Subject : Maths

SEE - 2081 (2025)

→ Sudurpaschim province [RE-1031 'SP']

By C.P. Sunar

Answer Sheet

Q.N. 1 Ans.

Soln.

(a) Here,

Let, C be the cricket and B be the basketball liked students.

Then,

The cardinality of $n(\overline{B \cup C})$ is

$n(\overline{B \cup C}) = 20$.

(b) Here,

$n(U) = 120$

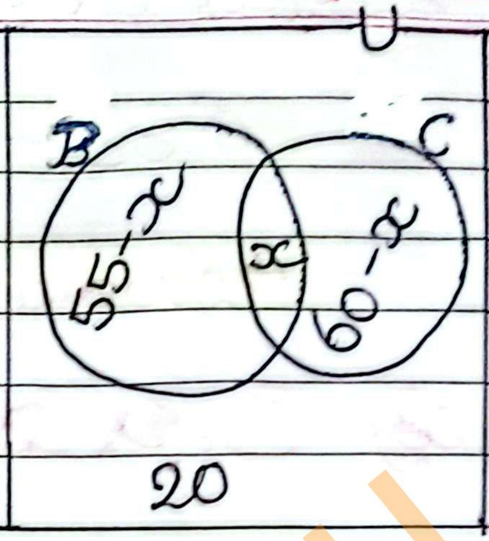
$n(B) = 55$

$n(C) = 60$

$n(\overline{B \cup C}) = 20$

$n(B \cap C) = ?$ (x let)

Showing it in a Venn diagram,



(c) From Venn diagram,

$$55 - x + x + 60 - x + 20 = 120$$

or, $135 - x = 120$

or, $x = 135 - 120$

$\therefore x = 15$

So, $n(B \cap C) = 15$

Now,

The no. of students who liked cricket game only is

$n_o(C) = 60 - x$

$= 60 - 15$

$= 45$

(d) Here,

The no. of students who liked basketball game only is

$n_o(B) = 55 - x$
$= 55 - 15$
$= 40$

Now,
The no. of students who liked cricket is more than who liked basketball by
$= 45 - 40$
$= 5$

Q.N.2 Ans
Soln.
(a) Aatmik has to use quarterly compound interest to get more interest

(b) Here,
principal (P) = Rs. 4,00,000
Time (T) = 2 years
Rate of interest (R) = 10%
Semi-annual compound interest (SCI) = ?
We know that,

$$SCI = P\left[\left(1+\frac{R}{200}\right)^{2T} - 1\right]$$

$$= 400000\left[\left(1+\frac{10}{200}\right)^{2\times2} - 1\right]$$

$$= 400000\left[(1.05)^4 - 1\right]$$

$$= 400000 \times 0.2155$$

$$= Rs.\ 86200$$

Thus,
He receives Rs. 86200 compound interest at the end of 2 years.

(c) Here,
$P = Rs.\ 400000$
$T = 1$ year
$R = 10\%$ p.a.

Now,
The quarterly compound interest is

$$= P\left[\left(1+\frac{R}{400}\right)^{4T}-1\right]$$

$$= 400000\left[\left(1+\frac{10}{400}\right)^{4\times1}-1\right]$$

$$= 400000\left[(1.025)^{4}-1\right]$$

$$= 400000 \times 0.1038$$

$$= Rs\,41520$$

So, semi annual compound interest in 2 years is not double than quarterly compound interest in one year.

Q.N. 3 Ans

Soln.

(a) Here,

Initial price V_0, Rate of depreciation R and the time T, then,

The price of a machine after T years,

$$V_T = V_0\left(1-\frac{R}{100}\right)^{T}$$

(b) Here,
Initial price(V_0) = Rs. 80000
Rate of depreciation (R) = 20 %
Time (T) = 2 years
price after 2 years (V_2) = ?
We know,

$$V_T = V_0\left(1 - \frac{R}{100}\right)^T$$

$$V_2 = 80000\left(1 - \frac{20}{100}\right)^2$$

$$= 80000 \times (0.8)^2$$

$$= Rs. 51200$$

Now,
Cost price (CP) = Rs. 80000
selling price (SP) = Rs. (51200 + 30000)
= Rs. 81200

Then,
profit = SP − CP
= Rs. (81,200 − 80,000)
= Rs. 1200

Thus,
Rs. 1200 is the total profit by selling the machine.

(c) Here,
The price of the machine after 3 years,

$$V_3 = 80000\left(1 - \frac{20}{100}\right)^3$$

$$= 80000 \times (0.8)^3$$

$$= Rs.\ 40960$$

Now,
The selling price of a machine is less than the purchased price by

$$= Rs.\ (80000 - 40960)$$

$$= Rs.\ 39040 \text{ Ans}$$

Q.N. 4 Ans,
Soln.

(a) Here,
1 Aus. dollar = NRs. 86.06

or, NRs. 1 $= \frac{1}{86.06}$ Aus. dollar

$\therefore$ NRS. 1,29,090 $= \frac{1}{86.06} \times 129090$

$= 1500$ Aus. dollar

Thus,
the businessman exchange 1500 Australian dollars.

(b) After revaluation,
1 Aus. dollar $=$ RS. 86.06 $-$ 2% of RS. 86.06

$=$ RS. 86.06 $- \frac{2}{100} \times 86.06$

$=$ RS. 86.06 $-$ RS. 1.7212

$=$ RS. 84.3388

Now,
1500 Aus. dollars $=$ RS. 84.3388 $\times$ 1500
$=$ RS. 126508.2

Thus,
The businessman receive NRS. 126508.2 when he exchanged Australian dollar after revaluation in Nepali currency.

(c) Here,
The businessman made loss in this transaction. Then,

$$\text{Loss\%} = \frac{129090 - 126508.2}{129090} \times 100\%$$

$$= \frac{2581.8}{129090} \times 100\%$$

$$= 0.02 \times 100\%$$

$$= 2\%$$

Q.N. 5 Ans

Soln.

(a) The formula to find the volume of the pyramid is

$$= \frac{1}{3} a^2 h$$

Where, a = length of a base
h = Vertical height

(b) Here,
Length of base (a) = 20cm
Vertical height (h) = 24cm
Slant height (l) = ?
Now,
We have the relation

$$l^2 = h^2 + \left(\frac{a}{2}\right)^2$$

or, $l^2 = 24^2 + \left(\frac{20}{2}\right)^2$

or, $l^2 = 576 + 100$

or, $l = \sqrt{676}$

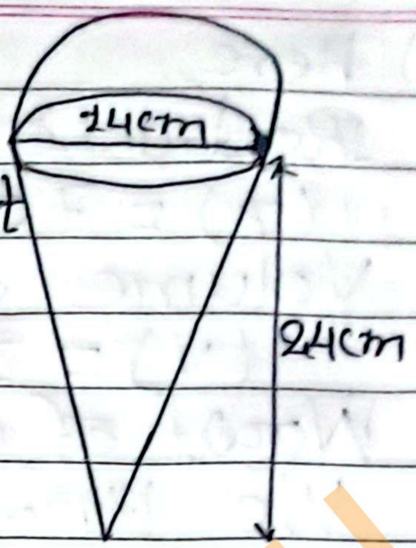
$\therefore l = 26cm$

Again,
The total surface area of the square based pyramid is

$TSA = 2al + a^2$
$= 2 \times 20 \times 26 + 20^2$
$= 1040 + 400$
$= 1440 cm^2$

Q.N. 6 Ans

Soln.



(a) If the vertical height h, radius r then,
The slant height is

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

(b) Here,
Radius of base $(r) = \frac{\text{diameter}}{2}$

$= \frac{14}{2}$

$= 7\text{cm}$

Vertical height of cone $(h) = 24\text{cm}$

Now,
The volume of the solid object

$$(V) = \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$$

$$= \frac{1}{3} \times \frac{22}{7} \times 7^2 \times 24 + \frac{2}{3} \times \frac{22}{7} \times 7^3$$

$$= 1232 + 718.67$$

$$= 1950.67\ \text{cm}^3$$

(C) Here,

Radius of cylindrical object (r) = 7 cm

Volume of cylindrical object (V) = 1950.67 cm^3

Height of cylinder (h) = ?

We know that

$V = \pi r^2 h$

or, $1950.67 = \frac{22}{7} \times 7 \times 7 \times h$

or, $h = \frac{1950.67}{154}$

$\therefore h = 12.67 cm$

Thus, the height of cylinder is 12.67 cm.

Q. N. 7 Ans

Soln.

(a) Here,

The volume of square based room

$(V) = 75\,m^3$

Height $(h) = 3\,m$

The area of (a door + 2 windows)

$= 6\,m^2$

We have,

$V = 75\,m^3$

or, $l^2 \times h = 75$ $[\because V = l \times b \times h]$

or, $l^2 = \frac{75}{3}$

or, $l = \sqrt{25}$

$\therefore l = 5\,m$

Now,

The area of 4 walls without door and windows is

$A = 2h(l+b) - (\text{Area of door + windows})$

$= 2 \times 3(5+5) - 6$ $[\because l = b]$

$= 60 - 6$

$= 54\,m^2$

The cost of plastering the four walls without door and windows at the rate of Rs. 200 per m^2 is

= Rs. 200 × 54

= Rs. 10,800 Ans

(b) Here,

The rate of plastering after increment is

= Rs. 200 + $\frac{1}{4}$ of Rs. 200

= Rs. 200 + Rs. 50

= Rs. 250

Now,

The cost of plastering after increment is

= Rs. 250 × 54

= Rs. 13500

∴ Increment in total cost

= Rs. 13500 − Rs. 10800

= Rs. 2700.

(c) Here,
Breadth of carpet (b_1) = 2m
Length of carpet (l_1) = ?
We have,
The area of floor of room

$$(A) = l \times b$$
$$= 5 \times 5$$
$$= 25 m^2$$

Now,

$$A = l_1 \times b_1$$
$$\text{or, } 25 = l_1 \times 2$$
$$\text{or, } l_1 = \frac{25}{2}$$
$$\therefore l_1 = 12.5 m$$

Thus,
12.5 m of carpet should be purchased from the market.

Q.N. 8 Ans

Soln.

(a) Here,

The amount collected on 2nd Baisakh = Rs. 20

The amount collected on 4th Baisakh = Rs. 80

Now,

$$\text{Mean} = \frac{20+80}{2}$$

$$= 50$$

Thus, 50 is the mean value of amount collected on 2nd Baisakh and 4th Baisakh.

(b) Here,

First term (a) = Rs. 10

No. of terms (n) = 10

$$\text{Common ratio } (r) = \frac{20}{10}$$

$$= 2$$

Where, $r > 1$,

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

So,

$$S_{10} = \frac{10(2^{10}-1)}{2-1}$$

$$= \frac{10(1024-1)}{1}$$

$$= 10 \times 1023$$

$$= \text{Rs. } 10230$$

Thus,
Rs. 10230 will be collected by 10^{th} days.

(c) Here,
$a = 10$
$r = 2$
$S_n = 163830$
$n = ?$

We have,

$$S_n = \frac{a(r^n - 1)}{r-1}$$

or, $163830 = \dfrac{10(2^n - 1)}{2-1}$

or, $2^n - 1 = \dfrac{163830}{10}$

or, $2^n = 16383 + 1$

or, $2^n = 16384$

or, $2^n = 2^{14}$

$\therefore n = 14$

Thus,
Up to 14 days of Baisakh can Rs. 163830 be collected.

Q.N.9 Ans,
⇒ Soln,
(a) The standard form of quadratic equation is
$ax^2 + bx + c$, where $a \neq 0$

(b) Here,
Length $(l) = 2x$
breadth $(b) = x$ (Let)
Area of rectangular field $(A) = 200m^2$

$A = l \times b$

or, $200 = 2x \times x$

or, $2x^2 = 200$

or, $x^2 = 100$

or, $x = \sqrt{100}$

$\therefore x = 10\text{ m}$

Now,

Length $= 2x = 2 \times 10 = 20\text{m}$

Breadth $= x = 10\text{m}$

Thus,

the length and breadth of a rectangular field are 20m and 10m respectively.

(C) Here,

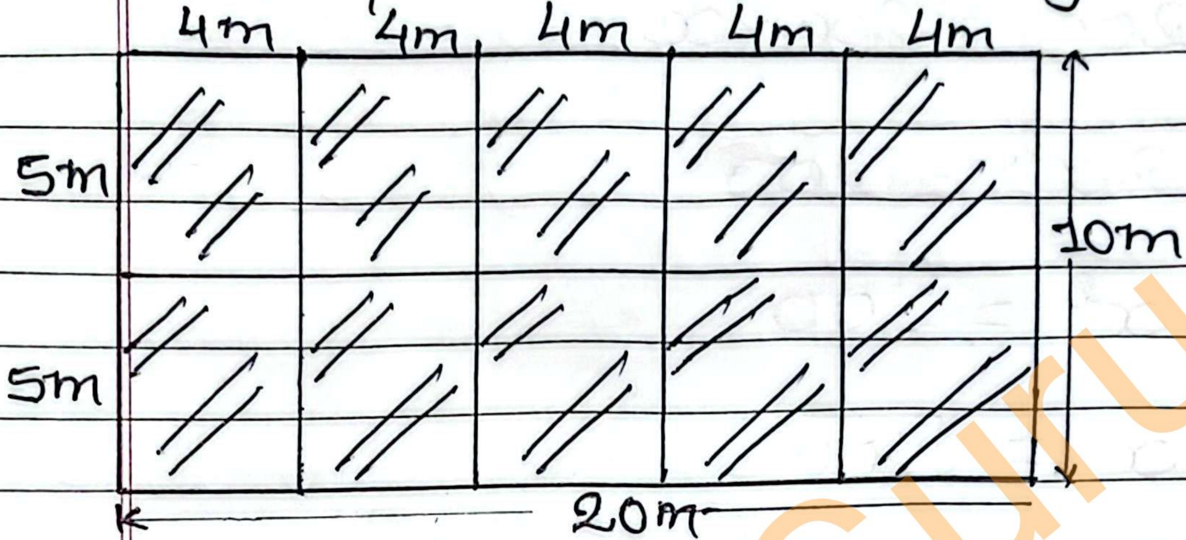
The maximum no. of pieces

$$= \frac{200}{5 \times 4}$$

$$= \frac{200}{20}$$

$$= 10$$

Now,
Represent it in figure,



Q.N. 10 Ans
Soln.
(a) Here,

$$\frac{1}{x-y}-\frac{1}{x+y}$$

$$=\frac{x+y-x+y}{(x-y)(x+y)}$$

$$=\frac{2y}{x^2-y^2}$$ Ans

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

(b) Soln,

Here,

$$x^2 = 3^{2/3} + 3^{-2/3} - 2$$

or, $$x^2 = (3^{1/3})^2 - 2 \times 3^{1/3} \times 3^{-1/3} + (3^{-1/3})^2$$

or, $$x^2 = (3^{1/3} - 3^{-1/3})^2$$

$$\therefore x = 3^{1/3} - 3^{-1/3}$$

Now,

$$x^3 = (3^{1/3} - 3^{-1/3})^3$$

or, $$x^3 = (3^{1/3})^3 - (3^{-1/3})^3 - 3 \times 3^{1/3} \times 3^{-1/3} \times (3^{1/3} - 3^{-1/3})$$

or, $$x^3 = 3^1 - 3^{-1} - 3 \times 3^0 \times (3^{1/3} - 3^{-1/3})$$

or, $$x^3 = 3 - \frac{1}{3} - 3x$$

or, $$x^3 = \frac{9 - 1 - 9x}{3}$$

or, $$\boxed{3x^3 + 9x = 8}$$

proved

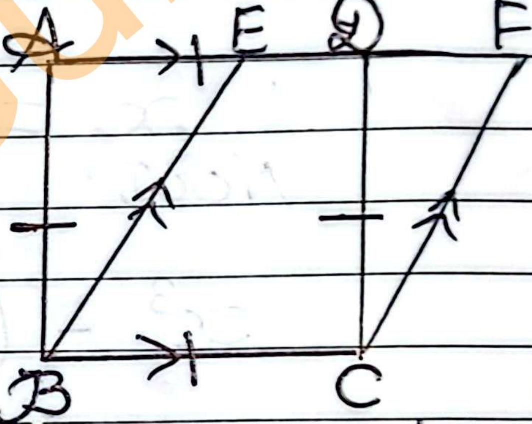
Q.N. 11 Ans,

Soln:

(a) The relation between the areas of parallelograms standing on the same base and between same parallel lines are equal to each other.

(b) Here,

Given:- ABCD is a square and EBCF is a parallelogram. Where, BE // CF and AF // BC.



To be proved:- Area of parallelogram EBCF = Area of square ABCD

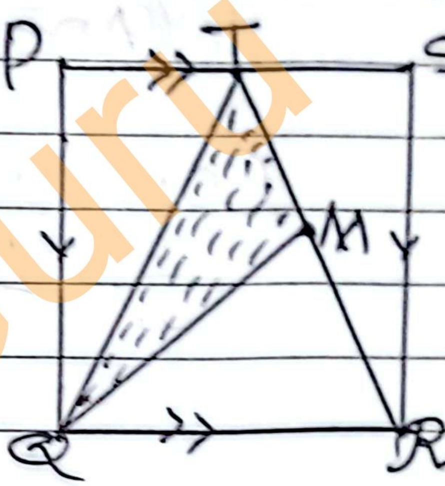
Proof:

Statements	Reasons
1. Area of ▱EBCF = BC×CD	1. Area of parallelogram = base×height
2. Area of square ABCD = BC×CD	2. Area of a square = length×breadth
3. Area of ▱EBCF = Area of square ABCD	3. From (1) and (2)

Conclusion: Hence, the area of parallelogram EBCF is equal to the area of square ABCD.

proved

(c) Soln.



Here,

Given: PQRS is a parallelogram and M is the mid point of TR.

To be proved: $\Delta TQM = \frac{1}{2}(\Delta PQT + \Delta SRT)$

proof:

Statements	Reasons
1. $\Delta TQR = \frac{1}{2} \square PQRS$ & $(\Delta PQT + \Delta SRT) = \frac{1}{2}$ of $\square PQRS$	1. Triangle TQR is made up of ΔPQT and ΔSRT.
2. $\Delta TQR = \Delta PQT + \Delta SRT$	2. From statement (1)

3. $\Delta TQM = \frac{1}{2}$ of ΔTQR	3. Midpoint M divides ΔTQR in two equal parts.
4. $\Delta TQM = \frac{1}{2}(\Delta PQT + \Delta SRT)$	4. From (2) and (3)

Conclusion: Hence, $\Delta TQM = \frac{1}{2}(\Delta PQT + \Delta SRT)$.

Proved

Q.N. 12 Ans

Solⁿ

(a) Here,

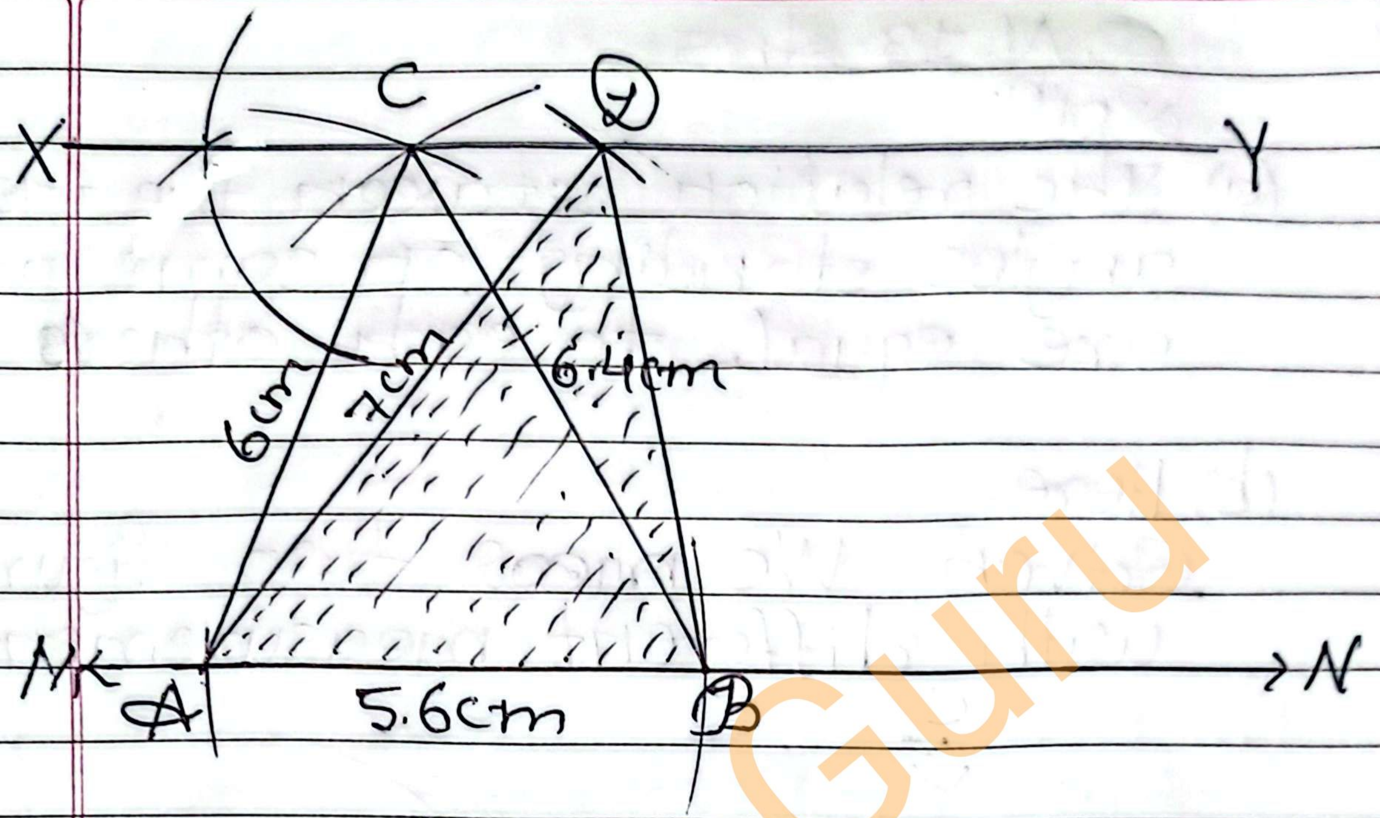
Given,

$BC = 6.4$ cm

$AB = 5.6$ cm

$AC = 6$ cm

Construction



We construct ΔDAB having 7cm one side equal to the area of ΔABC.

(b) The area of ΔABC and ΔDAB are equal because they are on the same base and between same parallel lines.

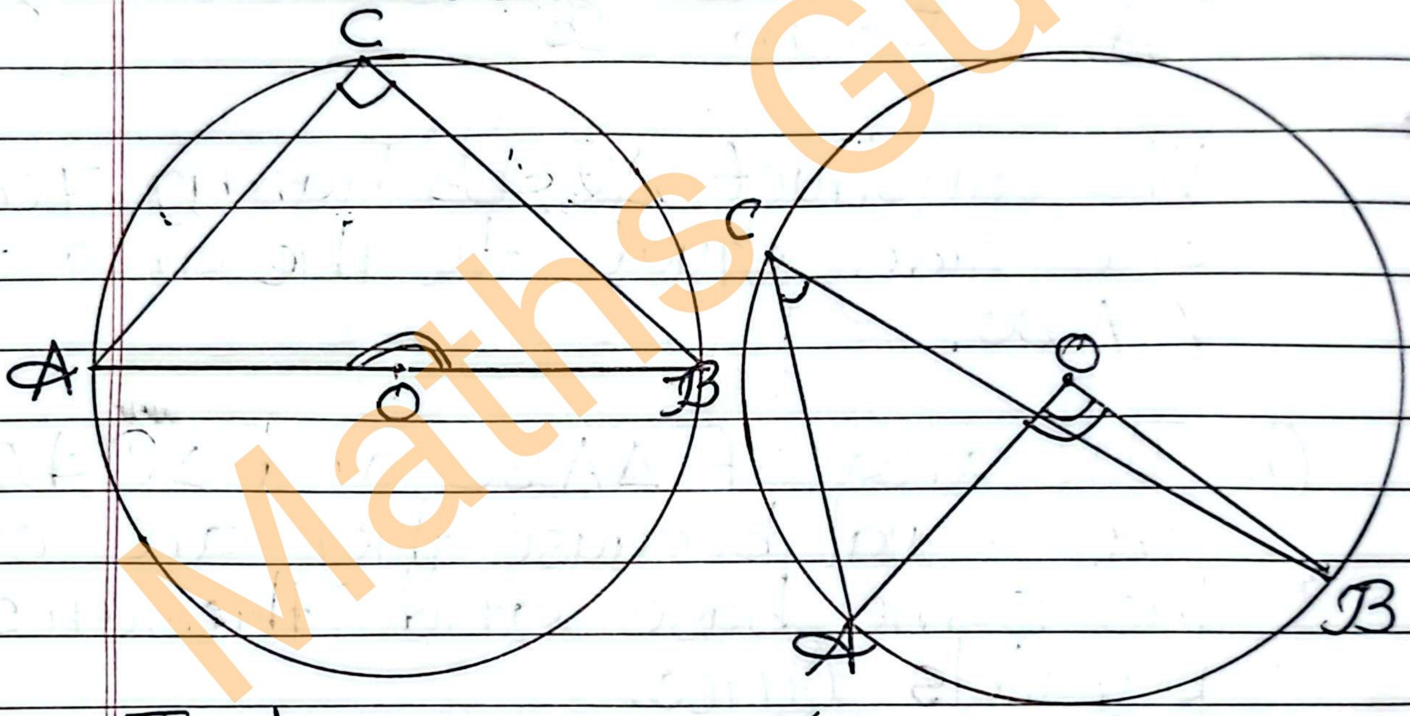
Q. N. 13 Ans

Soln.

(a) The relation between the inscribed angles standing on same arc are equal to each other.

(b) Here,

Given: We draw two figures with different measurement.



To be prove:- $\angle AOB = 2\angle ACB$

Observation Table

Fig.	$\angle AOB$	$\angle ACB$	Result
(a)	$180°$	$90°$	$\angle AOB = 2\angle ACB$
(b)	$90°$	$45°$	$\angle AOB = 2\angle ACB$

Conclusion: Hence, the central angle AOB is double of the inscribed angle ACB.

proved

(c) Here,

Central angle $= 5x^\circ$

Inscribed angle $= (2x+10)^\circ$

Now,

Central angle $= 2 \times$ Inscribed angle

or, $5x^\circ = 2(2x+10)^\circ$

or, $5x^\circ = 4x^\circ + 20^\circ$

or, $5x^\circ - 4x^\circ = 20^\circ$

$\therefore x^\circ = 20^\circ$

Thus,

the value of x is 20° Ans

Q. N. 14 Ans

Soln.

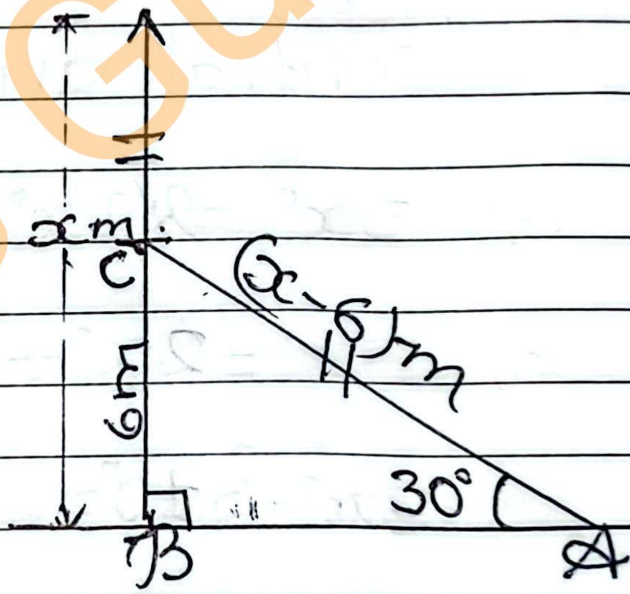
(a) Angle of elevation

The angle of elevation is the angle between the horizontal line of sight and the line of sight up to an object.

(b) Here,

The broken part of the tree is

$= (x-6)m$



(c) Here,

$AC = (x-6)m$

$BC = 6m$

Now,

$\sin 30^\circ = \frac{BC}{AC}$

or, $\frac{1}{2} = \frac{6}{x-6}$

or, $x-6 = 12$

or, $x = 12+6$

$\therefore x = 18m$

Thus, the height of tree before broken $= 18m$.

(d) Here, let y be the height of tree should be broken.

Then,
$\sin 45° = \frac{y}{18-y}$

or, $\frac{1}{\sqrt{2}} = \frac{y}{18-y}$

or, $\sqrt{2}y = 18-y$

or, $\sqrt{2}y + y = 18$

or, $2.4142y = 18$

or, $y = \frac{18}{2.4142}$

$\therefore y = 7.46m$

Thus, from the height of 7.46m of tree should be broken.

Q.N. 15 Ans.

Soln:

(a) Here,

First quartile (Q_1) = 35

Then,

The class where the first quartile lies = (20-40).

(b) Here,

P.T.O

C.I.	f	cf
0-20	2	2
20-40	x	$2+x$
40-60	8	$10+x$
60-80	5	$15+x$
80-100	1	$16+x$
	$N=16+x$	

Given, $Q_1 = 35$

Q_1 class $= (20-40)$

Now,

$l = 20$

$f = x$

$cf = 2$

$h = 20$

We know that,

$$Q_1 = l + \frac{\frac{N}{4} - cf}{f} \times h$$

or, $$35 = 20 + \frac{\frac{16+x}{4} - 2}{x} \times 20$$

or, $$35 - 20 = \frac{(16+x-8)}{\cancel{4}x} \times \cancel{20}^{5}$$

or, $15 = \frac{(8+x)}{x} \times 5$

or, $15x = 40 + 5x$

or, $15x - 5x = 40$

or, $10x = 40$

$\therefore x = 4$

Thus,
the value of x is 4.

(c) Here,
The highest frequency is 8,
so its corresponding class is (40-60).
Now,
$l = 40$
$f_1 = 8$
$f_0 = 4$
$f_2 = 5$
$h = 20$
We know that

$$\text{Mode}(M_o) = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$$

$$= 40 + \frac{8-4}{2 \times 8 - 4 - 5} \times 20$$

$$= 40 + \frac{4}{7} \times 20$$

$$= 40 + 11.429$$

$$= 51.429 \text{ Ans}$$

(d) Here,
No. of students who are above the Q_1 class $= 8+5+1$
$= 14$
No. of students who are below the Q_1 class $= 2$
Now,
The required ratio is
$= 14 : 2$

$= 7 : 1$ Ans

Q. N. 16 Ans

Soln:

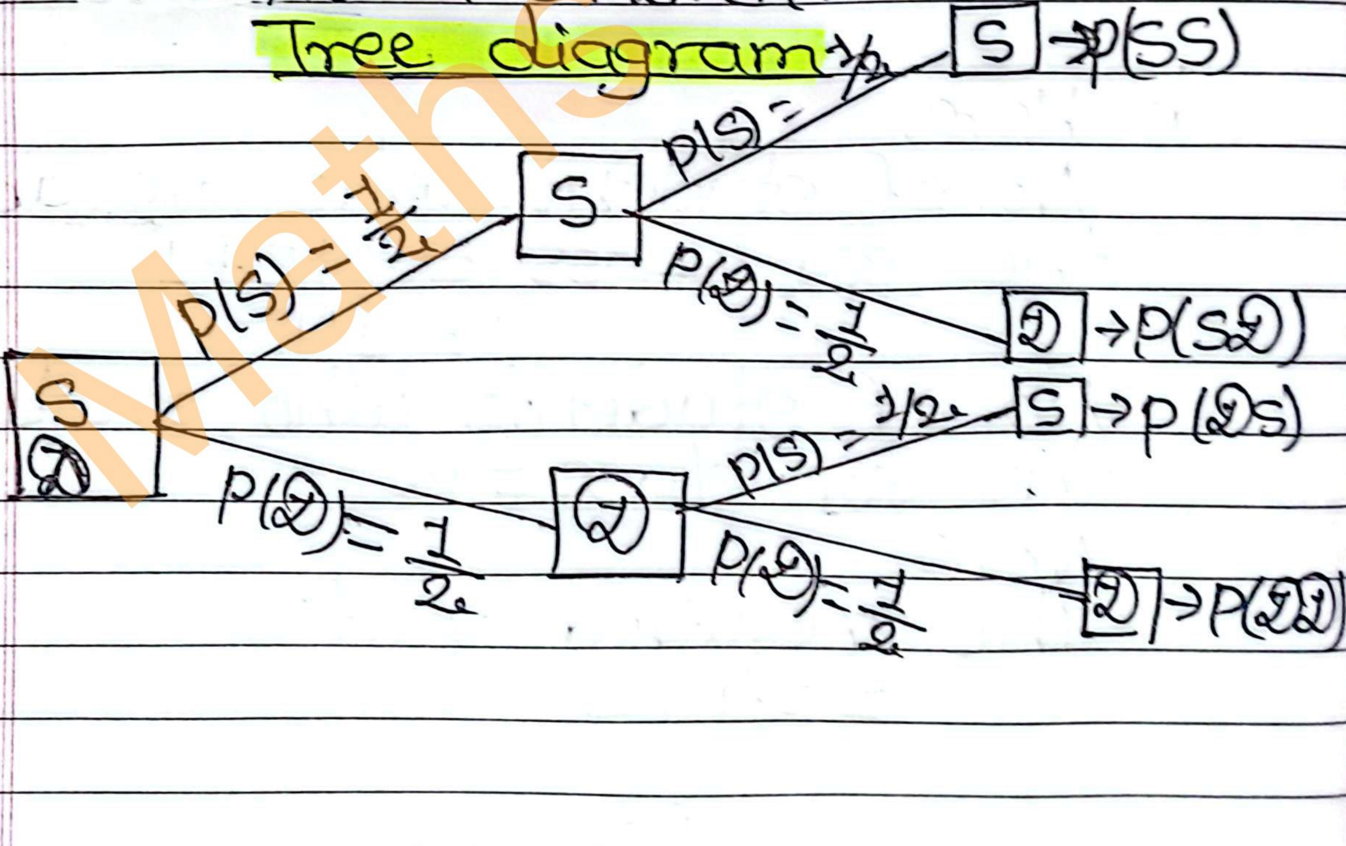
(a) The independent events are events where the outcome of one event does not influence or affect the probability of occurrence of the other event.

(b) Here,

Let S be the son and D be the daughter.

Total No. of children = 2

Tree diagram



(c) Here,
The probability of having both daughter is

$$p(DD) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

(d) Here,
The probability of having both son is

$$p(SS) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{2}$$

The maximum probability is $= 1$

Now,
The probability of getting both children son is less than the maximum probability by

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

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

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

Thank You!!!