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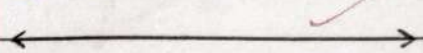
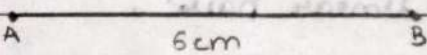
LINES - and - ANGLES

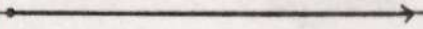
Line - A straight path that extends infinitely in both directions.



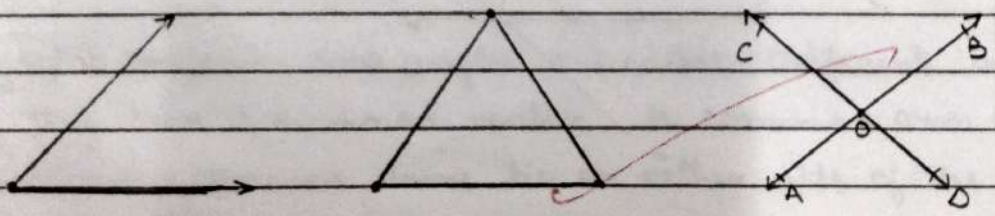
Line Segment - A line segment is a portion of a line. Hence, it has two end points and finite length.



Ray - A ray is a part of a line that extends only in one direction. It has one end point and has no definite length.

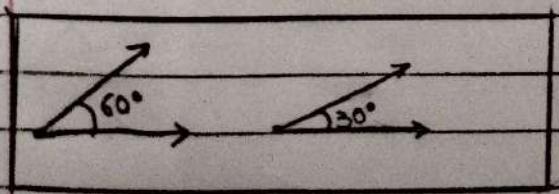


Angles - When two lines or line segments meet (intersect), an angle is formed. The common point is called vertex.



RELATED ANGLES

Complementery Angle - Two angles which add upto 90°



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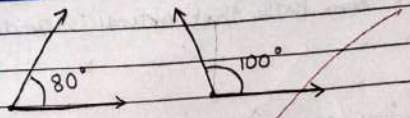
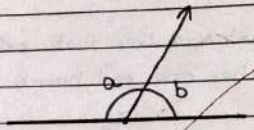
Supplementery Angles: Two angles which adds upto 180°

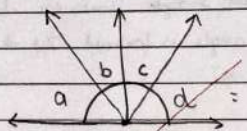


Linear Pair - Two adjacent angles when add upto 180° is called a ~~similar~~ linear pair.



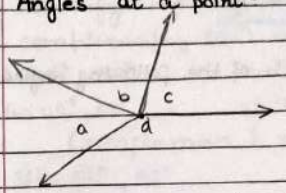
$a+b = 180°$
[Linear equation]

Angle on one side of a straight line -

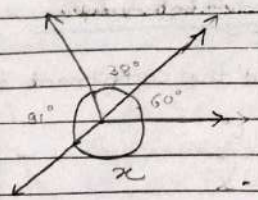


$a+b+c+d = 180°$

Angles at a point -



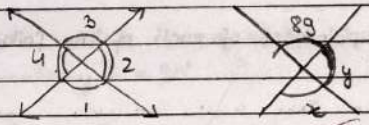
$a+b+c+d = 360°$



$x = 360° - (60° + 38° + 91°)$

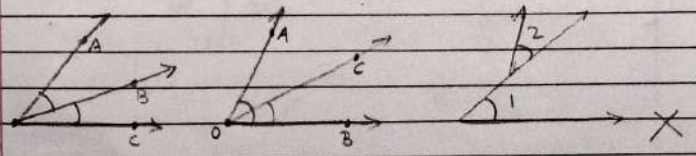
$x = 171°$

Vertically Opposite Angles -



$\angle 1$ and $\angle 3$
$\angle 2$ and $\angle 4$
are vertically opposite

Adjacent Angles - Two angles are called adjacent angles if they have a common vertex, a common arm and their non-common arms lie on either side of the common arm.



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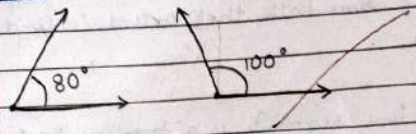
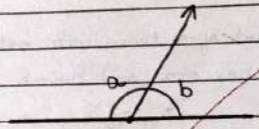
Supplementery Angles- Two angles which adds upto 180°

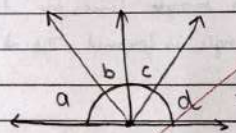


Linear Pair - Two adjacent angles when add upto 180° is called a ~~linear~~ linear pair.



a+b = 180°
[Linear equation]

Angle on one side of a straight line -



= a+b+c+d = 180°

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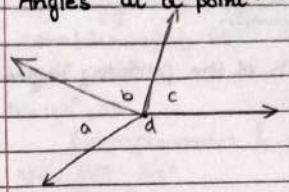
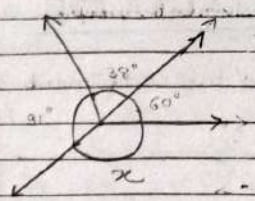
Angles at a point -

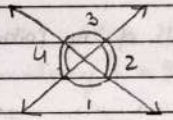


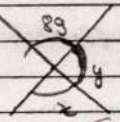
a+b+c+d = 360°



x = 360° - (60° + 38° + 91°)
x = 171°

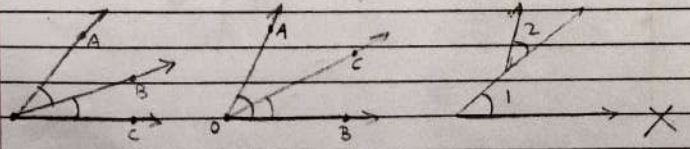
Vertically Opposite Angles -





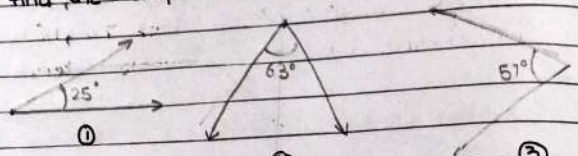
∠1 and ∠3
∠2 and ∠4
are vertically opposite

Adjacent Angles - Two angles are called adjacent angles if they have a common vertex, a common arm and their non-common arms lie on either side of the common arm.



Exercise 8.1

* Find the compliment of each of the following angles:



① 25°

② 63°

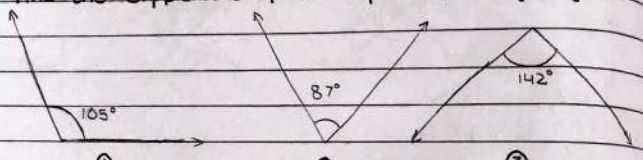
③ 57°

Ans-① ∴ 90° - 25°
= 65°

② ∴ 90° - 63°
= 27°

③ ∴ 90° - 57°
= 33°

* Find the supplement of each of the following angles:



① 105°

② 87°

③ 142°

Ans-① ∴ 180° - 105°
⇒ 75°

② ∴ 180° - 87°
= 93°

③ ∴ 180° - 142
= 38°

* Identify which of the following pairs of angles are complementary (90°) and which are supplementary (180°).

i> 55°, 125° ii> 34°, 56° iii> 137°, 43°
iv> 112°, 68° v> 45° 45° vi> 72°, 18°

Ans →

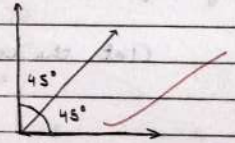
Complementary	Supplementary
ii> 34°, 56°	i> 55°, 125°
v> 45°, 45°	iii> 137°, 43°
vi> 72°, 18°	iv> 112°, 68°

* i> Find the ∠ which is equal to its complement.

Ans → Complementary ∠ = 90°

A.T.Q

$\frac{90}{2} = 45°$

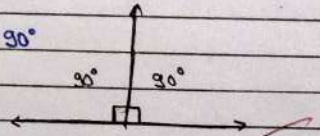


ii> Find the ∠ which is equal to its supplement.

Ans → Supplementary ∠ = 180°

A.T.Q

$\frac{180}{2} = 90°$



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* Two complementary angles are $(x+4)^\circ$ and $(2x-7)^\circ$, find the value of x.

Ans- 1st $\angle = (x+4)^\circ$

2nd $\angle = (2x-7)^\circ$

A.T.Q

$(x+4)^\circ + (2x-7)^\circ = 90^\circ$

$3x^\circ - 3^\circ = 90^\circ$

$3x^\circ = 90^\circ + 3^\circ$

$x^\circ = \frac{93^\circ}{3}$

$x^\circ = 31^\circ$

$\therefore \boxed{x = 31}$

* Two supplementary angles are in a ratio of 2:7, find the angles.

Ans. 1st $\angle = 2x$ (Let the common ratio be x.)

2nd $\angle = 7x$

A.T.Q

$2x + 7x = 180^\circ$

$9x = 180^\circ$

$x = \frac{180^\circ}{9}$

$\boxed{x = 20^\circ}$

$\therefore$ 1st $\angle = 2x$

$= 2 \times 20$

$= 40^\circ$

2nd $\angle = 7x$

$= 7 \times 20$

$= 140^\circ$

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* ~~Among two supplementary a~~

* If the difference in the measures of two complementary angles is 12°, find the measure of the $\angle$.

→ Let one of the $\angle$ s be x.

then the 2nd $\angle = (x+12)^\circ$

A.T.Q

$x + (x+12) = 90^\circ$

$2x + 12^\circ = 90^\circ$

$2x = 90^\circ - 12^\circ$

$x = \frac{78^\circ}{2}$

$x = 39^\circ$

$\therefore$ 1st $\angle = 39^\circ$

2nd $\angle = x + 12$

$= 39 + 12$

$= 51^\circ$

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* If one ∠ is half of its complement, find the measure of the angles.

Ans → Let the 1st ∠ be x.

Then the 2nd ∠ = $\frac{x}{2}$

A.T.Q

$x + \frac{x}{2} = 90°$

$\frac{3x}{2} = 90°$

$3x = 90° \times 2$

$x = \frac{180°}{3}$

$x = 60°$

$\therefore x = 60°$

2nd ∠ = $\frac{x}{2} = \frac{60}{2} = 30°$

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* Two adjacent angles are in a ratio of 5:3 and they together form an angle 128°, find these ∠s.

Ans → Let the common ratio be x.

1st ∠ = 5x

2nd ∠ = 3x

A.T.Q

$5x + 3x = 128°$

$8x = 128°$

$x = \frac{128°}{8}$

$x = 16°$

$\therefore$ 1st ∠ = $5x = 5 \times 16°$

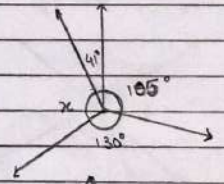
$= 80°$

2nd ∠ = $3x = 3 \times 16°$

$= 48°$

* Find the value of x in each of the following:

→

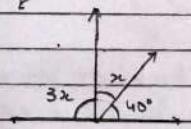


Ans ⇒ Total = 360°

Total of degree of ∠ given = 276°

Value of x = 360° - 276°

= 84°



Ans → A.T.Q

$3x + x + 40° = 180°$

$4x + 40° = 180°$

$4x = 180° - 40°$

$x = \frac{140°}{4} = 35°$

$x = 35°$

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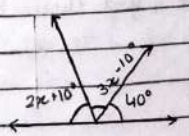
(continued)

Ans →



= A.T.I.I

$= 2x + 10^\circ + 3x - 10^\circ + 40^\circ = 180^\circ$

$5x + 40^\circ = 180^\circ$

$5x = 180^\circ - 40^\circ$

$x = \frac{140^\circ}{5}$

$x = 28^\circ$

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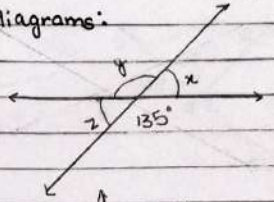
H.W

13. Find the values of x, y and z in each of the following diagrams:

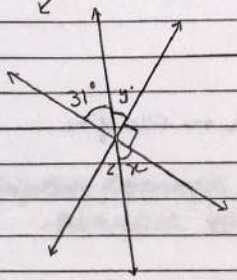
→



$z = 180^\circ - 135^\circ = 45^\circ$ (linear pair)

$x = z = 45^\circ$ (vertically opposite)

$y = 135^\circ$ (vertically opposite)

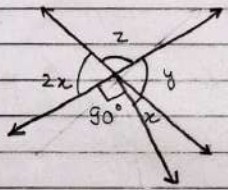


$\therefore y = z = 59^\circ$ [vertically opp. ∠s]

$x = 31^\circ$ [vertically opp. ∠s]

$y = 180^\circ - 90^\circ - 31^\circ$ [Angles on the one side of a straight line]

$y = 59^\circ$



$2x + 90^\circ + x = 180^\circ$

$3x = 180^\circ - 90^\circ$

$x = \frac{90^\circ}{3}$

$x = 30^\circ$

$y = 2x = 2 \times 30 + 60^\circ$

$z + y = 180^\circ$

$z + 60^\circ = 180^\circ$

$z = 180^\circ - 60^\circ$

$z = 120^\circ$

$\therefore x = 30^\circ$, $y = 60^\circ$ and $z = 120^\circ$

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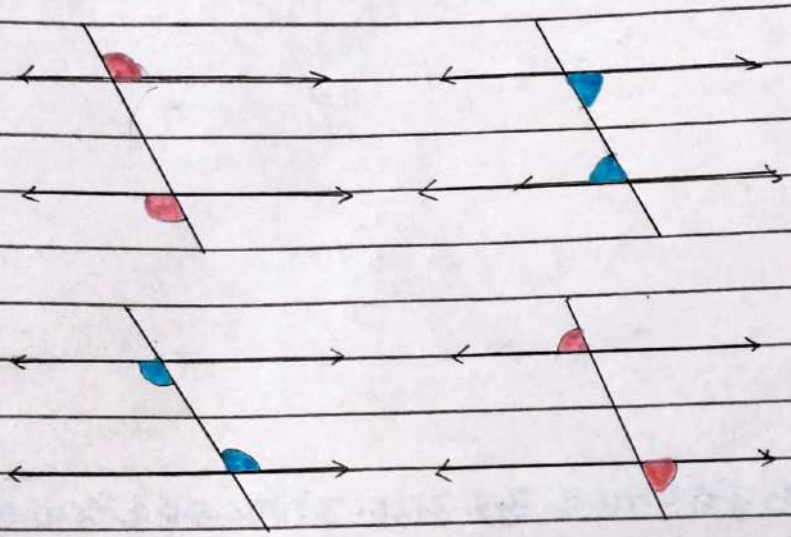
2. Alternative Angles -



NOTE - Each one of the pair of Alternative angles are equal in measure

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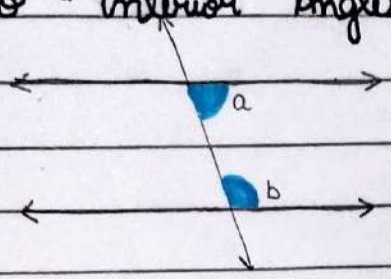
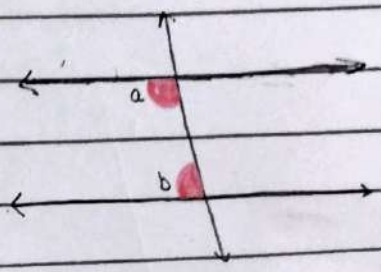
3. Co - interior Angles -

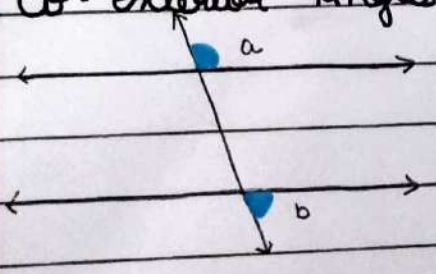


$\therefore \angle a + \angle b = 180^\circ$

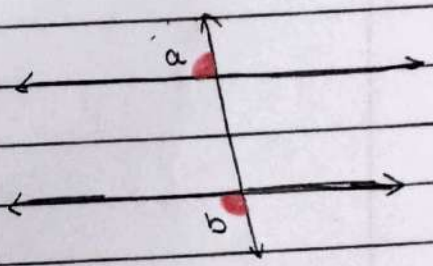


$\therefore \angle a + \angle b = 180^\circ$

4. Co - exterior Angles



$\therefore \angle a + \angle b = 180^\circ$



$\therefore \angle a + \angle b = 180^\circ$

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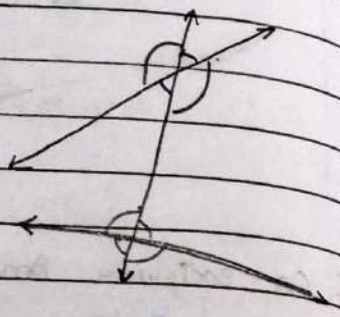
EXERCISE 8.2

★ Identify each of the given ---------- given figure.



i) ∠2, ∠6 Corresponding ∠s

ii) ∠1, ∠6 none

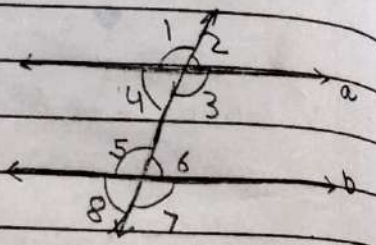
iii) ∠3, ∠5 Alternate interior

iv) ∠2, ∠7 none

v) ∠3, ∠6 Co-interior

vi) ∠4, ∠8 corresponding

★ State ----- statements:



i) If a||b, then ∠1 = ∠5

→ Corresponding ∠s are equal.

ii) If ∠4 = ∠6, then a||b.

→ Alternative interior ∠s are equal, so a||b.

iii) If ∠4 + ∠5 = 180°, then a||b.

Co-interior ∠s are equal, then a||b

VII A

Class Teacher Aradhana Mukherji

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Attendance for the Months	Brought Forward
M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A		

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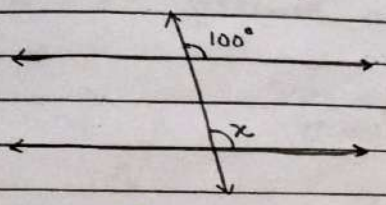
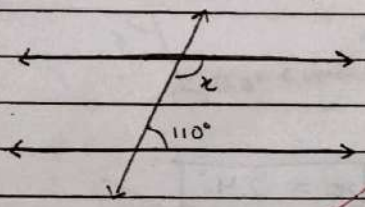
* In each of the following ---------- value of x:

i)



→ $x = 100°$ (corresponding ∠s are Equal.)

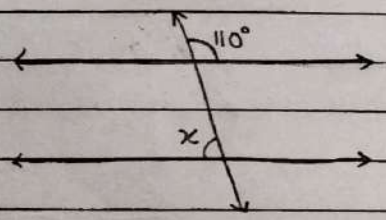
ii)



→ $180° - 110° = 70°$

$x = 70°$ (co-interior ∠s add and form 180°)

iii)



→ $x + 110° = 180°$ ~~(vertically opposite)~~ ~~(linear pair)~~ (Supplementary)

↓

(corresponding)

$x = 180° - 110$

$x = 70°$

Total Meeting for the Month

Total No. of Attendance for the Month

Avg. Attendance of the Month

Total/Meetings from the beginning of the sessio

Class VII A

Class Teacher Aradhana Mukherji

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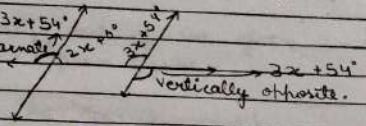
★ In each of the following ---------- figure:

i



→ $3x+54^\circ + 2x+6^\circ = 180^\circ$

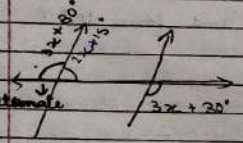
$5x + 60^\circ = 180^\circ$

$5x = 180^\circ - 60^\circ$

$x = \frac{120}{5}$

$x = 24^\circ$

ii



→ $3x+80^\circ + 2x+15^\circ = 180^\circ$

$5x + 45^\circ = 180^\circ$

$5x = 180^\circ - 45^\circ$

$x = \frac{135^\circ}{5}$

$x = 27^\circ$

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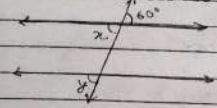
★ In the following figures ---------- lettered angles.

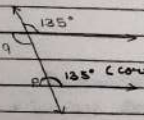
1



$x = 60^\circ$ (vertically oppo. b.s)

$y = 60^\circ$ (Alternate exterior b.s)

2

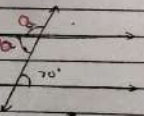


$q = 135^\circ$ (vertically opp. b.)

$p = 180^\circ - 135^\circ$ (supplementary)

$p = 45^\circ$

3

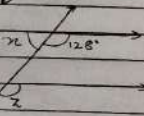


$b = 70^\circ$ (alternate)

$a = 180 - 70^\circ$ (linear pair)

$a = 110^\circ$

4



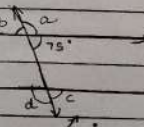
$z = 128^\circ$ (corresponding)

$x = 180 - 128^\circ$ (linear pair)

$x = 52^\circ$

$y = 52^\circ$

5



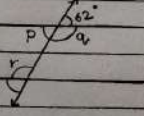
$c = 75^\circ$ (corresponding)

$b = 75^\circ$ (vertically oppo. b.s)

$a = 180^\circ - 75^\circ = 105^\circ$ (linear pair)

$d = 180^\circ - 75^\circ = 105^\circ$ (linear pair)

6



$p = 62^\circ$ (vertically oppo. b.s)

$q = 180^\circ - 62^\circ$ (linear pair)

$= 118$

$r = 118^\circ$ (Alternate)

$s = 62^\circ$ (corresponding.)

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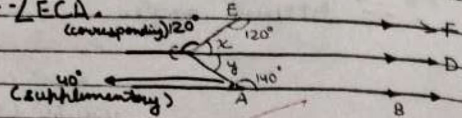
* In the adjoining figure ---- -------∠ECA.

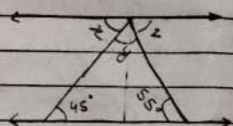


$x = 180° - 120°$ (supplimentary)
$= 60°$

$y = 40°$ (alternate)

∴ Reflex ∠ = $60° + 40° = 100°$ [redacted]
= [redacted] $360° - 100° = 260°$
$= 260°$

* In the adjoining figure --- -------- x, y and z.



$x = 45°$ (~~corresponding~~ alternate)
$z = 55°$ (~~corresponding~~ alternate)
y = Δ sums 180° so,
→ $45° + 55° = 100°$
→ $180° - 100° = 80°$
$y = 80°$

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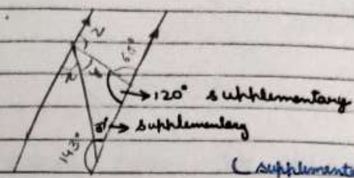
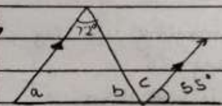
* Calculate the measure of each lettered ------ arrow :

i)



$x = 37°$ (alternate)
$z = 120°$ (alternate)
(supplementary) $y = x + z + y = 180°$
$y = 37° + 120° + y = 180°$
$y = 157° + y = 180°$
$y = 180° - 157°$
$= 23°$

ii)



$a = 55°$ (corresponding ∠)
$c = 72°$ (alternate ∠)
$b = a + b + c = 180°$ (supplementary)
$b = 55 + b + 72° = 180°$
$b = 55° + 72° = 180°$
$b =$ [redacted] $180° - 127$
$b = 53°$ (supplementary)

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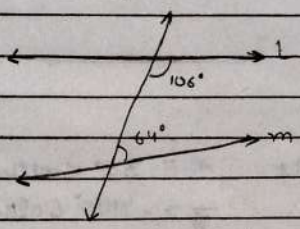
* In the figures given below, ---------- or not.

i)

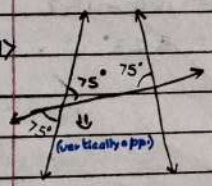


= $\angle a + \angle b = 180^\circ$

= $106^\circ + 64^\circ \neq 170^\circ$

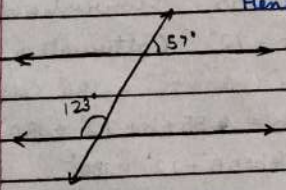
= No, hence proven l is not ll m.

ii)



After summing up they are not forming 180°.
Hence, proven l is not ll m.

iii)



After adding they are forming 180°.
Hence, proven l ll m.

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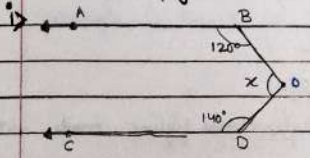
* a) In the figure ---------- x.
b) In the figure ---------- x.

i)



$\angle ABO + \angle BOD + \angle ODC = 360^\circ$

$120^\circ + \angle BOD + 140^\circ = 360^\circ$

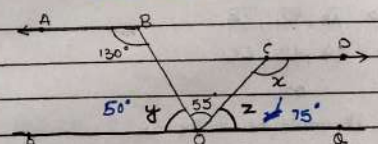
$\angle BOD + 260^\circ = 360^\circ$

$\angle BOD = 360^\circ - 260^\circ$

$\angle BOD = 100^\circ$

$\boxed{x = 100^\circ}$

ii)



$\angle ABO + \angle BOP = 180^\circ$

$130^\circ + \angle BOP = 180^\circ$

$\angle BOP = 180^\circ - 130^\circ$

$\angle BOP = 50^\circ$

$y = 50^\circ$

24/11/25

$z = (y + 55^\circ)$

$z = 180^\circ - (50 + 55)^\circ$

$z = 180^\circ - 105^\circ$

$z = 75^\circ$

$x = 180^\circ - 75^\circ$ (supplementary)

$\boxed{x = 105^\circ}$

Total Meeting for the Month
Total No. of Attendance for the Month
Attendance of the Month