AMC. The ratio of sides AM and AN is 2:5 then CM : BN is……



A) 5 : 2 B) 2 : 5

C) 1 : 2 D) 2 : 3

Ans:- B) 2 : 5

3. Sides of two similar triangles are in the ratio 4:9 then areas of these triangles are in the ratio……

A) 2 : 3 B) 4 : 9 C) 81 : 16 D) 16 : 81

Ans:- D) 16 : 81

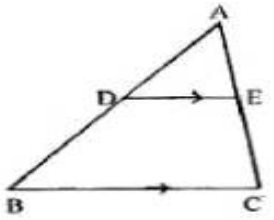
4.State Basic proportionality theorem.

Ans:- If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

5. State Converse of Basic proportionality theorem.

Ans:- If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

6. In the adjoining figure DE ‖ BC, BD = 7 cm, AD = 5cm and AC = 18 cm,find AE and CE.



Ans:- In Δ ADE and Δ ABC , AC=18 cm, AD=5 cm, BD= 7 cm ,∠A =∠A (∵common angle)

∠D =∠ B (∵corresponding angles)

∴ΔADE~ΔABC(∵ A.A. Criteria) $\frac{AE}{AC} = \frac{AD}{AB}, \frac{AE}{18} = \frac{5}{12}$ (∵ AB=AD+DB) AE = $\frac{5}{12}$ x18 = 7.5 cm

CE= AC – AE = 18 – 7.5 = 10.5 cm

7. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2\,AC^2$.

Ans:- Given that ΔABC is an isosceles right triangle. ∴ AC = CB

Applying Pythagoras theorem in ΔABC,(i.e., right-angled at point C), we obtain

$AB^2=AC^2+BC^2$,But AC = CB,Then,$AB^2=AC^2+AC^2$

Hence,$AB^2 = 2\,AC^2$

UNIT:-02

TRIANGLES

1. In ABC, DE || AB. If CD = 3 cm, EC = 4 cm, BE = 6 cm, then DA is equal to……

A) 7.5 cm B) 3 cm C) 4.5 cm D) 6 cm

Ans:- C) 4.5 cm

2. D and E are respectively the points on the sides AB and AC of a triangle ABC such that AD = 2 cm, BD = 3 cm, BC = 7.5 cm and DE || BC. Then, length of DE (in cm) is……..

A) 2.5 B) 3 C) 5 D) 6

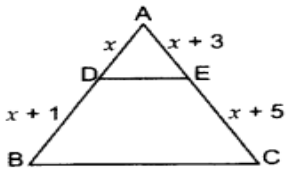
Ans:- B) 3

3. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. This theorem is called…

A) Gauss B) Pythagoras C) Thales D) Euclid

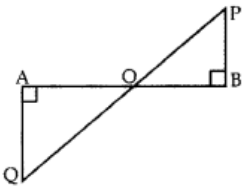
Ans:- C) Thales

4. In ΔABC, DE || BC, find the value of x.



Ans:- x = 3 cm

5. In the given figure, QA ⊥ AB and PB ⊥ AB. If AO = 20 cm, BO = 12 cm, PB = 18 cm, find AQ.



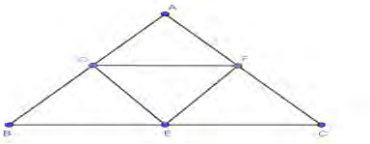
Ans:- In ΔOAQ and ΔOBP,

∠OAQ = ∠OBP … (Each 90°)

∠AOQ = ∠BOP … (vertically opposite angles)

ΔOAQ ~ ΔOBP(∵ A.A. Criteria), $\frac{AO}{BO}=\frac{AQ}{PB}, \frac{20}{12}=\frac{AQ}{18}$,AQ=30cm.

6. D, E and F are respectively the mid-points of sides AB, BC and CA of ΔABC. Find the ratio of the area of ΔDEF and ΔABC.



Ans:- D and E are the mid-points of ΔABC.

∴DE||AC and DE =$\frac{1}{2}$AC,In ΔBED and ΔBCA,

∠BED = ∠BCA (Corresponding angles) ,∠BDE = ∠BAC (Corresponding angles)

∠EBA = ∠CBA (Common angles),∴ ΔBED ~ ΔBCA (AAA similarity criterion)

Wkt $\frac{ar(\Delta BED)}{ar(\Delta BCA)}=\left(\frac{DE}{AC}\right)^2 \Rightarrow \frac{ar(\Delta BED)}{ar(\Delta BCA)}=\frac{1}{4} \Rightarrow ar(\Delta BED)=\frac{1}{4}ar(\Delta BCA)$

Similarly, $ar(\Delta CFE)=\frac{1}{4}ar(\Delta BCA)$ & $ar(\Delta ADF)=\frac{1}{4}ar(\Delta BCA)$

& Also, $ar(\Delta DEF)=ar(\Delta BCA)$-$[ar(\Delta BED)+ ar(\Delta CFE)+ar(\Delta ADF)]$

$ar(\Delta DEF)=ar(\Delta BCA)-\frac{3}{4}ar(\Delta BCA)=\frac{1}{4}ar(\Delta BCA) \Rightarrow \frac{ar(\Delta DEF)}{ar(\Delta BCA)}=\frac{1}{4}$

UNIT:-02

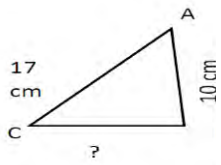
TRIANGLES

1. In a right angle triangle ABC, ∠B = 90°, AC = 17 cm and AB = 8 cm find the length of BC.

Ans:- In ΔABC ∠B=90^0,

$AB^2+BC^2=AC^2$,

$8^2+BC^2=17^2$, $64+BC^2=289$, $BC^2=289-64=225=15$.

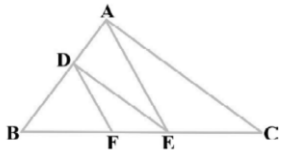


2. In the given Fig.,if DE‖ AC and DF‖ AE,prove that $\frac{BF}{FE}=\frac{BE}{AE}$.

Ans:- In ΔABC, DE‖AC,Then,$\frac{BE}{EC}=\frac{BD}{DA}$ ⋯→ (1)

In ΔAEB, DF‖ AE,Then,$\frac{BF}{FE}=\frac{BD}{DA}$ ⋯→ (2)

From (1) and (2) $\frac{BF}{FE}=\frac{BE}{EC}$



3. S and T are point on sides PR and QR of ΔPQR such that ∠P = ∠RTS. Show that ΔRPQ ~ ΔRTS.

Ans:- In ΔRPQ and ΔRTS, ∠QPR = ∠RTS (Given),∠PRQ= ∠TRS (Common)

∴ ΔRPQ ~ ΔRTS (AA similarity criterion)

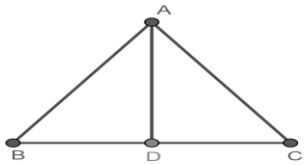
4. D is a point on the side BC of a triangle ABC such that ∠ADC = ∠BAC. Show at CA^2= CB.CD

Ans:- In ΔADC and ΔBAC, ∠ADC = ∠BAC (Given)

∠ACD = ∠BCA (Common angle)

∴ ΔADC ~ ΔBAC (By AA similarity criterion)

We know that corresponding sides of similar triangles are in proportion.$\frac{CA}{CB}=\frac{CD}{CA}$∴ CA^2= CB.CD



5. PQR is a triangle right angled at P and M is a point on QR such that PM ⊥ QR. Show that PM^2 = QM × MR.

Ans:- Let ∠MPR = x,In ΔMPR, ∠MRP = 180° – 90° – x

∠MRP = 90° – x,Similarly, In ΔMPQ, ∠MPQ = 90° − MPR

= 90° – x

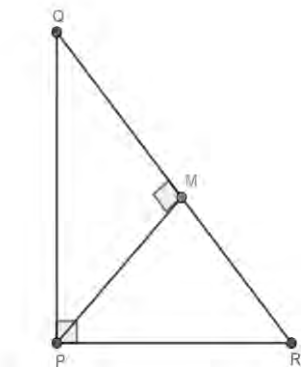
∠MQP = 180° – 90° – (90° – x),∠MQP = x

In ΔQMP and ΔPMR ,∠MPQ = ∠MRP

∠PMQ = ∠RMP,∠MQP = ∠MPR

∴ ΔQMP ~ ΔPMR (By AAA similarity criterion),

$\frac{QM}{PM}=\frac{PM}{MR}$,Then PM^2 = QM × MR .



UNIT:-02

TRIANGLES

1. ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Ratio of the area of triangles ABC and BDE is…….

A) 2 : 1 B) 1 : 2 C) 4 : 1 D) 1 : 4

Ans:- C) 4 : 1.

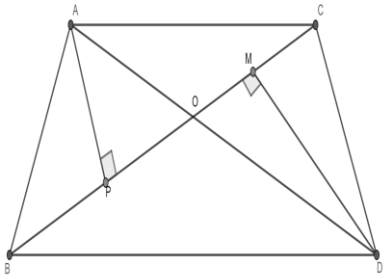
2. Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio……

A) 2 : 3 B) 4 : 9 C) 81 : 16 D) 16 : 81

Ans:- D) 16 : 81.

3. In the given figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\frac{ar(\Delta ABC)}{ar(\Delta DBC)}=\frac{AO}{DO}$.

Ans:- Let us draw two perpendiculars AP and DM on line BC.



W.k.t.area of a triangle= $\frac{1}{2}$×Base×Height, $\frac{ar(\Delta ABC)}{ar(\Delta DBC)}=\frac{\frac{1}{2}\times BC\times AP}{\frac{1}{2}\times BC\times DM}=\frac{AP}{DM}$

In ΔAPO and ΔDMO, ∠APO = ∠DMO (Each = 90°)

∠AOP = ∠DOM (Vertically opposite angles)

∴ ΔAPO ~ ΔDMO (By AA similarity criterion)

Then $\frac{AO}{DO}=\frac{AP}{DM}$ ∴ $\frac{ar(\Delta ABC)}{ar(\Delta DBC)}=\frac{AO}{DO}$

4. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2\,AC^2$.

Ans:- Given that ΔABC is an isosceles right triangle. ∴ AC = CB

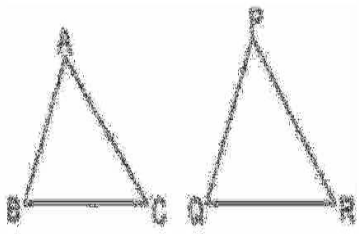
Applying Pythagoras theorem in ΔABC (i.e., right-angled at point C),

we obtain ,$AB^2=AC^2+BC^2$,But AC = CB,Then,$AB^2=AC^2+AC^2$,Hence$AB^2 = 2\,AC^2$

5. If the areas of two similar triangles are equal, prove that they are congruent.

Ans:- Let us assume two similar triangles as ΔABC ~ ΔPQR.

Wkt $\frac{ar(\Delta ABC)}{ar(\Delta PQR)}=\left(\frac{AB}{PQ}\right)^2=\left(\frac{BC}{QR}\right)^2=\left(\frac{AC}{PR}\right)^2$ ⟶(1)



Given that, $ar(\Delta ABC) = ar(\Delta PQR)$, $\frac{ar(\Delta ABC)}{ar(\Delta PQR)}=1$

Putting this value in equation (1), we obtain

$1=\left(\frac{AB}{PQ}\right)^2=\left(\frac{BC}{QR}\right)^2=\left(\frac{AC}{PR}\right)^2$

Then AB = PQ, BC = QR and AC = PR ∴ ΔABC ≅ ΔPQR (By SSS congruence criterion) .

UNIT:-02

TRIANGLES

1. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2\,AC^2$.

Ans:- Given that ΔABC is an isosceles right triangle. ∴ AC = CB

Applying Pythagoras theorem in ΔABC,we obtain ,$AB^2=AC^2+BC^2$,But AC = CB.

Then,$AB^2=AC^2+AC^2$,Hence,$AB^2 = 2\,AC^2$

2. ABC is an isosceles triangle with AC=BC.If $AB^2 = 2\,AC^2$.prove that ABC is a right triangle.

Ans:- Given that ΔABC is an isosceles triangle. ∴ AC = CB. And also given that,$AB^2 = 2\,AC^2$

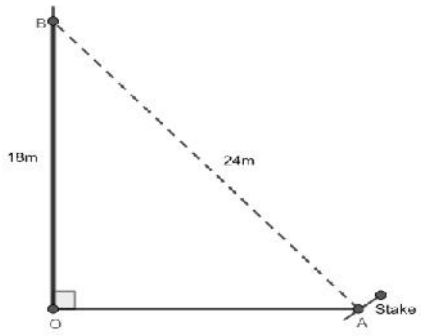
Then,$AB^2=AC^2+AC^2$,But AC = CB,$AB^2=AC^2+BC^2$

Hence, The triangle is satisfying the Pythagoras theorem.

Therefore, the given triangle is a right angled triangle.

3. A guy wire attached to a vertical pole of height 18 m is 24 m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?

Ans:- Let OB be the Pole and AB be the Wire.



Therefore, by Pythagoras theorem,

$AB^2=OA^2+BO^2$,$(24m)^2=(18m)^2+AO^2$

$576\ m^2 - 324\ m^2 = AO^2$, $AO^2 = 252m^2$, $AO = 6\sqrt{7}$ m

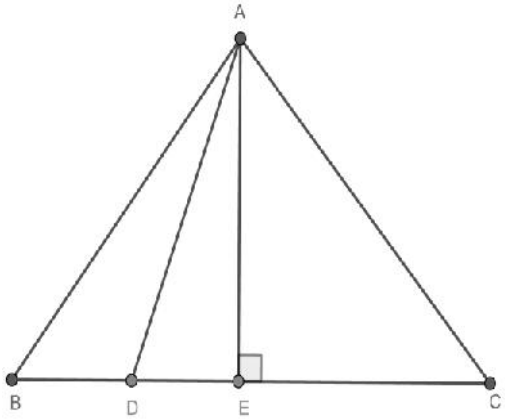
Therefore, the distance from the base is $6\sqrt{7}$ m.

4. In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$BC. Prove that $9\,AD^2 = 7\,AB^2$.

Ans:- Let the side of the equilateral triangle be a & AE be the altitude of ΔABC.

BE=EC=$\frac{BC}{2}=\frac{a}{2}$ and AE= $\frac{a\sqrt{3}}{2}$,Given that,BD= $\frac{1}{3}$BC= $\frac{a}{3}$

DE=BE-BD= $\frac{a}{2}-\frac{a}{3}=\frac{a}{6}$



Applying Pythagoras theorem in ΔADE, we obtain

$AD^2 = AE^2+DE^2$

$AD^2 = \left(\frac{a\sqrt{3}}{2}\right)^2 + \left(\frac{a}{6}\right)^2$

$= \left(\frac{3a^2}{4}\right) + \left(\frac{a^2}{36}\right)$

$AD^2 = \frac{28a^2}{36} = \frac{7}{9}AB^2$

$9\,AD^2 = 7\,AB^2$

UNIT:-02

TRIANGLES

I. Choose the correct answer along with the serial for the following multiple choice questions.

1. In a rectangle if length=8cm, breadth=6cm and its diagonal=…….cm

A) 9 B) 10 C) 14 D) 13

2. If ΔABC~ΔPQR, ∠B=500, ∠C=70^0,then ∠P =……

A). 60^0 B). 70^0 C). 80^0 D). 90^0

3. In ΔABC if DE‖ AB , if CD=3cm,CE=4 cm ,BE=6 cm,then AD=…….cm

A). 3.5 B). 4 C). 4.5 D). 5

4. A man goes 24m due west and then 7m due north. ……..far is he from the starting point.

A).17m B).25m C).26m D).31m

5. In an equilateral triangle the ratio between its side and altitude is ……..

A).1:$\sqrt{3}$ B).1:2 C). $\sqrt{3}$:2 D).2: $\sqrt{3}$

II. Solve the problems.

6. If a triangle has 3 sides of length (a-1) cm and ($2\sqrt{a}$) cm (a+1) cm ,then prove this triangle is right angled triangle.

7. In rhombus ABCD prove that $4AB^2 = BD^2 + AC^2$.

8. Two towers are of heights 10m and 18m. If the distance between the tops is 17m. Find the distance between their feet.

9. State and Prove “Pythagoras theorem”.

10. State and Prove “Areas of similar triangles theorem”.

11. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

12. ABCD is a trapezium in which AB‖ DC and its diagonals intersect each other at the point O.Show that AC‖ PR.Show that $\frac{AO}{BO}=\frac{CO}{DO}$.

13. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that ΔABE ~ ΔCFB.

14. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that ΔABC ~ ΔPQR.

15. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

UNIT:-03

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. If two equations have exactly one solution and are in the form $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ then they are……

A) Coincident lines
B) Intersecting lines
C) Transversal lines
D) Parallel lines

Ans:- B) Intersecting lines.

2. If two equations have no solutions and are in the form $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ then they are……..

A) Coincident lines
B) Intersecting lines
C) Transversal lines
D) Parallel lines

Ans:- D) Parallel lines.

3. In the general form of pair of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ where a_1, a_2, b_1, b_2 and c_1, c_2 are……..

A) Whole numbers
B) Real numbers
C) Integers
D) Co-primes

Ans:- B) Real numbers.

4. The coach of a cricket team buys 3 bats and 6 balls for Rs 3900. Later, she buys another bat and 2 more balls of the same kind for Rs 1300. Represent this situation algebraically.

Ans:- 3x+6y=3900, x+2y=1300

5. Check whether the pair of equations x + 3y = 6 and 2x – 3y = 12 is consistent.

Ans:- Here, $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, Thus the given pair of equation is consistent.

6. The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

Ans:- Let the 2 numbers be 10x+y and 10y+x, where x and y are positive integers.
By adding the 2 numbers we will get 11x+11y=66. x+y=6→ (1)
Also, difference of the two digits it 2 so, x-y=2→ (2)
Adding eq. (1) and (2), 2x=8, x=4.
Substituting x value in eqn.(2), 4-y=2 y=2, So the number can be 10x+y or 10y+x.
So the required numbers are 24 and 42. So there are two such numbers.

UNIT:-03

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. x+2y-4=0 and 2x+4y-12=0 then the lines are…….

A) Coincident B) Intersecting C) Transversal D) Parallel

Ans:- D) Parallel.

2. If the lines 3x+2ky-2=0and 2x+5y+1=0 are parallel ,then the value of k is……

A) $\frac{4}{15}$ B) $\frac{15}{4}$ C) $\frac{4}{5}$ D) $\frac{5}{4}$

Ans:- B) $\frac{15}{4}$.

3. The solution of the equations x-y=2 and x+y=4 are…….

A) 3,1 B) 4,3 C) 5,1 D) -1,-3

Ans:- A) 3,1.

4. If one equation of a pair of dependent linear equations is -3x+5y-2=0. The second equation will be……

A) -6x+10y-4=0 B) 6x-10y-4=0

C) 6x+10y-4=0 D) -6x+10y+4=0

Ans:- A) -6x+10y-4=0.

5. Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.

Ans:- Let the speed of Ritu in still water and the speed of stream be x km/h and y km/h respectively.

Speed of Ritu while rowing Upstream = (x – y) km/h & Downstream = (x + y) km/h

2(x + y) = 20 ⇒ x + y = 10 → (1)

2(x – y) = 4 ⇒ x – y = 2 → (2) By adding equation (1) and (2), we will get x=6

Putting this equation in (1), we will get y = 4.

Hence, Ritu's speed in still water is 6 km/h and the speed of the current is 4 km/h.

6.Five years ago, Hari was thrice as old as Ramu. Ten years later Hari will be twice as old as Ramu. How old are Hari and Ramu.

Ans:-Let the present age of Hari be = x Let the present age of Ramu be = y.

According to the given information, (x – 5) = 3(y – 5), x – 3y = – 10 → (1)

(x + 10y) = 2(y + 10) ,x – 2y = 10 → (2)

Subtracting equation (1) from equation (2), we get y = 20 → (3)

Putting this value in equation (1), we get x – 60 = – 10 ,x = 50

Hence, age of Hari = 50 years and age of Ramu = 20 years.

UNIT:-03

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. Half the perimeter of a rectangular room is 46 m, and its length is 6 m more than its breadth. ……..is the length and breadth of the room.

A) 2m, 20m B) 2m, 3m C) 56m, 40m D) 26m, 20m.

Ans:- D) 26m, 20m.

2. 2x+y=7,3x+2y=12,then solutions of the equation……

A) (-3,2) B) (1,0) C) (3,2) D) (2,3).

Ans:- D) (2,3).

3……pair of equations which satisfy the point (1,-1)

A) 4x–y=3,4x+y=3 B) 4x+y=3,3x+2y=1

C) 2x+3y=5,2x+3y=−1 D) 2x+y=3,2x–y=1

Ans:- B) 4x+y=3,3x+2y=1.

4. Find the value of x and y by using graphical method for the equations 2x+y=6 and 2x-y+2=0.

Ans:- 2x + y = 6

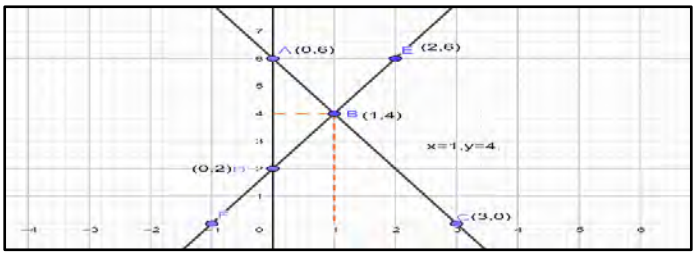
Y = 6 – 2x

X	0	1	3
Y	6	4	0

2x – y + 2 = 0

y = 2x + 2

X	0	1	3
Y	6	4	0



5. The coach of a cricket team buys 3 bats and 6 balls for Rs 3900. Later, he buys another bat and 2 more balls of the same kind for Rs 1300. Find the cost of each ball and bat separately.

Ans:- let the cost of bat be x and the cost of ball be y. according to the Question:

3x+6y= 3900→(1)

x +3y = 1300→ (2),by multiplying the eqn.(2) by 2 we will get,

⇒2x+ 6y = 2600 now

by elimination method we get ,

3x+6y= 3900

- 2x + 6y = 2600

x =1300

putting x value in (2) we will get, 1300 +3y= 1300

3y= 1300-1300, ⇒ y= 0.

UNIT:-03

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. If x = a, y = b is the solution of the equation x – y = 2 and x + y = 4, then the value of a and b are respectively……

A) 3 and 5 B) 5 and 3 C) 3 and 1 D) -1 and -3.

Ans:- C) 3 and 1.

2. The angles of a triangle are x, y and 40°. The difference between the two angles x and y is 30°. The values of x and y are…….

A) 45°, 75° B) 50°, 80° C) 55°, 85° D) 55°, 95°.

Ans:- C) 55°, 85°.

3. Find the value of x and y by using graphical method for the equations x+y=3 and 3x-2y=4.

Ans:- x+ y = 3

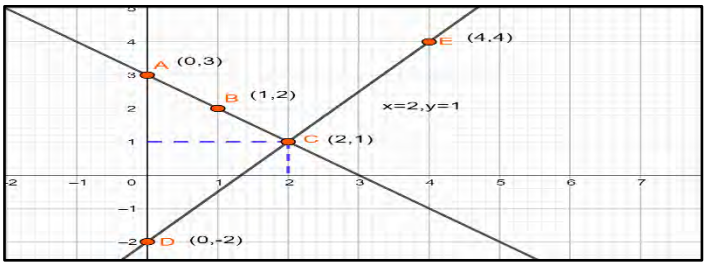
y = 3 – x

X	0	1	2
Y	3	2	1

3x-2y = 4

2y = 3x – 4

X	0	2	4
Y	-2	1	4



5. Solve 2x + 3y = 11 and 2x – 4y = – 24 and hence find the value of ‘m’ for which y = mx + 3.

Ans:-2x + 3y = 11→(I)

2x – 4y = -24→ (2)

From equation (2), we get , x = $\frac{(11-3y)}{2}$ → (3)

Substituting the value of x in equation (2), we get

$2\frac{(11-3y)}{2}$ – 4y = 24,11 – 3y – 4y = -24,-7y = -35,y = 5→ (4)

Putting the value of y in equation (3), we get

x = $\frac{(11-3x5)}{2}$= $\frac{-4}{2}$ = -2

Hence, x = -2, y = 5

Also,

y = mx + 3

5 = -2m +3

-2m = 2

m = -1

Therefore, the value of m is -1.

UNIT:-03

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. A pair of linear equations that are inconsistent……

A) $x - y + 3 = 0, x - y + 6 = 0.$ B) $2x - y + 20 = 0, x - 2y + 10 = 0.$

C) $3x - 4y + 12 = 0, x - y + 10 = 0.$ D) $5x - 10y + 20 = 0, x - 2y + 4 = 0.$

2. The pair of linear equations $5x + 10y = 12$ and $15 + 30y = 10$ have…….solution/s.

A). Unique B). Infinitely many C). No D). Two

3. The pair of linear equations $2x - 3y = 7$ and $3x + 2y = 5$ are……pair.

A). Consistent B). Dependent C). Inconsistent D). Independent.

4. A pair of linear equations with infinitely many solutions…….

A) $2x - 3y + 6 = 0, 2x + 3y + 6 = 0.$ B) $3x - 4y - 6 = 0, 3x - 4y + 6 = 0.$

C) $x - y + 10 = 0, x - y + 10 = 0.$ D) $5x - 10y + 20 = 0, 5x - 20y + 30 = 0.$

5. The value of 'k' for which the straight lines $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ represents parallel lines is……..

A). $\frac{-5}{4}$ B). $\frac{2}{5}$ C). $\frac{15}{4}$ D). $\frac{3}{2}$.

II. Solve the problems.

6. Solve the pair of linear equations graphically: -

a) $x + y = 5$ and $x - y = 8.$ b) $2x - y - 4 = 0$ and $4x - 2y - 8 = 0.$

7. Solve the following pair of linear equations by the substitution method: -

a) $x + y = 1$ and $x - y = 3.$ b) $2x + 4y = 8$ and $x + 3y = 5.$

8. Solve the following pair of linear equations by the elimination method: -

a) $x + 3y = 8$ and $2x + 3y = 4.$ b) $x - y = 3$ and $2x + y = 6.$

9. Solve by appropriate method: - $2x + 3y + 5 = 0$ and $3x - 2y - 12 = 0.$

10. For what values of k will the following pair of linear equations have infinitely many solutions? $kx+3y-(k-3) = 0$ and $12x+ky-k=0.$

11.The area of a rectangle gets reduced by 9 square unit. If its length is reduced by 5 units and breath is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimension of the rectangle.

UNIT:-04

Circles

1. Maximum number of tangents drawn to a circle from an external point is.....
A) 2 B) 3 C) 4 D) 5.
Ans:- A) 2.

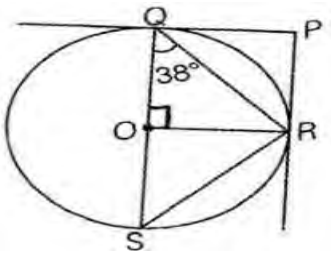
2. A straight which intersects a circle at two distinct points is.....
A) Tangent B) Chord C) Secant D) Diameter.
Ans:- C) Secant.

3. The angle between a tangent to a circle and the radius through the point of contact is.....
A) 60° B) 90° C) 120° D) 180°.
Ans:- B) 90°.

4. Number of tangents can be drawn at any point on a circle is.....
A) 1 B) 2 C) 3 D) Many.
Ans:- A) 1.

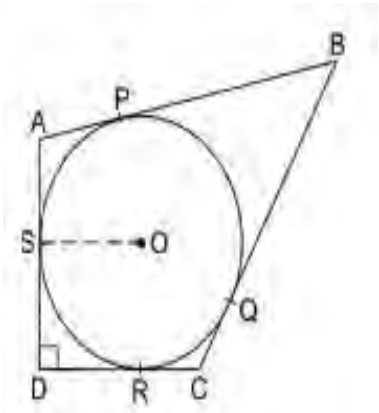
5..... parallel tangents at most a circle can have.
A) 1 B) 2 C) 3 D) Many.
Ans:- B) 2.

6. PQ and PR are tangents at Q and R, respectively. If ∠SQR = 38°, then find ∠QPR, ∠PRQ, ∠QSR and ∠PQR.



Ans:- In ΔQSR, ∠QRS = 90° (Angle in semi-circle)
∠SQR + ∠QRS+ ∠QSR = 180°
38° + 90° + ∠QSR = 180°
∠QSR = 180° - 128° = 52°.

7. A circle touches all the four sides of a quadrilateral ABCD. Prove that AB+CD = BC+DA.



Ans:- AP = AS, BP = BQ, SD = DR, CQ = CR→1
(tangents drawn from an external point are equal)
Consider the L.H.S,
AB + CD = AP + PB + DR + RC
= AS + BQ + SD + CQ (from (1))
= AS + SD + BQ + CQ
⟹AB + CD = AD + BC
= R.H.S

UNIT:-04

Circles

1. The lengths of tangents drawn from an external point to the circle are……

A) Equal B) Not equal

C) sometimes are equal D) Never equal.

Ans:- A) Equal.

2. Tangents drawn at extremities of the diameter of a circle are…….

A) Perpendicular B) Parallel C) Equal D) Not equal.

Ans:- B) Parallel.

3. Distance between two parallel tangents of a circle of radius 3.5cm is……

A) 3.5cm B) 7cm C) 10cm D) 14cm.

Ans:- B) 7cm.

4. The length of common chord of two intersecting circles is 30 cm. If the diameters of these two circles are 50 cm and 34 cm, then calculate the distance between their centers.

Ans:- ∠SQR= 38° PQ and PR are tangents In Quadrilateral PQOR,

∠Q=∠R =90° (Radius ⊥ Tangent at touching point)

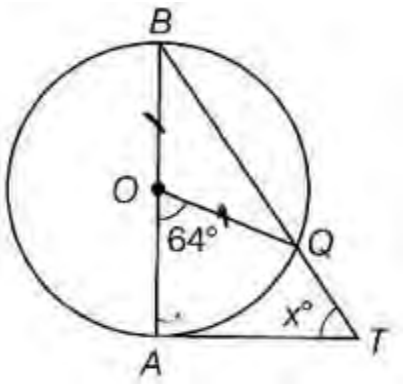
∠O =90° (Data) ,∠O + ∠R + ∠Q + ∠P = 360°, 90° + 90° + 90° + ∠QPR =360°,

∠QPR =360°-270°=90°,In ΔPQR,PQ = PR(tangents drawn from an external point)

∴∠PQR = ∠PRQ = x opposite angles of equal sides ∴ x + x ∠QPR = 180°

(Sum of ∠'s of Δ) 2x + 90° = 180° x = $\frac{90^0}{2}$ = 45° ∴∠PQR = 45°&∠PRQ = 45°.

5. In the given figure, AB is a diameter of the circle with center O and AT is a tangent. Calculate the numerical value of x.



Ans:- ∠AOQ = 64° (Given)

∠AOQ + ∠BOQ = 180°

∠BOQ = 180° - 64° = 116° →(1)

In ΔBOQ , OB = OQ (radii of same circle)

∴∠OBQ = ∠OQB →2

Sum of ∠'s of triangle ∠OBQ +∠OBQ + 116° = 180°

2∠OBQ = 180° - 116° = 64°

∠OBQ = $\frac{64^0}{2}$ = 32 → (3)

∴ In Δ BAT, ∠A = 90° (Radius ⊥ Tangent)

∠B + ∠A + ∠T =180° ,32° + 90° + x° = 180° ,x= 180° -122°, x= 58°.

UNIT:-04

Circles

1. If the angle between the two tangents to a circle is 40^0,then the angle between the radii is.....

A) 90^0 B) 100^0 C) 140^0 D) 180^0.

Ans:- C) 140^0.

2. ..... is the name of two circles having a common center.

A) Concentric B) Cocentric C) Duocentric D) Monocentric..

Ans:- A) Concentric.

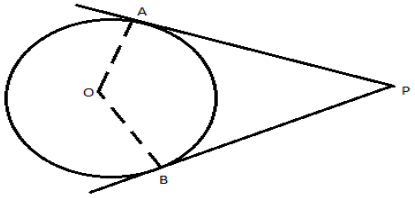
3. The intersecting point of a circle and a tangent .....

A) Point of contract B) Point of contact

C) Point of circle D) Point of tangent.

Ans:- B) Point of contact.

4. Prove that the angle between two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the center.



Ans:- AP and BP are tangents to a circle with center 'O' .

To prove that :- $\angle AOB + \angle APB = 180°$

Proof :- In Quadrilateral OAPB

$\angle A = \angle B = 90°$ $\angle A + \angle B + \angle O + \angle P = 360°$ sum of angles in a Quadrilateral

$90° + 90° + \angle O + \angle P = 360°$, $\angle O + \angle P = 360° - 180° = 180$

$\angle AOB + \angle APB = 360°$

5. In the given figure, $\angle ADC = 90°$, BC = 38 cm, CD = 28 cm and BP = 25 cm, then the radius of the circle.

Ans:- $\angle ADC = 90°$, BC = 38 cm, CD = 28 cm and BP = 25 cm

$\rightarrow$BQ = 25cm (tangent from an external point)

CQ = BC – BQ = 38 – 25 =13cm

$\therefore$CQ = CR = 13cm (Tangents from an external point)

DR = CD – CR = 28 – 13 ,DR = 15cm$\rightarrow$(1)

In Quadrilateral ORDS,$\angle R = \angle S = 90°$

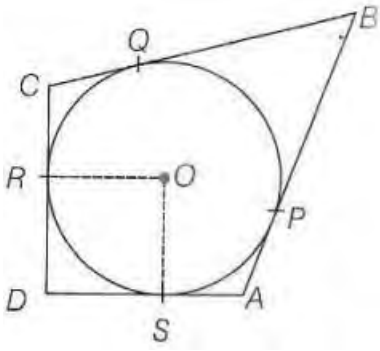
(radius $\perp$ tangent at a point of contact) $\angle D = 90°$(Data)

$\angle O = 90°$ (sum of interior angles in Quadrilateral is 360°)

OR = OS (radii of same circle)

$\therefore$ ORDS is a square. $\therefore$ OS = OR = DR OS = OR = 15cm (from (1))

$\therefore$Radius of given circle is 15cm.



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UNIT:-04

CIRCLES

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. PQ and PR are tangents to the circle with center 'o' if ∠ QPR=80° then ∠ QOR is.....

A). 60^0 B). 80^0 C). 100^0 D). 180^0.

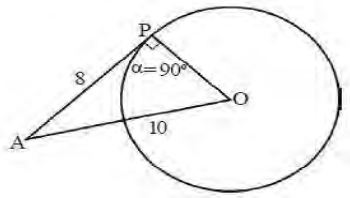
2. The length of the tangent 'P' drawn to a circle with diameter 48 cm from a point 25 cm from the center of the circle is.....

A). 7 cm B). 14 cm C). 16 cm D). 24 cm.

3. A tangent of 24 cm is drawn to a circle with 7 cm radius then the distance from center to the point is.....

A) 12 cm B) 12.5 cm C) 25 cm D) 50 cm.

4. In figure PA = 8cm, OA= 10 cm, then diameter of the circle is.....



A) 6 cm B) 12 cm

C) 16 cm D) 14 cm.

5. The tangents drawn at the end points of diameter of circle are mutually.....

A) parallel B) intersect

C)perpendicular D) intersect at the center.

II. Solve the problems.

6. In two concentric circles, the chord of 8cm drawn to the bigger circle touches the smaller circle with radius equal to 3cm, then find radius of bigger circle.

7. Isosceles ΔABC is inscribed in a circle and AB=AC, show that the tangent drawn to the circle at vertex A is parallel to BC.

8. Prove that "the tangent at any point of a circle is perpendicular to the radius through the point of contact".

9. Prove that "The length of tangents drawn from an external point to a circle are equal".

10. AB is the chord of the circle with center O, AOC is diameter of the circle and AT is the tangent drawn at A, show that ∠BAT = ∠ACB .

11. A circle touches the side BC of a ΔABC at P and AB and AC when produced at Q and R respectively as shown in the figure. Show that AQ = $\frac{1}{2}$(Perimeter of ΔABC).

UNIT:-05

Constructions

1. To divide a line segment AB in the ratio 3:4, first, a ray AX is drawn so that ∠BAX is an acute angle and then at equal distances points are marked on the ray AX such that the minimum number of these points is…….

A) 5 B) 7 C) 9 D) 11.

Ans:- B) 7.

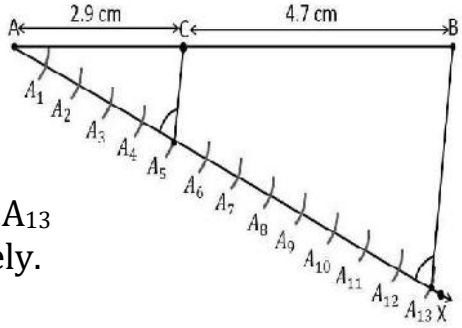
2. To divide a line segment AB of length 7.6cm in the ratio 5:8, a ray AX is drawn first such that ∠BAX forms an acute angle and then points A_1, A_2, A_3, ….are located at equal distances on the ray AX and the point B is joined to……

A) A_5 B) A_6 C) A_{10} D) A_{13}.

Ans:- D) A_{13}.

3.Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8. Measure the two parts.

Ans:- **Justification:**The construction of the given problem can be justified by proving that,$\frac{AC}{CB}=\frac{5}{8}$.



By construction, we have $A_5C \parallel A_{13}B$. From Basic proportionality theorem for the triangle $AA_{13}B$, we get, $\frac{AC}{CB}=\frac{AA_5}{A_5A_{13}} \rightarrow(1)$

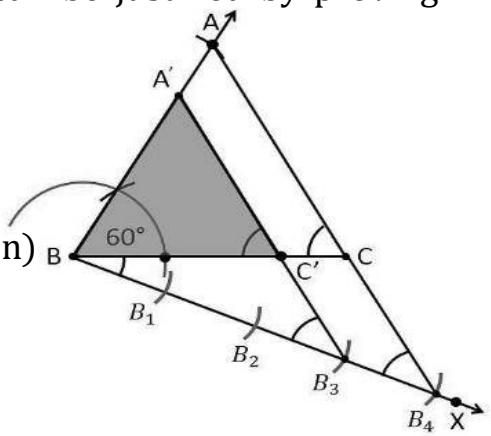
From the figure constructed, it is observed that AA_5 and A_5A_{13} contain 5 and 8 equal divisions of line segments respectively.

Therefore, it becomes, $\frac{AA_5}{A_5A_{13}}=\frac{5}{8} \rightarrow(2)$

Compare the equations (1) and (2), we obtain $\frac{AC}{CB}=\frac{5}{8}$.

4. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

Ans:- **Justification:**The construction of the given problem can be justified by proving that,Since the scale factor is $\frac{3}{4}$, we need to prove,



$A'B = (\frac{3}{4})AB, BC' = (\frac{3}{4})BC, A'C' = (\frac{3}{4})AC$

From the construction, we get $A'C' \parallel AC$

In $\Delta A'BC'$ and ΔABC,

$\therefore \angle A'C'B = \angle ACB$ (Corresponding angles), $\angle B = \angle B$ (common)

$\therefore \Delta A'BC' \sim \Delta ABC$ (From AA similarity criterion)

Since the corresponding sides of the similar triangle are in the same ratio, it becomes,Therefore, $\frac{A'B}{AB}=\frac{BC'}{BC}=\frac{A'C'}{AC}$

So, it becomes, $\frac{A'B}{AB}=\frac{BC'}{BC}=\frac{A'C'}{AC}=\frac{3}{4}$.

UNIT:-05

Constructions

1. To divide a line segment PQ in the ratio m:n, where m and n are two positive integers, draw a ray PX so that ∠PQX is an acute angle and then mark points on ray PX at equal distances such that the minimum number of these points is……..

A) M+n B) M-n C) M+n-1 D) Greater of m and n.

Ans:- A) M+n.

2. A pair of tangents can be constructed from a point P to a circle of radius 3.5 cm situated at a distance of ……from the center.

A) 3.5 B) 2.5 C) 5 D) 2.

Ans:- C) 5.

3. Draw a triangle ABC with side BC = 7 cm, ∠ B = 45°, ∠ A = 105°. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of Δ ABC.

Ans:- **Justification:**The construction of the given problem can be justified by proving that,Since the scale factor is $\frac{4}{3}$, we need to prove,

$A'B = (\frac{4}{3})AB, BC' = (\frac{4}{3})BC, A'C' = (\frac{4}{3})AC$

From the construction, we get A'C' || AC

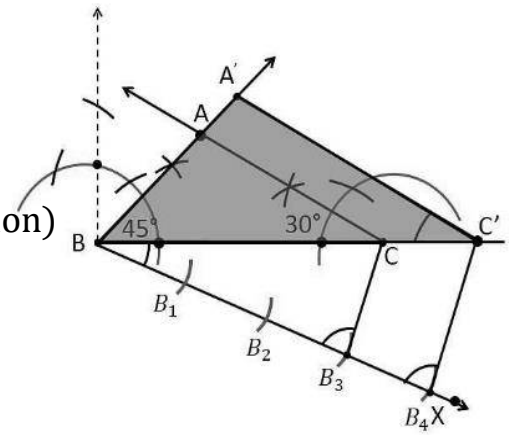
In ΔA'BC' and ΔABC,

∴ ∠ A'C'B = ∠ACB (Corresponding angles),∠B = ∠B (common)

∴ ΔA'BC' ~ ΔABC (From AA similarity criterion)

Since the corresponding sides of the similar triangle are in the same ratio, it becomes,Therefore, $\frac{A'B}{AB} = \frac{BC'}{BC} = \frac{A'C'}{AC}$

So, it becomes, $\frac{A'B}{AB} = \frac{BC'}{BC} = \frac{A'C'}{AC} = \frac{4}{3}$.



4. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.

Ans:- **Justification:**The construction of the given problem can be justified by proving that PQ and PR are the tangents to the circle of radius 4 cm with center O.

To prove this, join OQ and OR represented in dotted lines.

From the construction,

∠PQO is an angle in the semi-circle.

We know that angle in a semi-circle is a right angle, so it becomes,

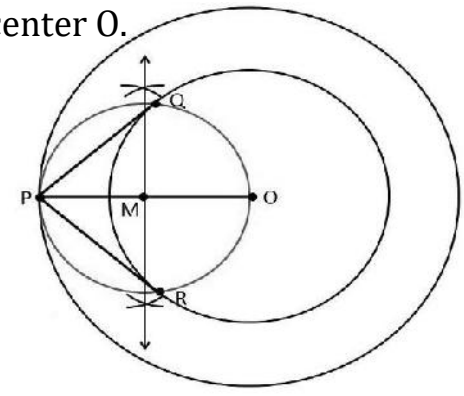
∴ ∠PQO = 90°

Such that

⇒ OQ ⊥ PQ

Since OQ is the radius of the circle with radius 4 cm, PQ must be a tangent of the circle.

Similarly, we can prove that PR is a tangent of the circle.



UNIT:-05

CONSTRUCTIONS

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. To construct a pair of tangents to a circle at an angle of 60° to each other, it is needed to draw tangents at endpoints of those two radii of the circle, the angle between them should be……..

A). 100^0 B). 90^0 C). 180^0 D). 120^0.

2. To construct a triangle ABC and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle. A ray AX is drawn where multiple points at equal distances are located. The last point to which point B will meet the ray AX will be……..

A). A1 B). A2 C). A3 D). A4.

II. Solve the problems.

3. Divide the line segment of length 7 cm in the ratio 3:5 and name the corresponding angles.

4. Draw the line segment of length 6 cm and divide it in the ratio 3:4.

5. Construct a triangle of sides 4cm, 5cm and 6 cm and then draw a triangle similar to it whose sides are in the ratio 2:3 of the corresponding sides of the first triangle.

6. Construct a right angled triangle with base BC= 4cm, $\angle B=90^0$ and $\angle C=50^0$ and then construct another triangle whose sides are in the ratio 3:4 similar to first triangle.

7. Draw a Δ ABC with base BC= 6cm, $\angle B=45^0$ and $\angle A=105^0$ then construct a triangle whose side are $\frac{4}{3}$ times the corresponding sides of triangle ABC.

8. Construct a triangle of sides 3 cm, 4cm and 5cm and construct another triangle similar to it whose sides are in $\frac{2}{3}$ of the corresponding sides of the first triangle.

9. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameters each at a distance of 7 cm from its center. Draw tangents to the circle from these two points P and Q.

10. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

UNIT:-06

CO ORDINATE GEOMETRY

1. The Coordinates of the origin is……

A) (1,1) B) (0,0) C) (0,1) D) (1,0)

Ans:- B) (0,0).

2. Area of the triangle formed by three collinear points is……

A) 0 sq.units B)1 sq.units C)2 sq.units D)4 sq.units

Ans:- A) 0 sq.units.

3. The perpendicular distance of point P (3,-5) from x axis is……

A) 4 units B) 1 Unit C) 3 units D) 5 units

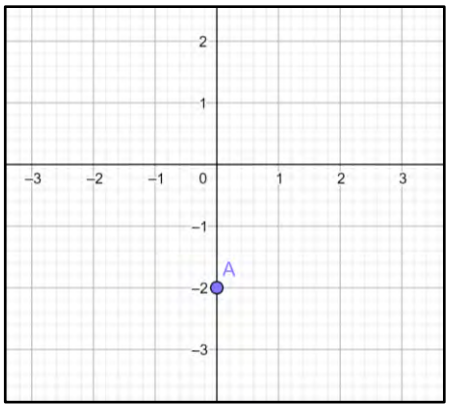
Ans:- D) 5 units.

4. If the distance between origin and the point p (x, y) is……

A) x + y B) x - y C) $\sqrt{x^2-y^2}$ D) $\sqrt{x^2+y^2}$

Ans:- D) $\sqrt{x^2+y^2}$.

5. The coordinates of the point A in the given graph is….



A) (1,3) B) (-3,-1)

C) (0,-2) D) (-3,0)

Ans:- C) (0,-2).

6.The coordinates of a point P on the x-axis is…….

A) (x,0) B) (0,y)

C) (0,0) D) (0,-y)

Ans:- A) (x,0).

7. Find the distance between the points (0,3) and (4,0)

Ans:-Distance=$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$=$\sqrt{(4-0)^2+(0-3)^2}$

=$\sqrt{4^2+3^2}$=$\sqrt{16+9}=\sqrt{25}$ =5 units.

8. Find the coordinates of the midpoint of the line segment formed by joining the points (2,3) and (4,5).

Ans:- Mid point=$\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)=\left(\frac{2+4}{2},\frac{3+5}{2}\right)=\left(\frac{6}{2},\frac{8}{2}\right)$=(3,4)

9. Check whether points (1, 1), (2, 2) an (3,3) are collinear.

A =$\frac{1}{2}\left[x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right]$=$\frac{1}{2}[1(2-3)+2(3-1)+3(1-2)]$

=$\frac{1}{2}[1(-1)+2(2)+3(-1)]$=$\frac{1}{2}[-1+4-3]$=$\frac{1}{2}[0]$=0 square units.

This means that the area of the triangle formed by these points is zero. But no triangle has area of zero units practically which means that these points are collinear.

10. Find the radius of the circle whose center is (3,4) and a point on its circumference is (-3,-4).

Ans:-Radius=$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$=$\sqrt{(-3-3)^2+(-4-4)^2}$

=$\sqrt{(-6)^2+(-8)^2}$=$\sqrt{36+64}=\sqrt{100}$ =10 units.

UNIT:-06

CO ORDINATE GEOMETRY

1. The points (- 1, – 2), (1, 0), (- 1, 2), (- 3, 0) forms a quadrilateral of type……

A) Square B) Rectangle C) Parallelogram D) Rhombus

Ans:- A) Square.

2. If the distance between the points A(2, -2) and B(-1, x) is equal to 5, then the value of x is…

A) 2 B)-2 C)1 D)-1

Ans:- A) 2.

3. The midpoints of a line segment joining two points A(2, 4) and B(-2, -4) is……..

A) (-2,4) B) (2,-4) C) (0, 0) D) (-2,-4)

Ans:- C) (0, 0).

4. The distance between the points P(0, 2) and Q(6, 0) is……

A) $4\sqrt{10}$ B) $2\sqrt{10}$ C) $\sqrt{10}$ D) $3\sqrt{10}$

Ans:- B) $2\sqrt{10}$.

5. The points which divides the line segment of points P(-1, 7) and (4, -3) in the ratio of 2:3 is……

A) (3,1) B) (-3,-1) C) (-1,-3) D) (1,3)

Ans:- D) (1,3).

6. The coordinates of a point P, where PQ is the diameter of circle whose center is (2, – 3) and Q is (1, 4) is……..

A) (3, -10) B) (2, -10) C) (-3, 10) D) (-2, 10)

Ans:- A) (3, -10).

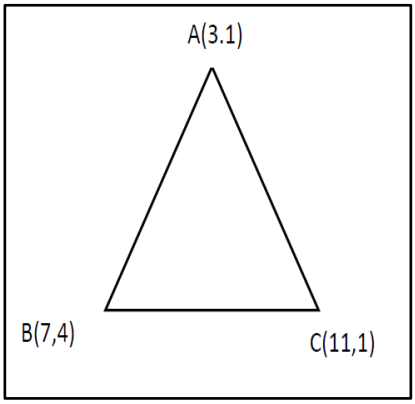
7. Find the value of m if the points (m,2),(-3,4) and (7,-1) are collinear.

Ans:- A $= \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$

$0 = \frac{1}{2}\left[m\,4 - (-1) + (-3)(-1 - 2) + 7(2 - 4)\right]$

$0 = \frac{1}{2}\left[m(5) + (-3)(-3) + 7(-2)\right] = \frac{1}{2}\left[5m - 5\right] = \frac{5}{2}\left[m - 1\right]$

$\therefore 5(m-1) = 0, m-1 = 0 \therefore m = 1$



8. Find the type of the triangle formed by the points (3, 1), (7,4) & (11,1) and justify your answer.

Ans:-Distance Of AB$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(7-3)^2 + (4-1)^2} = \sqrt{25} = 5$ units.

Distance Of BC$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(11-7)^2 + (1-4)^2} = \sqrt{25} = 5$ units.

Distance Of CA$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(11-3)^2 + (1-1)^2} = \sqrt{64} = 8$ units.

∴The triangle formed is an Isosceles triangle as two sides are of equal length.

UNIT:-06

CO ORDINATE GEOMETRY

1. The area of a rhombus if its vertices are (3, 0), (4, 5), (-1, 4) and (-2,-1) taken in order,is…

A) 12 sq.unit B) 24 sq.unit C) 30 sq.unit D) 32 sq.unit

Ans:- B) 24 sq.unit.

2. The points (-4, 0), (4, 0), (0, 3) are the vertices of a…….triangle.

A) Right B) Isosceles C) Equilateral D) Scalene

Ans:- B) Isosceles.

3. The point which divides the lines segment joining the points (7, -6) and (3, 4) in ratio 1 : 2 internally lies in the…….

A) I quadrant B) II quadrant C) III quadrant D) IV quadrant

Ans:- D) IV quadrant.

4. The fourth vertex D of a parallelogram ABCD whose three vertices are A(-2, 3), B(6, 7) and C(8, 3) is……..

A) (0, 1) B) (0, -1) C) (-1, 0) D) (1, 0)

Ans:- B) (0, -1).

5. The area of a triangle with vertices (a, b + c), (b, c + a) and (c, a + b) is……

A) $(a + b + c)^2$ B) 0 C) a + b + c D) abc

Ans:- B) 0.

6. If the points A(1, 2), O(0, 0), C(a, b) are collinear, then……

A) a = b B) a = 2b C) 2a = b D) a = -b

Ans:- C) 2a = b.

7. Find a point on x-axis which is equidistant from the points (2,-5) and (-2,9).

Ans:- A point on x-axis is in the form (x,0)

Here the length of AM and BM are same

∴AM = BM 8.

Distance Of AM =Distance Of BM=$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

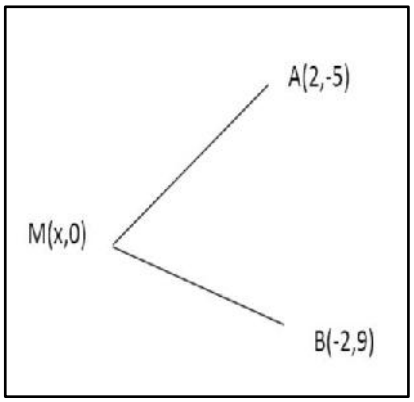
$\sqrt{(x-2)^2+(0-(-5))^2}=\sqrt{(x-(-7))^2+(0-9)^2}$

$\sqrt{(x-2)^2+(5)^2}=\sqrt{(x+7))^2+(-9)^2}$

$(x-2)^2+25 = (x+2)^2+81 \Rightarrow x^2 + 4 - 4x + 25 = x^2 + 4 + 4x + 81$

$29 - 4x = 4x + 85 \Rightarrow -4x - 4x = 85 - 29 \Rightarrow -8x = 56, x=\frac{56}{-8}=7$

Required point is (-7,0).



8. Find the ratio in which the line segment joining the points (-3, 10) and (6, – 8) is divided by (-1, 6).

Ans:- Consider the ratio in which the line segment joining (-3, 10) and (6, -8) is divided by point (-1, 6) be k :1.Therefore, -1 = $\frac{(6k-3)}{(k+1)} \Rightarrow -k - 1 = 6k - 3 \Rightarrow 7k = 2 \Rightarrow k = \frac{2}{7}$

Therefore, the required ratio is 2: 7.

UNIT:-06

CO ORDINATE GEOMETRY

1. The area of the triangle OAB, the coordinates of the points A(4, 0), B(0, 3) and O is origin, is.....

A) 14 sq.unit B) 18 sq.unit C) 28 sq.unit D) 30 sq.unit

Ans:- A) 14 sq.unit.

2. The distance between the lines 2x+4 = 0 and x–5 = 0, is.....

A) 9units B) 1units C) 5units D) 7units

Ans:- D) 7units.

3. If a is any positive integer such that the distance between the points P(a, 2) and Q(3, –6) is 10 units, then the value of a is.....

A) -3 B) 6 C) 9 D) 3

Ans:- C) 9.

4. The perimeter of triangle formed by the points (0, 0), (2, 0) and (0, 2) is.....

A) 4units B) 6units C) $6\sqrt{2}$units D) $4+2\sqrt{2}$units

Ans:- D) $4+2\sqrt{2}$units.

5. The points (1, 2), (–5, 6) and (a, –2) are collinear only if a =.....

A) -3 B) 7 C) 2 D) 5

Ans:- B) 7.

6. The point on the x-axis which is equidistant from (2, –5) and (–2, 9) is.....

A) (–7, 0) B) (–5, 0) C) (–6, 0) D) (–7, 1)

Ans:- A) (–7, 0).

7. Determine the ratio in which the line 2x + y – 4 = 0 divides the line segment joining the points A(2, –2) and B(3, 7).

Ans:- Consider line 2x + y – 4 = 0 divides line AB joined by the two points A(2, -2) and B(3, 7) in k : 1 ratio.

Coordinates of point of division can be given as follows:

$x = \frac{(2+3k)}{(k+1)}$ and $y = \frac{(-2+7k)}{(k+1)}$

Substituting the values of x and y given equation, i.e. 2x + y – 4 = 0, we have

$2\{\frac{(2+3k)}{(k+1)}\} + \{\frac{(-2+7k)}{(k+1)}\} - 4 = 0 \Rightarrow \frac{(4+6k)}{(k+1)} + \frac{(-2+7k)}{(k+1)} = 4$

$4 + 6k - 2 + 7k = 4(k+1)$

$-2 + 9k = 0$

Or $k = \frac{2}{9}$

Hence, the ratio is 2: 9.

UNIT:-06

CO ORDINATE GEOMETRY

1. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). Square of the length of its diagonal is……

A) 5units B) 3units C) 34units D) 4units

Ans:- C) 34units.

2. The points (–4, 0), (4, 0) and (0, 3) are the vertices of a…….triangle.

A) Right B) Isosceles C) Equilateral D) Scalene.

Ans:- B) Isosceles.

3. The ratio in which x-axis divides the line segment joining the points (5, 4) and (2, –3) is…….

A) 5:2 B) 3:4 C) 2:5 D) 4:3

Ans:- D) 4:3.

4. The fourth vertex D of a parallelogram ABCD whose three vertices are A(–2, 3), B(6, 7) and C(8, 3) is……

A) (0, 1) B) (0, -1) C) (-1, 0) D) (1, 0)

Ans:- B) (0, -1).

5. The values of y for which the distance between the points P (2, –3) and Q (10, y) is 10units, is…….

A) –9, 5 B) –9, 3 C) –9, 2 D) –9, 6

Ans:- B) –9, 3.

6. The equation of a line parallel to x-axis at a distance of 5 units below x-axis is……

A) x = 5 B) x = -5 C) y = –5 D) y = –5x

Ans:- C) y = –5.

7. Find the coordinates of a point A, where AB is the diameter of circle whose center is (2, –3) and B is (1, 4).

Ans:- Let the coordinates of point A be (x, y).

Mid-point of AB is (2, – 3), which is the center of the circle.

Coordinate of B = (1, 4)

$(2, -3) = \left(\frac{(x+1)}{2}, \frac{(y+4)}{2}\right)$

$\frac{(x+1)}{2} = 2$ and $\frac{(y+4)}{2} = -3$

x + 1 = 4 and y + 4 = -6⇒x = 3 and y = -10.

The coordinates of A(3,-10).

UNIT:-06

CO-ORDINATE GEOMETRY

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. P is a point on X-axis at a distance of 3units from Y-axis to its left. The coordinates of P are……

A). (3, 0) B). (0, 3) C). (-3, 0) D). (0, -3).

2. If the points A(6, 1), B(8, 2), C(9, 4) and D(p,3) are vertices of a parallelogram , taken in order, then the value of p is……

A). 7 B). 9 C). 5 D). 8.

3. The centroid of a triangle with two vertices (3, –10), (–1, –9) is (2, –4). The co-ordinates of the third vertex are……

A). (-4,-7) B). (4,-7) C). (4,7) D). (7,4).

4. The distance of (–6, 8) from the origin is……

A). 8units B). 27units C). 10units D). 6units.

5. Point on x-axis has coordinates…….

A). (a, 0) B). (0, a) C). (–a, a) D). (a, – a).

6. The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1:2 internally lies in the……..

A). I quadrant B). II quadrant C). III quadrant D). IV quadrant.

7. If the point P(2, 1) lies on the line joining A(4,2) and B(8,4), then……..

A). AP = $(\frac{1}{3})$AB B). AP = PB C). PB = $(\frac{1}{3})$AB D). AP =$(\frac{1}{2})$AB.

8. The area of the triangle whose vertices are (1, –1), (–4, 6) and (–3, –5)is….

A). 26sq.units B). 34sq.units C).24sq.units D). 28sq.units.

II. Solve the problems.

9. Find the ratio in which the point (-1,1) (1,1) divides the line joining the points (4,-2) and (-1,3).

10. If Q (0, 1) is equidistant from P (5, – 3) and R (x, 6), find the values of x. Also find the distance QR and PR.

11. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, -1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

UNIT:-07

QUADRATIC EQUATIONS

1. If the roots of $ax^2 + bx + c = 0$ are equal then,.....

A) $\frac{b}{2a}=\frac{2c}{b}$ B) $b^2 + 4ac = 0$ C) $\frac{b}{2a}=\frac{b}{2c}$ D) a = b.

Ans:- A) $\frac{b}{2a}=\frac{2c}{b}$.

2. If one root of $px^2 + qx + r = 0$ is reciprocal of the other root then.....

A) p = q B) q = r C) p = r D) p = q = r.

Ans:- C) p = r.

3. The sum of the roots of $3x^2 + 6x + 3 = 0$ is.....

A) 2 B) -3 C) 1 D) -2.

Ans:- D) -2.

4. If one root of $2x^2 + kx + 4 = 0$ is -2, then the value of k is.....

A) 12 B) -6 C) 6 D) -12.

Ans:- C) 6.

5. The nature of the roots of $2x^2 – 4x - 3 = 0$ is.....

A) Real & distinct B) real & equal C) no real roots D) imaginary roots.

Ans:- A) Real & distinct.

6. The roots of quadratic equation $3x^2 – 6x = 0$ are.....

A) (0,2) B) (3,6) C) (0,-2) D) (0,6).

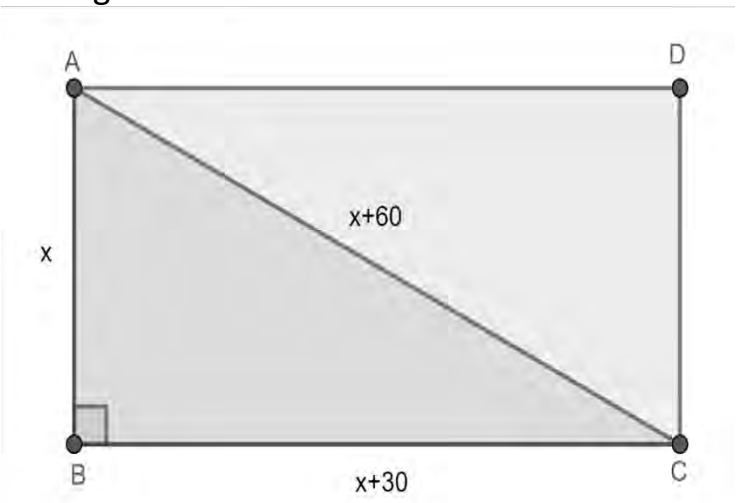
Ans:- A) (0,2).

7. The diagonal of a rectangular field is 60 meters more than the shorter side. If the longer side is 30 meters more than the shorter side, find the sides of the field.

Ans:- Let us assume that, the shorter side of the rectangle be x m.

Then, larger side of the rectangle = (x + 30) m.

And then, diagonal of the rectangle = (x + 60) m.



ABC is a right triangle,

then by pythagorus theorem,

$AC^2=AB^2+BC^2$

$(x+60)^2=x^2+(x+30)^2$

$\Rightarrow x^2 + x^2 + 900 + 60x = x^2 + 3600 + 120x$

$\Rightarrow x^2 – 60x – 2700 = 0$

$\Rightarrow x^2 – 90x + 30x – 2700 = 0$

$\Rightarrow x(x – 90) + 30(x -90) = 0$

$\Rightarrow (x – 90)(x + 30) = 0$

$\Rightarrow x = 90, -30$

However, side of the field cannot be negative. Therefore, the length of the shorter side will be 90 m.

and the length of the larger side will be (90 + 30) m = 120 m.

UNIT:-07

QUADRATIC EQUATIONS

1. Equation of $(x+1)^2-x^2=0$ has number of real roots equal to.....

A) 1 B) 2 C) 3 D) 4.

Ans:- A) 1.

2. The roots of $100x^2 - 20x + 1 = 0$ is.....

A) $\frac{1}{20}$ and $\frac{1}{20}$ B) $\frac{1}{10}$ and $\frac{1}{20}$ C) $\frac{1}{10}$ and $\frac{1}{10}$ D) $\frac{1}{20}$ and $\frac{1}{10}$

Ans:- C) $\frac{1}{10}$ and $\frac{1}{10}$.

3. The sum of two numbers is 27 and product is 182. The numbers are.....

A) 12 and 13 B) 13 and 14 C) 12 and 15 D) 13 and 24.

Ans:- B) 13 and 14.

4. If $\frac{1}{2}$ is a root of the quadratic equation $x^2-mx-\frac{5}{4}=0$, then value of m is.....

A) 2 B) -2 C) -3 D) 3.

Ans:- B) -2.

5. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, the other two sides of the triangle are equal to.....

A) Base=10cm and Altitiude=5cm B) Base=12cm and Altitude=5cm

C) Base=14cm and Altitude=10cm D) Base=12cm and Altitude=10cm.

Ans:- B) Base=12cm and Altitude=5cm.

6. The roots of quadratic equation $2x^2 + x + 4 = 0$ are.....

A) Positive and negative B) Both Positive

C) Real roots D) No real roots.

Ans:- D) No real roots.

7. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was Rs.90, find the number of articles produced and the cost of each article.

Ans:- Let us say, the number of articles produced be x.

Therefore, cost of production of each article = Rs $(2x + 3)$

Given, total cost of production is Rs.90

$\therefore x(2x + 3) = 90, \Rightarrow 2x^2 + 3x - 90 = 0, \Rightarrow 2x^2 + 15x - 12x - 90 = 0, \Rightarrow x(2x + 15) - 6(2x + 15) = 0,$

$\Rightarrow (2x + 15)(x - 6) = 0,$ Thus, either $2x + 15 = 0$ or $x - 6 = 0, \Rightarrow x = -\frac{15}{2}$ or $x = 6$

As the number of articles produced can only be a positive integer,therefore, x can only be 6.

Hence, number of articles produced = 6.

Cost of each article = $2 \times 6 + 3$ = Rs 15.

UNIT:-07

QUADRATIC EQUATIONS

1. The sum of the reciprocals of Rehman's ages 3 years ago and 5 years from now is $\frac{1}{3}$. The present age of Rehman is…….

A) 7 B) 10 C) 5 D) 6.

Ans:- A)7.

2. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Then the speed of the train…….

A) 30 km/hr B) 40 km/hr C) 50 km/hr D) 60 km/hr.

Ans:- B) 40 km/hr.

3. If one root of equation $4x^2-2x+k-4=0$ is reciprocal of other. The value of k is…..

A) -8 B) 8 C) -4 D) 4.

Ans:- B) 8.

4. The equation $2x^2 + kx + 3 = 0$ has two equal roots, then the value of k is…….

A) $\pm\sqrt{6}$ B) ± 4 C) $\pm 3\sqrt{2}$ D) $\pm 2\sqrt{6}$.

Ans:- D) $\pm 2\sqrt{6}$.

5. The sum of the roots of the quadratic equation $3x^2 – 9x + 5 = 0$ is…….

A) 3 B) 6 C) -3 D) 2.

Ans:- C) -3.

6. If the roots of $px^2 + qx + 2 = 0$ are reciprocal of each other, then…….

A) p = 0 B) p = -2 C) p = ±2 D) p = 2.

Ans:- D) p = 2.

7. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

Ans:- Let us assume that,the time taken by the smaller tap to fill the tank = x hr.

Time taken by the larger tap = (x – 10) hr

Part of tank filled by smaller tap in 1 hour = $\frac{1}{x}$,Part of tank filled by larger tap in 1 hour = $\frac{1}{(x-10)}$

As given, the tank can be filled in $9\frac{3}{8} = \frac{75}{8}$ hours by both the taps together.

Therefore,$\frac{1}{x} + \frac{1}{(x-10)} = \frac{8}{75}$, $\frac{x-10+x}{x(x+10)} = \frac{8}{75}$,⇒ $75(2x – 10) = 8x^2 – 80x$,⇒ $150x – 750 = 8x^2 – 80x$

⇒ $8x^2 – 230x +750 = 0$,⇒ $8x^2 – 200x – 30x + 750 = 0$,⇒ $8x(x – 25) -30(x – 25) = 0$

⇒ $(x – 25)(8x -30) = 0$,⇒ $x = 25, \frac{30}{8}$,Time taken by the smaller tap cannot be $\frac{30}{8} = 3.75$ hours, as the time taken by the larger tap will become negative, which is logically not possible.

Therefore, time taken individually by the smaller tap and the larger tap will be 25 and 25 – 10 =15 hours respectively.

UNIT:-07

QUADRATIC EQUATIONS

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, the value of k is……..

A). 1 B). -1 C). 2 D). -2.

2. The roots of the equation $7x^2 + x - 1 = 0$ are……..

A). real and distinct B). real and equal

C). not real D). non real and distinct.

3. The equation $12x^2 + 4kx + 3 = 0$ has real and equal roots, if…….

A). $k = \pm 3$ B). $k = \pm 9$ C). $k = 4$ D). $k = \pm 2$.

4. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$, then……..

A). $p = 3$ B). $p = 5$ C). $p = 7$ D). $p = 1$.

5. A chess board contains 64 equal squares and the area of each square is 6.25 cm^2. A border round the board is 2 cm wide. The length of the side of the chess board is…….

A). 8 cm B). 12 cm C). 24 cm D). 36 cm.

6. One year ago, a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Their present ages are……

A). 7 years, 49 years B). 5 years, 25 years

C). 1 year, 50 years D). 6 years, 49 years.

7. The sum of the squares of two consecutive natural numbers is 313. The numbers are…….

A). 12, 13 B). 13,14 C). 11,12 D). 14,15.

8. The sum of the squares of two consecutive natural numbers is 20. Representing this statement in the form of quadratic equation is,……

A). $X^2 + (x + 1)^2 = 20$ B). $x^2 - (x - 1)^2 = 20$

C). $(x + 1)^2 - x^2 = 20$ D). $x^2+(x+1)^2+20=0$.

II. Solve the problems.

9. If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q$ has equal roots. Find the value of q.

10. The sum of the ages of a father and his son is 45 years. Five years ago the product of their age was 124 Years. Determine their present ages.

UNIT:-08

INTRODUCTION TO TRIGONOMETRY

1. (1+cosθ) (1-cosθ) =……

A) $\sin^2\theta$ B) $\tan^2\theta$ C) 1 D) 0.

Ans:- A) $\sin^2\theta$.

2. sin A . cosA . tanA + cosA. sinA. cotA =……

A) $\sin^2A - \cos^2A$ B) $\tan^2A + \cot^2A$

C) $\sin^2A + \cos^2A$ D) $\sin^2A + \tan^2A$.

Ans:- C) $\sin^2A + \cos^2A$.

3. If $1 - \cos^2\theta = \frac{3}{4}$ then the value of sin θ……

A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) 1 D) 0.

Ans:- A) $\frac{\sqrt{3}}{2}$.

4. 2 cos θ =1 and θ is an acute angle then the value of 'θ'……

A) 0^0 B) 30^0 C) 45^0 D) 60^0.

Ans:- D) 60^0.

5. If sinθ = cosθ then the value of θ……

A) 0^0 B) 30^0 C) 45^0 D) 90^0.

Ans:- C) 45^0.

6. The value of $\cos 48^0 - \sin 42^0$ is……

A) 0 B) 1 C) 2 D) 3.

Ans:- D) p = 2.

7. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0° < A + B \leq 90°$; A > B, find A and B.

Ans:- $\tan(A + B) = \sqrt{3}$, Since $\sqrt{3} = \tan 60°$

Now substitute the degree value ⇒ $\tan(A + B) = \tan 60°$,$(A + B) = 60°$ →(I)

$\tan(A - B) = \frac{1}{\sqrt{3}}$, Since $\frac{1}{\sqrt{3}} = \tan 30°$

Now substitute the degree value ⇒ $\tan(A - B) = \tan 30°$

$(A - B) = 30°$ → (II)

Now add the equation (I) and (II), we get

$A + B + A - B = 60° + 30°$,Cancel the terms B, $2A = 90°$,Then $A = 45°$

Now, substitute the value of A in equation (I) to find the value of B,

$45° + B = 60°$

$B = 60° - 45°$

$B = 15°$

Therefore $A = 45°$ and $B = 15°$.

UNIT:-08

INTRODUCTION TO TRIGONOMETRY

1. If sin A = $\frac{3}{4}$, then tan A.....

A) $\frac{3}{\sqrt{7}}$ B) $\frac{2}{\sqrt{7}}$ C) $\frac{31}{\sqrt{7}}$ D) $\frac{1}{\sqrt{7}}$.

Ans:- A) $\frac{3}{\sqrt{7}}$.

2. If 15 cot A =8, then sec A.....

A) $\frac{17}{9}$ B) $\frac{17}{8}$ C) $\frac{8}{17}$ D) $\frac{15}{8}$.

Ans:- C) $\frac{8}{17}$.

3. sin 60° cos 30° + sin 30° cos 60°.....

A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) 1 D) 0.

Ans:- C) 1.

4. $\frac{2\tan 30°}{1+\tan^2 30°}$ =.....

A) sin 60° B) cos 60° C) tan 60° D) sin 30°.

Ans:- A) sin 60°.

5. $\frac{1-\tan^2 45°}{1+\tan^2 45°}$ = ...

A) tan 90° B) 1 C) sin 45° D) 0.

Ans:- D) 0.

6. sin 2A = 2 sin A is true when A =.....

A) 0° B) 30° C) 45° D) 60°.

Ans:- A) 0° .

7. Prove the given identity, where the angles involved are acute angles for which the expressions are defined. $\left[\frac{(\tan\theta)}{(1-\cot\theta)}\right]+\left[\frac{(\cot\theta)}{(1-\tan\theta)}\right]$ =1 + sec θ cosec θ

Ans:- To prove this, first take the Left-Hand side (L.H.S) of the given equation,

$= \left[\frac{\left(\frac{\sin\theta}{\cos\theta}\right)}{\left(1-\frac{\cos\theta}{\sin\theta}\right)}\right]+\left[\frac{\left(\frac{\cos\theta}{\sin\theta}\right)}{\left(1-\frac{\sin\theta}{\cos\theta}\right)}\right] = \left[\frac{\left(\frac{\sin\theta}{\cos\theta}\right)}{\left(\frac{\sin\theta-\cos\theta}{\sin\theta}\right)}\right]+\left[\frac{\left(\frac{\cos\theta}{\sin\theta}\right)}{\left(\frac{\cos\theta-\sin\theta}{\cos\theta}\right)}\right]$

$= \left[\frac{\sin 2\theta}{\cos\theta(\sin\theta-\cos\theta)}\right]+\left[\frac{\cos 2\theta}{\sin\theta(\cos\theta-\sin\theta)}\right] = \left[\frac{\sin 2\theta}{\cos\theta(\sin\theta-\cos\theta)}\right]-\left[\frac{\cos 2\theta}{\sin\theta(\sin\theta-\cos\theta)}\right]$

$= \frac{1}{(\sin\theta-\cos\theta)}\left[\frac{\sin 2\theta}{\cos\theta}\right]-\left[\frac{\cos 2\theta}{\sin\theta}\right] = \frac{1}{(\sin\theta-\cos\theta)}\left[\frac{\sin 3\theta-\cos 3\theta}{\sin\theta.\cos\theta}\right]$

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

= 1 + sec θ cosec θ =R.H.S.

Therefore, $\left[\frac{(\tan\theta)}{(1-\cot\theta)}\right]+\left[\frac{(\cot\theta)}{(1-\tan\theta)}\right]$ =1 + sec θ cosec θ ,Hence proved.

UNIT:-08

INTRODUCTION TO TRIGONOMETRY

1. If tan 2A = cot (A – 18°), where 2A is an acute angle, then the value of A.....

A) 0° B) 36° C) 45° D) 60°.

Ans:- B) 36°.

2. sin 25° cos 65° + cos 25° sin 65°=.....

A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) 1 D) 0.

Ans:- C) 1.

3. 9 $\sec^2$A - 9 $\tan^2$A =.....

A) 1 B) 9 C) 8 D) 0.

Ans:- B) 9.

4. (1 + tan θ + sec θ) (1 + cot θ - cosec θ)=.....

A) 0 B) 1 C) 2 D) -1.

Ans:- C) 2.

5. $(sec\ A\ +\ tan\ A)(1\ -\ sin\ A)$ =.....

A) sec A B) sin A C) cosec A D) cos A.

Ans:- D) cos A.

6. $\frac{1+tan^2\ A}{1+cot^2 A}$=.....

A) $\sec^2$ A B) -1 C) $\cot^2$A D) $\tan^2$A.

Ans:- D) $\tan^2$A.

7. Prove the given identity, where the angles involved are acute angles for which the expressions are defined.

$\left[\frac{(\cos A-\sin A+1)}{(\cos A+\sin A+1)}\right]=cosec\ A\ +\ cot\ A,\ using\ the\ identity\ cosec^2 A\ =\ 1+cot^2 A.$

Ans:- To prove this, first take the Left-Hand side (L.H.S) of the given equation,

$\left[\frac{(\cos A-\sin A+1)}{(\cos A+\sin A+1)}\right]$ Divide the numerator and denominator by sin A, we get

$=\left[\frac{\left(\frac{\cos A-\sin A+1}{\sin A}\right)}{\left(\frac{\cos A+\sin A+1}{\sin A}\right)}\right]=\left[\frac{cot\ A-1+cosec\ A}{cot\ A+1+cosec\ A}\right]$

$=\left[\frac{(cot\ A+cosec\ A)-(cosec\ 2\ A-cot\ 2\ A)}{cot\ A+1+cosec\ A}\right]$ (Because, $cosec^2 A\ =\ 1+cot^2 A.$)

$=\left[\frac{(cot\ A+cosec\ A)-(cosec\ A-cot\ A)(cosec\ A+cot\ A)}{cot\ A+1+cosec\ A}\right]$

$=\left[\frac{(cot\ A+cosec\ A)[1-(cosec\ A-cot\ A)]}{cot\ A+1+cosec\ A}\right]$

$=\left[\frac{(cot\ A+cosec\ A)[1-cosec\ A+cot\ A]}{cot\ A+1+cosec\ A}\right]$

$=\left[\frac{(cot\ A+cosec\ A)[cot\ A+1-cosec\ A]}{cot\ A+1+cosec\ A}\right]$

$=cosec\ A\ +\ cot\ A.$

UNIT:-08

INTRODUCTION TO TRIGONOMETRY

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. sin A= $\frac{3}{4}$ then cosec A =.....

A). $\frac{5}{3}$ B). $\frac{4}{3}$ C). $\frac{5}{3}$ D). $-\frac{3}{4}$.

2. The value of cos 45^0 .....

A). 1 B). $\frac{\sqrt{3}}{2}$ C). $\frac{1}{\sqrt{2}}$ D). $\frac{2}{\sqrt{3}}$.

3.The value of $\frac{\sin 18^0}{\cos 72^0}$.....

A). 0 B). 1 C). 2 D). 3.

4. The value of Cosec31^0 – sec 59^0 is .....

A). 0 B). 1 C). 2 D). 3.

5. (sec A + tan A) (1 – sin A) =.....

A). sec A B). sin A C). cosec A D). cos A.

6. (1 + tan θ + sec θ) (1 + cot θ - cosec θ)=.....

A).0 B). 1 C). 2 D). – 1.

7. $\frac{(\sin^2 63° + \sin^2 27°)}{(\cos^2 17° + \cos^2 73°)}$ =.....

A).0 B). 1 C). 2 D). – 1.

8. If tan A = cot B, prove that A + B =.....

A). 0^0 B). 90^0 C). 60^0 D). 30^0

II. Solve the problems.

9. Prove that, secA(1- sinA)(secA + tanA) = 1.

10.Prove that, (1+cot $\theta - cosec\theta$)(1+$tan\theta + sec\theta$)=2.

11. Prove that, $(sinA + cosecA)^2 + (cosA + secA)^2 = 7 + \tan^2 A + \cot^2 A$.

12.Prove that, $\frac{1+tan\ 2\ A}{1+cot\ 2\ A} = \left(\frac{1-tan\ A}{1-cot\ A}\right)^2 = \tan^2 A$.

13. Prove that, (cosec A – sin A)(sec A – cos A) = $\frac{1}{(\tan A + \cot A)}$.

14.Prove that, $\frac{(sin\ \theta - 2sin^3\theta)}{(2cos^3\theta - cos\ \theta)} = \tan\theta$.

15. Prove that, (1 + tan θ + sec θ) (1 + cot θ - cosec θ)=2.

UNIT:-09

SOME APPLICATIONS OF TRIGONOMETRY

1. From a point on the ground 30m away from the foot of the tower, if the angle of elevation of the top of the tower is 45^0 then the height of the tower is……

A) 60m B) 45m C) 30m D) $30\sqrt{3}$m.

Ans:- C) 30m.

2. If a pole of height $4\sqrt{3}$ m from the ground casts a shadow of length 4m, then its angle of elevation towards the sun is……

A) 30^0 B) 45^0 C) 60^0 D) 90^0.

Ans:- C) 60^0 .

3. The angle of depression from point A are $\angle DAC = 30^0$, $\angle DAE = 45^0$ then the angle of elevation from point C is……

A) 15^0 B) 30^0 C) 45^0 D) 75^0.

Ans:- B) 30^0.

4. A 10m long rope is tied from a pole of height 5m to the ground. The angle of elevation made by the rope with the ground is…….

A) 15^0 B) 30^0 C) 45^0 D) 60^0.

Ans:- B) 30^0.

5.If the angle of elevation of the sun is 45^0 then the length of the shadow cast by a 15m tall building is…….

A) 25m B) 20m C) 15m D) 10m.

Ans:- C) 15m.

6. If the height of the pole and the shadow cast by it are in the ratio $\frac{1}{\sqrt{3}}$ then the angle of elevation formed is……

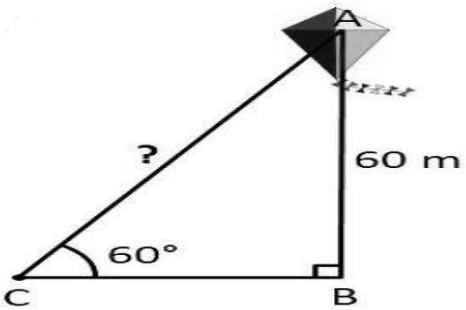
A) 0^0 B) 30^0 C) 60^0 D) 90^0.

Ans:- B) 30^0.

7. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.

Ans:- In right ΔABC

Let length of the string from the ground i.e. the value of AC



$\sin 60° = \frac{AB}{AC} \Rightarrow \frac{\sqrt{3}}{2} = \frac{60}{AC} \Rightarrow AC = \frac{60X\,2}{\sqrt{3}} = \frac{120}{\sqrt{3}} X \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{120\sqrt{3}}{3} = 40\sqrt{3}$

$\Rightarrow$ AC = $40\sqrt{3}$ m

Thus, the length of the string from the ground is $40\sqrt{3}$ m.

UNIT:-09

SOME APPLICATIONS OF TRIGONOMETRY

1. If the length of the shadow cast by a building is 20m and angle of elevation from the tip of the shadow to the top of the building is 60^0 then the height of the building is.....

A) 20m B) $20\sqrt{3}$m C) 25m D) $30\sqrt{3}$m.

Ans:- B) $20\sqrt{3}$m.

2. If a pole of height 2m casts a shadow of length $2\sqrt{3}$m, then the angle of elevation towards the tip of the pole from the tip of the shadow is.....

A) 30^0 B) 45^0 C) 60^0 D) 90^0.

Ans:- A) 30^0 .

3. If the height of a pillar is equal to the length of the shadow cast by it then the angle of elevation of the top of the pillar is.....

A) 15^0 B) 30^0 C) 45^0 D) 75^0.

Ans:- C) 45^0.

4. The angle of elevation formed by the shadow of a pole to the top of the pole is 300. If the height of the pole is 100m then the length of the shadow cast by it is.....

A) $100\sqrt{3}$m B) 100m C) $100(\sqrt{3}-1)$m D) $\frac{100}{\sqrt{3}}$m.

Ans:- D) $\frac{100}{\sqrt{3}}$m.

5. From the point 15m away from the foot of the pole of height 50m the angle of elevation to the top of the pole is.....

A) 0^0 B) 45^0 C) 60^0 D) 90^0.

Ans:- B) 45^0.

6. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

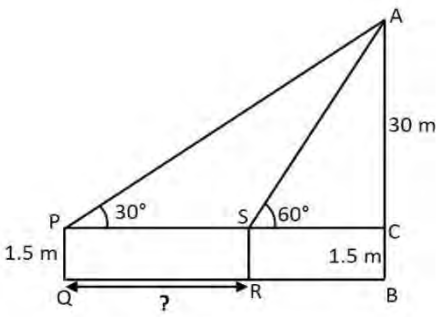
Ans:- The distance boy walked towards the building i.e. QR

From figure,QR= PS and RB=SC.

Height of the building = AB = 30 m.

AC = AB – BC = 30 – 1.5 = 28.5m

Here,PQ and CB are parallel lines,PQ=CB=1.5 m.



In right ΔAPC, tan 30° = $\frac{AC}{PC} \Rightarrow \frac{1}{\sqrt{3}} = \frac{28.5}{PC}$,PC=28.5 $\sqrt{3}$ m.

Again,In right ΔASC,tan 60° = $\frac{AC}{SC} \Rightarrow \sqrt{3} = \frac{28.5}{SC}$SC=$\frac{28.5}{\sqrt{3}}$m

Then, the length of PC =PS+SC

28.5 $\sqrt{3}$ m.=PS+$\frac{28.5}{\sqrt{3}}$m ⇒PS= 28.5 $\sqrt{3}$ m.- $\frac{28.5}{\sqrt{3}}$m ,PS=19$\sqrt{3}$ m.=QR.

Thus, the distance boy walked towards the building is 19$\sqrt{3}$ m.

UNIT:-09

SOME APPLICATIONS OF TRIGONOMETRY

1. A kite is flying at a height of 75m above the ground. If the inclination of the string of the kite with the ground is 600 then the length of the string is……

A) $50\sqrt{2}$m B) $50\sqrt{3}$m C) $\frac{100}{\sqrt{2}}$m D) $\frac{100}{\sqrt{3}}$m.

Ans:- B) $50\sqrt{3}$m.

2. If the angle of depression of a ship as observed from the top of a 75m high light house is 30^0 then the distance between the ship and the light house is…….

A) $25\sqrt{2}$m B) $75\sqrt{2}$m C) $25\sqrt{3}$m D) $75\sqrt{3}$m.

Ans:- D) $75\sqrt{3}$m.

3. A ladder placed along the wall makes an angle of 60^0 with the the ground. If the foot of the ladder is 8m away from the wall then the height of the wall is……

A) 4m B) 8m C) $8\sqrt{2}$m D) 16m.

Ans:- D) 16m.

4. The angle of depression of a car which is at a distance of $10\sqrt{3}$m from the foot of the building which is 10m tall is……

A) 30^0 B) 45^0 C) 60^0 D) 90^0.

Ans:- A) 30^0.

5. If the angle of depression of a boat from the top of a bridge of height 50m is 300, then the distance of the boat from the bridge is……

A) $50\sqrt{3}$m B) 50m C) $25\sqrt{3}$m D) 25m.

Ans:- A) $50\sqrt{3}$m.

6. A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower and the width of the canal.

Ans:- In right ΔACB,tan 60° = $\frac{AB}{BC} \Rightarrow \sqrt{3} = \frac{AB}{BC} \Rightarrow$ AB= $\sqrt{3}$ BC →(1)

Again,In right ΔADB,tan 30° = $\frac{AB}{BD} \Rightarrow \frac{BD}{\sqrt{3}}$ =AB→(2)

From (1) and (2).$\frac{BD}{\sqrt{3}}$ =AB = $\sqrt{3}$ BC ⇒BD=3BC.

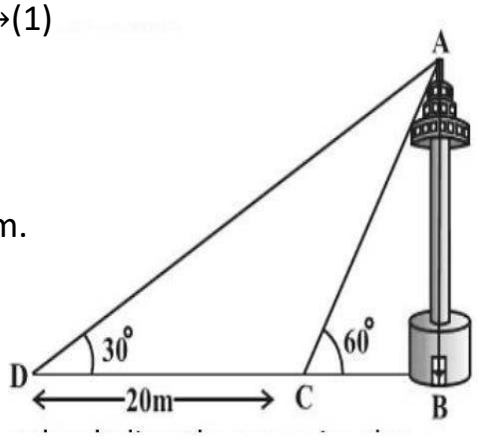
Then distance boy walked towards the building is $19\sqrt{3}$ m.

⇒BD=3BC. ⇒BC+CD=3BC.⇒3BC-BC=20⇒2BC=20

BC=$\frac{20}{2}$=10m.Hence,the width of the canal=10m.

From (1), AB= $\sqrt{3}$ BC ,AB= $\sqrt{3}$ x10 m,AB= $10\sqrt{3}$ m.

Hence,height of the tower =$10\sqrt{3}$ m.



UNIT:-09

SOME APPLICATIONS OF TRIGONOMETRY

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. If the altitude of the sun is 60°, the height of a tower which casts a shadow of length 90m is……

A). 60m B). 90m C). $60\sqrt{3}$m D). $90\sqrt{3}$m.

2. When the sun's altitude changes from 30° to 60°, the length of the shadow of a tower decreases by 70m. …….. is the height of the tower.

A). 35m B). 140m C).60.6m D). 20.2m

3. The upper part of a tree broken by the wind falls to the ground without being detached. The top of the broken part touches the ground at an angle of 30° at a point 8m from the foot of the tree. The original height of the tree is…….

A). 8m B). 24m C). $24\sqrt{3}$m D). $8\sqrt{3}$m.

4. The angle of elevation of the sun when the length of the shadow of the tree is $\sqrt{3}$ times the height of the tree is……..

A). 30° B). 90° C). 60° D). 45°.

5. A kite is flying at a height of 60m from the level ground, attached to a string inclined at 30° to the horizontal. The length of the string is……

A). 60m B). 120m C). $40\sqrt{3}$m D). $50\sqrt{3}$m

6. The angle of elevation from a point 30 meter from the base of tree as level ground to the top of the tree is 60°. The height of the tree is….

A). $60\sqrt{3}$m B). $30\sqrt{3}$m C). 30m D). $\frac{30}{\sqrt{3}}$m.

II. Solve the problems.

7. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

8. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30° . Find the distance travelled by the balloon during the interval.

UNIT:-10

STATISTICS

1. The mean of the data 1, 2, 3, 4, 5 is……

A) 15 B) 7.5 C) 3.5 D) 3.

Ans:- D) 3.

2. The median of the data 5,3,14,16,19 and 20 is……

A) 14 B)14.5 C) 15 D) 16.

Ans:- C) 15.

3. The midpoint of the class interval (20 – 25) is……

A) 18 B) 22.5 C) 22 D) 23.

Ans:- B) 22.5.

4. The empirical relationship between the three measures of central tendency is…….

A) 2 Median = Mode +3Mean B) 3Median = Mode + 2 Mean

C) Median = Mode + Mean D) Median = Mode – Mean

Ans:- B) 3Median = Mode + 2 Mean.

5. The mode of the following frequency distribution is……..

X	3	6	9	11	13
f	2	8	13	3	5

A) 5 B) 8 C) 3 D) 13

Ans:- D) 13.

6. The table below shows the daily expenditure on food of 25 households in a locality. Find the mean daily expenditure on food by a suitable method.

Daily expenditure (in ₹)	100-150	150-200	200-250	250-300	300-350
Number of House holds	4	5	12	2	2

Ans:- In this case, the value of mid-point (x_i) is very large, so let us assume the mean value,

a = 225

and class interval is h = 150-100=50.

Daily expenditure (in ₹)	No of house holds	Class mark	$u_i=\frac{x_i-225}{50}$	$f_i.u_i$
100-150	4	125	$\frac{-100}{50}=-2$	4x-2=-8
150-200	5	175	$\frac{-50}{50}=-1$	5x-1=-5
200-250	12	225	$\frac{0}{50}=0$	12x0=0
250-300	2	275	$\frac{50}{50}=1$	2x1=2
300-350	2	325	$\frac{100}{50}=2$	2x2=4
	Σf_i=25			$\Sigma f_i.\ u_i$=-7

Mean = $\bar{x} = a+h\frac{\sum f_i u_i}{\sum f_i}$

The formula to find the mean is:

Mean = $\bar{x} = a+h\frac{\sum f_i u_i}{\sum f_i}$

$=225+50x\frac{-7}{25}$

=225-14=211

Thus,Mean Daily expenditure on food is ₹ 211.

UNIT:-10

STATISTICS

1. The mean of the first five prime numbers is.....
A) 5.7 B) 5.6 C) 5.5 D) 5.
Ans:- B) 5.6 .

2. If for certain data the mean is 16 and median is 15 then the mode is equal to.....
A) 10 B)11 C) 12 D) 13.
Ans:- D) 13.

3. The value that repeats most often in given set of data is.....
A) Mean B) Median C) Mode D) More.
Ans:- C) Mode.

4. The Mean of 50 and 100 is.....
A) 75 B) 70 C) 50 D) 100.
Ans:- A) 75.

5. .....among the following is not a measure of central tendency.
A) Mean B) Median C) Mode D) More.
Ans:- D) More.

6. If the mean of the data 11, 8, 9, 12 and x is 10 then the value of 'x 'is.....
A) 8 B) 9 C) 10 D) 11.
Ans:- A) 75.

7. If the mode of 16, 15, 17, 16, 15, x,19, 17, 14, 8 is 15 then x =.....
A) 19 B) 15 C) 14 D) 8.
Ans:- B) 15.

8. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized it in the table given below. Find the mode of the data:

Number of Cars	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	7	14	13	12	20	11	15	8

Ans:- To find out the modal class, let us the consider the class interval with high frequency
Here, the greatest frequency = 20, so the modal class = 40 – 50,l = 40
class width (h) = 10
f_1 = 20,f_0 = 12 and f_2 = 11
The formula to find the mode =l + $\frac{(f1-f0)}{(2f1-f0-f2)}$ X h
=40 + $\frac{(20-12)}{(2X20-12-11)}$ X 10
= 40 + $\frac{8}{(40-23)}$ X 10=40+$\frac{80}{17}$=40+4.7=44.7
Thus,Modal number of cars are 44.7.

UNIT:-10

STATISTICS

1. The size of the class interval (10-15) is.....

A) 5 B) 6 C) 10 D) 15.

Ans:- A) 5.

2. The formula to calculate the mode is.....

A) $l + \frac{(f1 - f0)}{(2f1 + f0 - f2)} \times h$ B) $l + \frac{(f1 - f0)}{(2f1 - f0 - f2)} \times h$

C) $l + \frac{(f1 + f0)}{(2f1 - f0 - f2)} \times h$ D) $l + \frac{(f1 + f0)}{(2f1 - f0 + f2)} \times h$

Ans:- B) $l + \frac{(f1 - f0)}{(2f1 - f0 - f2)} \times h$.

3. The formula to calculate the median is.....

A) $l + \frac{(\frac{n}{2} + cf)}{f} \times h$ B) $l - \frac{(\frac{n}{2} - cf)}{f} \times h$

C) $l + \frac{(\frac{n}{2} - cf)}{f} \times h$ D) $l - \frac{(\frac{n}{2} - cf)}{f} \times h$

Ans:- C) $l + \frac{(\frac{n}{2} - cf)}{f} \times h$.

4. In the given frequency distribution table if mode lies in the class interval (30-40) then which of the..... is correct.

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	7	5	X	9	11

A) X<11 B) X>9 C) X<11 D) X>11.

Ans:- D) X>11.

5. In the following distribution table the class-interval which contains the mode is.....

Class interval	10-15	15-20	20-25	25-30	30-35
Frequency	2	5	10	9	7

A) 10-15 B) 15-20 C) 20-25 D) 25-30.

Ans:- C) 20-25.

6. The following table shows the ages of the patients admitted in a hospital during a year: Find the mode .

Age (in years)	5-15	15-15	25-35	35-45	45-55	55-65
Number of Patients	6	11	21	23	14	5

Ans:- To find out the modal class, let us the consider the class interval with high frequency

Here, the greatest frequency = 23, so the modal class = 35 – 45,l = 35,class width (h) = 10, $f_1 = 23, f_0 = 21$ and $f_2 = 14$

The formula to find the mode $= l + \frac{(f1 - f0)}{(2f1 - f0 - f2)} \times h$

$= 35 + \frac{(23 - 21)}{(2X23 - 21 - 14)} \times 10 = 35 + \frac{2}{(46 - 35)} \times 10 = 35 + \frac{2}{11} X10 = 35 + 1.8 = 36.8$

UNIT:-10

STATISTICS

1. The marks scored by a student in 6 subjects are 27, 30, 45, 60, 35 and x. If the mean of all scores is 42 then the value of x is…….

A) 40 B) 42 C) 55 D) 52.

Ans:- C) 55.

2. If $\Sigma f_i = 20$, $\Sigma f_i x_i = 140+5k$ and $\bar{X} = 9$,then value of k is……

A) 2 B) 4 C) 8 D) 6.

Ans:- C) 8.

3. The frequency(f_0) of class preceding the modal class for the given distribution is……

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	7	5	13	9	11

A) 7 B) 5 C) 13 D) 9.

Ans:- B) 5.

4.The frequency(f_2) of class preceding the modal class for the given distribution is……

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	7	5	13	9	11

A) 7 B) 5 C) 13 D) 9.

Ans:- D) 9.

5. In the following frequency distribution table the value of 'l' when calculating the mode is……..

Class interval	10-15	15-20	20-25	25-30	30-35
Frequency	2	5	10	9	7

A) 10 B) 15 C) 20 D) 25.

Ans:- C) 20.

6. The lengths of 40 leaves in a plant are measured correctly to the nearest millimeter, and the data obtained is represented as in the following table:Find the median length of the leaves.

Length (in mm)	Number of Leaves Frequency(f_i)	Length (in mm)	Number of Leaves Frequency(f_i)	Cumulative frequency
118-126	3	117.5-126.5	3	3
127-135	5	126.5-135.5	5	3+5=8
136-144	9	135.5-144.5	9	8+9=17
145-153	12	144.5-153.5	12	17+12=29
154-162	5	153.5-162.5	5	29+5=34
163-171	4	162.5-171.5	4	34+4=38
172-180	2	171.5-180.5	2	38+2=40
			Σf_i=40	

Ans:- Here,$\frac{n}{2} = \frac{40}{2}$=20,

Median class=144.5-153.5,Lower limit=l=144.5

Class interval=h=126.5-117.5=9,

Frequency of the Median Class=f=12

Cumulative frequency of the class before Median class=C_f=17

Median = $l + \frac{(\frac{n}{2} - cf)}{f} \times h = 144.5 + \frac{(20-17)}{12} \times 9$

$= 144.5 + \frac{3}{12} \times 9 = 144.5 + 2.25 = 146.75$

Therefore, the median length of the leaves is 146.75 mm.

UNIT:-10

STATISTICS

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. The mean value of scores 3,4,8,6,9,12 is……

A). 7 B). 8 C). 9 D). 42.

2. If the mean of 10,15,19,20 and m+1 is 20, then 'm' is……..

A). 30 B). 35 C).65 D). 100.

3. The median of scores 81,95,106,38,95,104 and 28 is……..

A). 106 B). 81 C). 104 D). 95.

4. The midpoint of interval (10-20) is……

A). 15 B). 14 C). 12 D). 10.

5. The wickets taken by a bowler in 10 cricket matches are as follows: 2,6,4,5,0,2,1,3,2,3 then the mode of the data is……..

A). 0 B). 1 C). 2 D). 3.

6. If the mean value of 'x',6,8,9 and 12 is 8, then the value of 'x' is…….

A). 4 B). 5 C). 16 D).10.

II. Solve the problems.

7. Calculate the median for the given data.

C.I.	1-4	4-7	7-10	10-13	13-16	16-19
f	6	30	40	16	4	4

8. The following table gives the age of 300 people in a village. Find the arithmetic mean of their ages.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of people	20	50	80	120	20	10

9. The following frequency distribution gives the monthly consumption of an electricity of 68 consumers in a locality. Find the median, mean and mode of the data and compare them:

Monthly Consumptions	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Number of Consumptions	4	5	13	20	14	8	4

UNIT:-11

SURFACE AREAS AND VOLUMES

1. If the perimeter of the base of the cylinder is 22cm and height is 5cm then its Curved Surface Areas is……..

A) 35π cm^2 B) 45π cm^2 C) 55π cm^2 D) 65π cm^2.

Ans:- A) 35π cm^2.

2. If the perimeter of the base of the cylinder is 88cm and the height is 10cm, then the volume of the cylinder is……

A) 1890π cm^3 B) 1960π cm^3 C) 1940π cm^3 D) 1920π cm^3.

Ans:- B) 1960π cm^3.

3. Total Surface Area of the water pipe whose radius is 'r' units and length is 'h' units……

A) $2\pi r(r+h)$ B) $2\pi rh$ C) $\pi r^2+2\pi rh$ D) $\pi r(r+h)$.

Ans:- B) $2\pi rh$.

4. Curved Surface Area of the cylinder whose radius is 7cm and height is 10 cm is……

A) 220 cm^2 B) 410 cm^2 C) 432 cm^2 D) 440 cm^2.

Ans:- D) 440 cm^2.

5. Total surface area of the hemisphere whose radius is 7cm is……

A) 412cm^2 B) 432cm^2 C) 462cm^2 D) 484cm^2.

Ans:- C) 462cm^2.

6. The volume of the cuboid whose dimensions are (5 x 6 x 3) is……

A) 180 cubic units B) 120 cubic units

C) 90 cubic units D) cubic units.

Ans:- C) 90 cubic units.

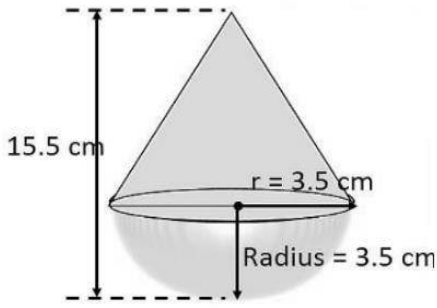
7. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Ans:- Given that the radius of the cone and the hemisphere (r)= 3.5 cm or $\frac{7}{2}$ cm

The total height of the toy is given as 15.5 cm.So, the height of the cone (h) = 15.5-3.5 = 12cm

Slant height of the Cone= l= $\sqrt{h^2+r^2}$

$= \sqrt{12^2+\left(\frac{7}{2}\right)^2} = \sqrt{144+\frac{49}{4}} = \sqrt{\frac{576+49}{4}} = \sqrt{\frac{625}{4}} = \frac{25}{2}$



∴ The curved surface area of cone = $\pi rl = (\frac{22}{7})\times(\frac{7}{2})\times(\frac{25}{2}) = \frac{275}{2}$ cm^2

Also, the curved surface area of the hemisphere = $2\pi r^2$

$= 2\times(\frac{22}{7})\times(\frac{7}{2})^2 = 2\times(\frac{22}{7})\times(\frac{7}{2})\times(\frac{7}{2}) = 77$ cm^2

Now, the Total surface area of the toy = CSA of cone + CSA of hemisphere

$= (\frac{275}{2})+77$ cm$^2 = (\frac{275+154}{2})$ cm$^2 = \frac{429}{2}$ cm^2 = 214.5cm^2

So, the total surface area (TSA) of the toy is 214.5cm^2.

UNIT:-11

SURFACE AREAS AND VOLUMES

1. Volume of a cylinder is 300 m^3. Volume of the cone whose radius and height is equal to that of the cylinder is……

A) 900 m^3 B) 600m^3 C) 150 m^3 D) 100 m^3.

Ans:- D) 100 m^3.

2. Surface Area of a sphere whose radius is 7cm is…….

A) 154 cm^2 B) 308 cm^2 C) 616 cm^2 D) 770 cm^2.

Ans:- C) 616 cm^2.

3. The formula to calculate the Curved Surface Area of the frustum of a cone is…….

A) $\pi(r_1^2 - r_2^2)l$ B)$\pi(r_1-r_2)l$ C) $\pi(r_1^2 + r_2^2)l$ D) $\pi(r_1+r_2)l$.

Ans:- D) $\pi(r_1+r_2)l$.

4. Formula to calculate the Total Surface Area of a right circular cylinder is…….

A) πr^2h B) $2\pi r(r+h)$ C) $\pi r(r+h)$ D) $2\pi r^2(r+h)$.

Ans:- B) $2\pi r(r+h)$.

5. Lateral Surface Area of a cube whose volume is 27 cm^3 is……

A) 36cm^2 B) 54cm^2 C) 63cm^2 D) 108cm^2.

Ans:- A) 36 cm^2.

6. Perimeter of a base of a cylinder is 24 cm, height is 8cm then the Curved Surface Areas will be……

A) 136cm^2 B) 160cm^2 C) 190cm^2 D) 192cm^2.

Ans:- D) 192cm^2.

7. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass.

Ans:- Given, the height of the big cylinder (H) = 220 cm, Radius of the base (R) = $\frac{24}{2}$ = 12 cm

So, the volume of the big cylinder = $\pi R^2H = \pi(12)^2 \times 220\ cm^3 = 99565.8\ cm^3$

Now, the height of smaller cylinder (h) = 60 cm

Radius of the base (r) = 8 cm

So, the volume of the smaller cylinder = πr^2h

$= \pi(8)^2 \times 60\ cm^3 = 12068.5\ cm^3$

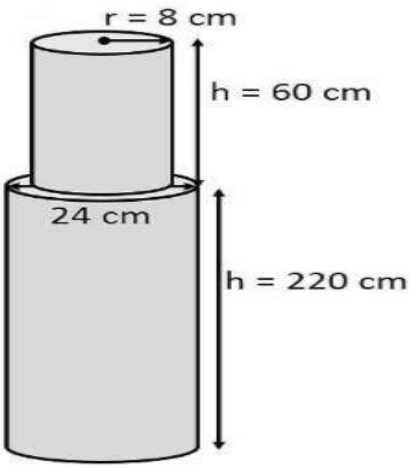
∴ Volume of iron = Volume of the big cylinder+ Volume of the small cylinder

$= 99565.8 + 12068.5 = 111634.5\ cm^3$

We know, Mass = Density x volume

So, mass of the pole = 8×111634.5

= 892.26 kg.



UNIT:-11

SURFACE AREAS AND VOLUMES

1. A cuboid of dimensions 12cm x 6cm x 3cm is melted to form a cube, then the edge of each face of the cube is……

A) 21 cm B) 12 cm C) 6 cm D) 3 cm.

Ans:- C) 6 cm.

2. Curved Surface Areas of a cone whose radius of the base is 7cm, and slant height 10 cm is ……..

A) 110 cm^2 B) 210 cm^2 C) 220 cm^2 D) 240 cm^2.

Ans:- C) 220 cm^2.

3. A solid cone is melted to from a cylinder whose radius is equal to that of the cone. If the height of the cylinder is 5 cm, then the height of the cone is……

A) 18 cm B)15 cm C) 12 cm D) 10 cm.

Ans:- B)15 cm.

4. The ratio of the volumes of two spheres is 64:27 respectively.The ratio of their radii is…….

A) 3:4 B) 4:3 C) 9:16 D) 16:9.

Ans:- B) 4:3 .

5. A Sphere of radius ‘r’ units is converted into a cone of height ‘r’ units. Radius of the cone is……

A) r units B) 2r units C) 3r units D) 4r units.

Ans:- B) 2r units.

6. A pencil sharpened at one edge is a combination of……..

A) Frustum of a cone and a cylinder B) Cone and cylinder

C) Cylinder and Hemisphere D) Cone and Hemisphere.

Ans:- B) Cone and cylinder.

7. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

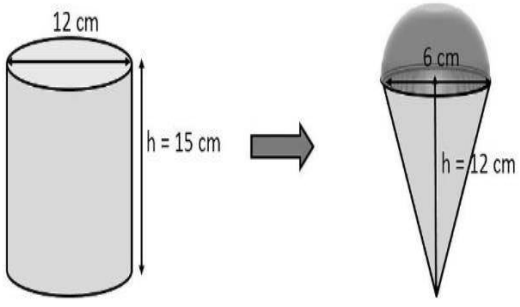
Ans:- Number of cones will be = $\frac{\text{Volume of cylinder}}{\text{Volume of ice cream cone}}$

For the cylinder part, Radius = $\frac{12}{2}$= 6 cm, Height = 15 cm

∴ Volume of cylinder = $\pi \times r^2 \times h = 540\pi$

For the ice cone part, Radius of conical part = $\frac{6}{2}$ = 3 cm

Height = 12 cm, Radius of hemispherical part = $\frac{6}{2}$ = 3 cm



Now, Volume of ice cream cone = Volume of conical part + Volume of hemispherical part

= $(\frac{1}{3})\times\pi\times r^2\times h+(\frac{2}{3})\times\pi\times r^3$= 36π +18π= 54π∴ Number of cones = $\frac{540\pi}{54\pi}$= 10.

UNIT:-11

SURFACE AREAS AND VOLUMES

1. If the ratio of the radii of 2 spheres is 4:5 then the ratio of their areas is.....

A) 4:5 B) 5:4 C) 16:25 D) 25:16.

Ans:- C) 16:25.

2. If the volume of two spheres is in the ratio 27:8 then the ratio of their radii is.....

A) 2:3 B) 3:2 C) 4:9 D) 9:4.

Ans:- B) 3:2.

3. Number of lead sheets each of radius 2 cm can made by melting a sphere of radius 4cm is..

A) 1 B)2 C) 4 D) 8.

Ans:- D) 8.

4. The base area of the cylinder is 80 sq.cm. If its height is 5cm, then its volume is.....cubic cm.

A). 200 B). 80 C). 100 D). 400.

Ans:- D). 400.

5. A bucket of height 12 cm, has a top and bottom diameter of 40 cm and 20 cm respectively. The cost of tin sheet used for making the bucket at the rate of Rs. 1.20 per dm^2 will be.....Rs.

A). 21.44 B). 45.50 C). 60.45 D). 20.67.

Ans:- A). 21.44.

6.If the volume of a cube is 343 cm^3, then its edge is.....

A). 9cm B). 8cm C). 49cm D). 7cm.

Ans:- D). 7cm.

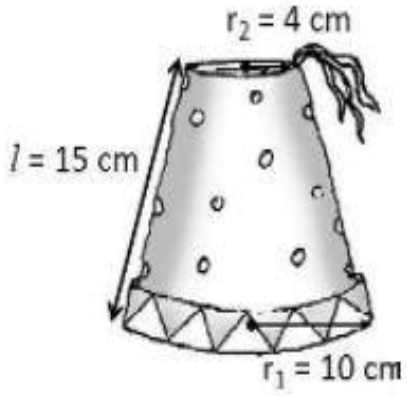
7. A fez, the cap used by the Turks, is shaped like the frustum of a cone (see Fig.). If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.

Ans:- Given,

For the lower circular end, radius (r_1) = 10 cm

For the upper circular end, radius (r_2) = 4 cm

Slant height (l) of frustum = 15 cm



Now,

The area of material to be used for making the fez = CSA of frustum + Area of upper circular end

CSA of frustum = $\pi(r_1+r_2)\times l = 210\pi$

And, Area of upper circular end = $\pi r_2^2 = 16\pi$

∴ The area of material used = $210\pi+16\pi$

$=\pi(210+16)=\frac{22}{7}(226)=\frac{4972}{7}=710.28\ cm^2$.

UNIT:-11

SURFACE AREAS AND VOLUMES

I. Choose the correct answer along with the serial for the following multiple-choice questions.

1. A cone made of modelling clay whose height is 24cm and radius of base 6 cm is reshaped into sphere, then the radius of sphere is……

A) 3 cm B)6cm C) 12cm D)24 cm.

2. A solid formed on revolving a right-angled triangle about its height is……..

A) Cuboid B) Cylinder

C) Sphere D) Right circular cone.

3. The length of each edge of a cube with its volume 1331 cm^3 is……

A) 12cm B) 11cm C) 15cm D) 13cm.

4. The surface area of a sphere of radius 7 cm is……

A) 154cm^2 B)308cm^2 C) 616cm^2 D) 770cm^2.

5. The curved surface area of a right circular cylinder is 440 cm^2 and its radius is 7cm, its height is…….

A) 3.5 cm B) 7cm C) 10cm D)14cm.

6. A cylinder and a cone are of same base , radius and of same height . The ratio of the volume of the cylinder to that of the cone is……

A) 2:1 B) 3:1 C) 2:3 D) 3:2.

II. Solve the problems.

7. A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass.

8. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.

9. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained is drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.