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## PRACTICE PAPER 07 (2024–25)
## CHAPTER 06 LINES AND ANGLES
### (ANSWERS)

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|---|---|
| **SUBJECT: MATHEMATICS** | **MAX. MARKS : 40** |
| **CLASS : IX** | **DURATION : 1½ hrs** |

**General Instructions:**
(i).    **All** questions are compulsory.
(ii).   This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii).  **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv).   There is no overall choice.
(v).    Use of Calculators is not permitted

## SECTION – A
### Questions 1 to 10 carry 1 mark each.

**1.** Aditya was given a riddle by Pragya who stated that an angle is 24° less than its complementary angle. The angle's measure is:
(a) 36°                (b) 33°                (c) 66°                (d) 57°
Ans. (b) 33°
Let the angle be x. Its complementary angle = x + 24°
$\Rightarrow$ x + x + 24° = 90°
$\Rightarrow$ 2x = 90° – 24° $\Rightarrow$ 2x = 66° $\Rightarrow$ x = 33°

**2.** If the ratio of two co-interior angles on the same side of the transversal is 7 : 8, the bigger angle of the two angles is:
(a) 54°                (b) 100°                (c) 96°                (d) 84°
Ans. (c) 96°
Let the angles be 7x and 8x
Sum of co-interior angles is 180°
$\Rightarrow$ 7x + 8x = 180°
$\Rightarrow$ 15x = 180° $\Rightarrow$ x = 12°
Bigger angle is 8x = 8 × 12° = 96°

**3.** In the given figure, lines XY and MN intersect at O. If ∠XOP + ∠YON = 85° and ∠XOM = 45°, ∠YON is:
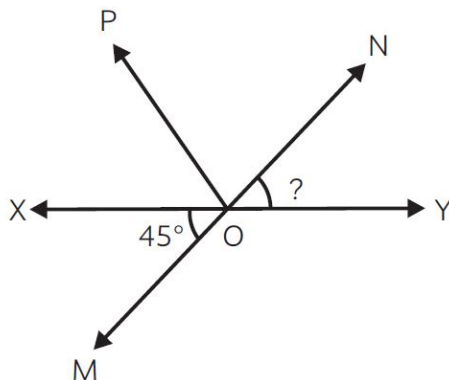


(a) 55°                (b) 45°                (c) 75°                (d) 65°
Ans. (b) 45°
Since ∠XOM and ∠YON are vertically opposite angles, they are equal.
∴ ∠XOM = 45°
Hence, ∠YON = 45°

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**4.** In the adjoining figure, if ∠AOC = 48°, then the value of a is:
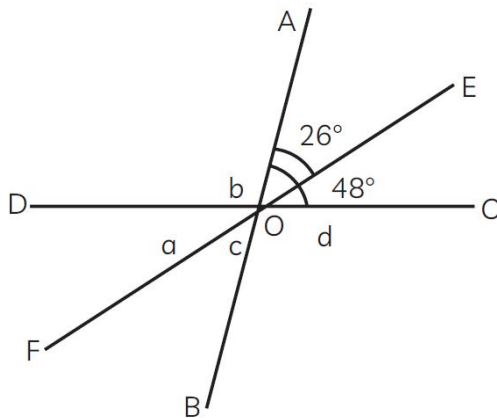


(a) 26°          (b) 22°          (c) 42°          (d) 24°

Ans. (b) 22°

∠AOC = ∠AOE + ∠EOC

⇒ 48° = 26° + ∠EOC

⇒ ∠EOC = 48° – 26°

⇒ ∠EOC = 22°

⇒ a = ∠EOC [Vertically opposite angle]

⇒ a = 22°

**5.** In the given figure, if PM || NO, ∠MNO = 55°, and LQ ⊥ MN, then ∠PLQ is equal to:
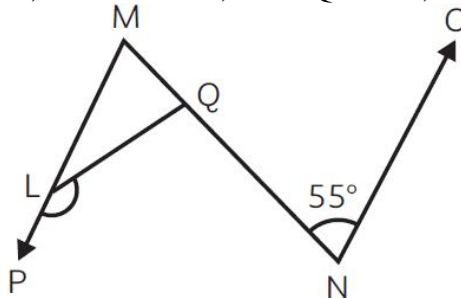


(a) 110°          (b) 125°          (c) 145°          (d) 115°

Ans. (c) 145°

Given: PM || NO, ∠MNO = 55° and LQ ⊥ MN,

Since, PM || NO

∴ ∠MNO = ∠LMN [Alternate angles]

i.e., ∠MNO = ∠LMQ = 55°

∠PLQ = ∠LQM + ∠LMQ [Exterior angle property of triangles]

⇒∠PLQ = 90° + 55° ⇒∠PLQ = 145°

**6.** In the given figure, if OB || CD, ∠BCD = 40° and AE ⊥ BC then ∠OAE is equal to:
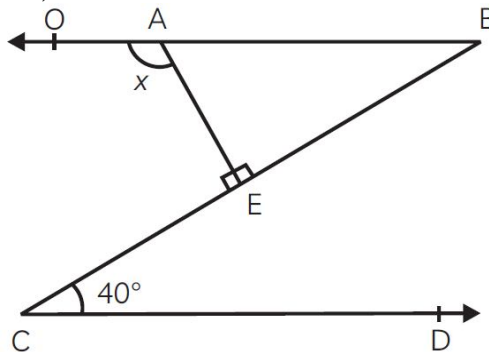


(a) 110°          (b) 135°          (c) 130°          (d) 115°

Ans. (c) 130°

Given: OB || CD, ∠BCD = 40° and AE ⊥ BC,

Since, OB || CD and BC is a transversal
∴ ∠BCD = ∠OBC [Alternate angles]
⇒∠BCD = ∠ABE
⇒∠BCD = ∠ABE = 40° [Given]
Now, ∠OAE = ∠AEB + ∠ABE [Exterior angle property of a triangle]
⇒∠OAE = 90° + 40°
⇒∠OAE = 130°

7. In figure if x : y = 1 : 4, then values of x and y are respectively
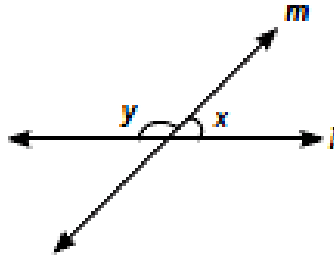


    (a) 36° and 144°        (b) 18° and 72°        (c) 144° and 36°        (d) 72° and 18°

Ans: Given, x : y = 1 : 4

$$\Rightarrow \frac{x}{y} = \frac{1}{4} = \frac{k}{4k} \Rightarrow x = k \text{ and } y = 4k$$

From the figure, x + y = 180° (Linear pair axiom)
⇒ k + 4k = 180° ⇒ 5k = 180° ⇒ k = 36°
Hence, x = k= 36°
and y = 4k = 4 × 36° = 144°
 Correct option is (a).

8. An angle is 20° more than three times the given angle. If the two angles are supplementary, then the angles are

    (a) $\dfrac{70^0}{4}, \dfrac{290^0}{4}$        (b) 40°, 140°        (c) 60°, 120°        (d) 40°, 50°

Ans: Let an angle be x. Then, other angle = 3x + 20°
Since the two angles are supplementary, so

$$x + 3x + 20° = 180° \Rightarrow 4x = 180° - 20° = 160° \Rightarrow x = \frac{160^0}{4} = 40°$$

So, one angle = 40°. Then, other angle = 3x + 20° = 3 × 40° + 20° = 120° + 20° = 140°
  Correct option is (b).

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A):** Two adjacent angles always form a linear pair.
   **Reason (R):** In a linear pair of angles, two non-common arms are opposite rays.
   Ans. (d) Assertion (A) is false but reason (R) is true.
   Adjacent angles with opposite rays as non-common arms are called the linear pair. Hence, reason is true.
   Two adjacent angles form a linear pair if non-common arms are opposite rays.
   Hence, assertion is false.

**10. Assertion (A):** If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 5 : 4, then the greater of the two angles is $100^0$.
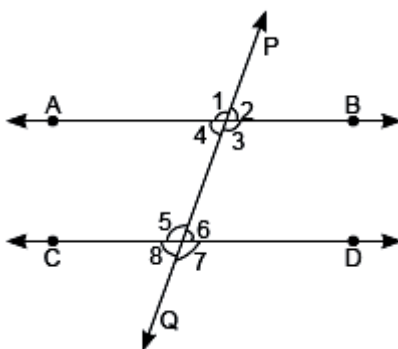**Reason (R):** If a transversal intersects two parallel lines, then the sum of the interior angles on the same side of the transversal is $180^0$.
Ans: (a) Both A and R are true and R is the correct explanation of A.

## SECTION – B
### Questions 11 to 14 carry 2 marks each.

**11.** In the given figure, AB || CD, $\angle 2 = 120° + x$ and $\angle 6 = 6x$. Find the measure of $\angle 2$ and $\angle 6$.



Ans: Given AB || CD,
$\Rightarrow \angle 2 = \angle 6$            (corresponding angles)
$\Rightarrow 120° + x = 6x$        ($\angle 2 = 120 + x$)
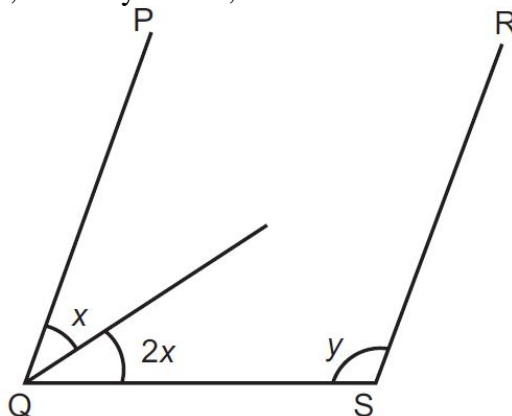$\Rightarrow 120° = 6x - x = 5x$
$\Rightarrow x = \dfrac{120^0}{5} = 24°$
$\therefore \angle 2 = 120° + x = 120° + 24° = 144°$
and $\angle 6 = 6x = 6 \times 24° = 144°$

**12.** In the given figure, PQ || RS, and x : y = 2 : 3, then find the value of y.



Ans. In the given figure, PQ || RS, then,
$\angle PQS + \angle RSQ = 180°$ [Sum of interior angles]
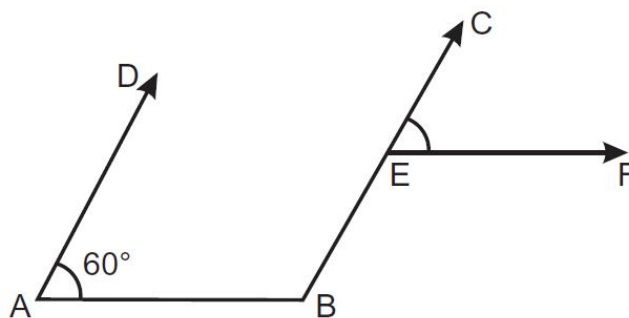$\Rightarrow (x + 2x) + y = 180°$
$\Rightarrow 3x + y = 180°$
Since, x : y = 2 : 3, let x = 2a, y = 3a
$\therefore 3 \times (2a) + 3a = 180°$
$\Rightarrow 9a = 180° \Rightarrow a = 20°$
Thus, the value of y = $3 \times 20° = 60°$

**13.** In given figure, AD || BC and EF || AB. $\angle DAB = 60°$. Find $\angle CEF$.

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Ans. ∠DAB + ∠CBA = 180° [Co-interior angles]
⇒ 60°+∠CBA = 180° ⇒∠CBA = 180° – 60° ⇒∠CBA = 120°
Since, EF || AB,
∴ ∠ABE = ∠BEF = 120° [Alternate angles]
Now, ∠BEF + ∠CEF = 180° [Linear pair]
⇒120° + ∠CEF = 180°
⇒∠CEF = 60°

14. In the below figure, if PQ || RS, ∠ MXQ = 135° and ∠ MYR = 40°, find ∠ XMY.
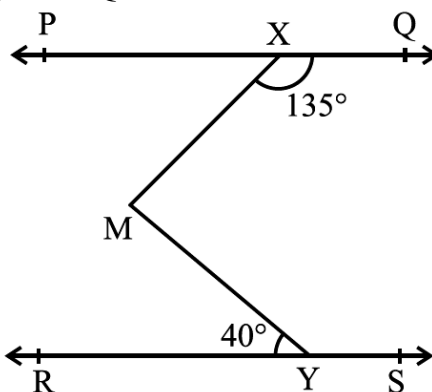


Ans: Here, we draw a line AB parallel to line PQ, through point M. Now, AB || PQ and PQ || RS.
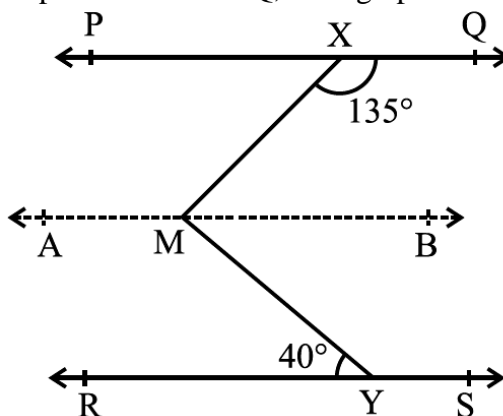


Therefore, AB || RS (Why?)
Now, ∠ QXM + ∠ XMB = 180°
(AB || PQ, Interior angles on the same side of the transversal XM)
But ∠ QXM = 135°
So, 135° + ∠ XMB = 180°
Therefore, ∠ XMB = 45° (1)
Now, ∠ BMY = ∠ MYR (AB || RS, Alternate angles)
Therefore, ∠ BMY = 40° (2)
Adding (1) and (2), you get
∠ XMB + ∠ BMY = 45° + 40°
That is, ∠ XMY = 85°

**Questions 15 to 17 carry 3 marks each.**

**15.** While playing piano Arijit Singh's daughter found that the treble strings of a grand piano are parallel. When view from the above, the bass strings are transversal. Find the x and y in the figure given below.
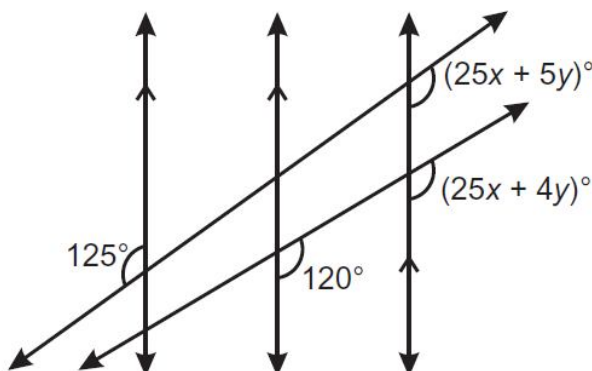


Ans. By the alternate exterior angle
$[25x + 5y]° = 125°$ …(i)
By the corresponding angles
$[25x + 4y]° = 120°$ …(ii)
Subtract eq. (ii) from the eq. (i) we get
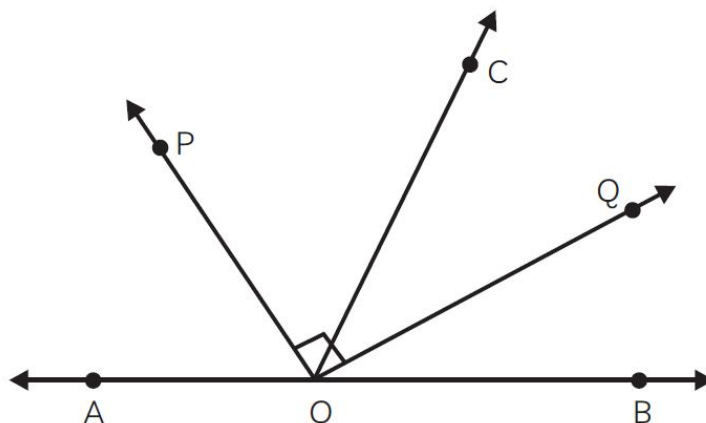$[25x + 5y]° – [25x + 4y]° = 125° – 120°$
$\Rightarrow y = 5°$
Putting the value of x in eq. (i), we get $25x + 5[5] = 125$
$\Rightarrow 25x + 25 = 125$
$\Rightarrow 25x = 125 – 25$
$\Rightarrow 25x = 100 \Rightarrow x = 4$

**16.** In figure, OP bisects ∠AOC, OQ bisects ∠BOC and OP ⊥ OQ. Show that the points A, O and B are collinear.



Ans. OP bisects ∠AOC
∴ ∠AOP = ∠COP ...(i)
Since, OQ bisects ∠BOC
∴ ∠BOQ = ∠COQ ...(ii)
Now, ∠AOB = ∠AOP + ∠COP + ∠COQ + ∠BOQ
= ∠COP + ∠COP + ∠COQ + ∠COQ
From eqs. (i) and (ii)
∠AOB = 2(∠COP + ∠COQ) = 2∠POQ
= 2(90°) [∵ OP ⊥ OQ]
= 180°
∴ The points A, O and B are collinear. [By converse of Linear Pair Axiom]

**17.** In the given figure, $\angle 1 = 55°$, $\angle 2 = 20°$, $\angle 3 = 35°$ and $\angle 4 = 145°$. Prove that AB ∥ CD.
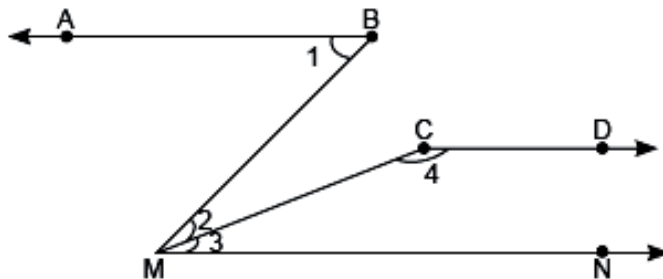


Ans: We have,
$\angle BMN = \angle 2 + \angle 3 = 20° + 35° = 55° = \angle 1 = \angle ABM$.
But these are the alternate angles formed by transversal BM on AB and MN.
So, by converse of alternate interior angles theorem.
AB ∥ MN                                                  ...(i)
Now, $\angle 3 + \angle 4 = 35° + 145° = 180°$
This, shows that sum of the co-interior angles is $180°$.
Hence, CD ∥ MN                                           ...(ii)
From (i) and (ii), we have AB ∥ CD.           Hence proved.

# SECTION – D
## Questions 18 carry 5 marks.

**18.** In the given figure, EF is the transversal to two parallel lines AB and CD. GM and HL are the bisectors of the corresponding angles EGB and EHD. Prove that GM ∥ HL.
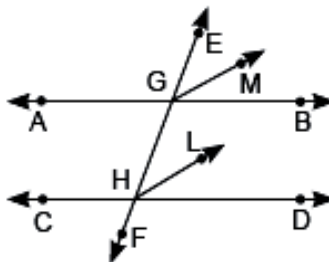


Ans:  Given: AB ∥ CD and EF is transversal that intersects AB and CD at G and H respectively
∴  $\angle EGB = \angle GHD$                    ...(i)  (Corresponding angles)
Now, GM is the angle bisector of $\angle EGB$

$\Rightarrow \angle EGM = \angle MGB = \dfrac{1}{2}\angle EGB$
$\Rightarrow \angle EGB = 2\angle EGM$                    ...(ii)
Similarly, HL is the angle bisector of $\angle GHD$

$\Rightarrow \angle GHL = \angle LHD = \dfrac{1}{2}\angle GHD$
$\Rightarrow \angle GHD = 2\angle GHL$                    ...(iii)
Substituting from (ii) and (iii) in (i), we get
$2\angle EGM = 2\angle GHL$
$\Rightarrow \angle EGM = \angle GHL$
But these are equal corresponding angles formed by transversal EF with GM and HL.
Hence, GM ∥ HL                    ...(Converse of corresponding angles axiom)

# SECTION – E (Case Study Based Questions)
## Questions 19 to 20 carry 4 marks each.

**19.** Ritesh and Sheetal are cousins and both went to visit Mughal Garden. Before going, they searched the location of their destination on a map. During searching, they found on map that

Akbar Road and M.G. road form a right angle at their intersection point and Hudson lane form 57° angle with M.G. road.



Akbar Road

Hudson Lane

57°

M.G. Road

H.M. Road

B.T. Road
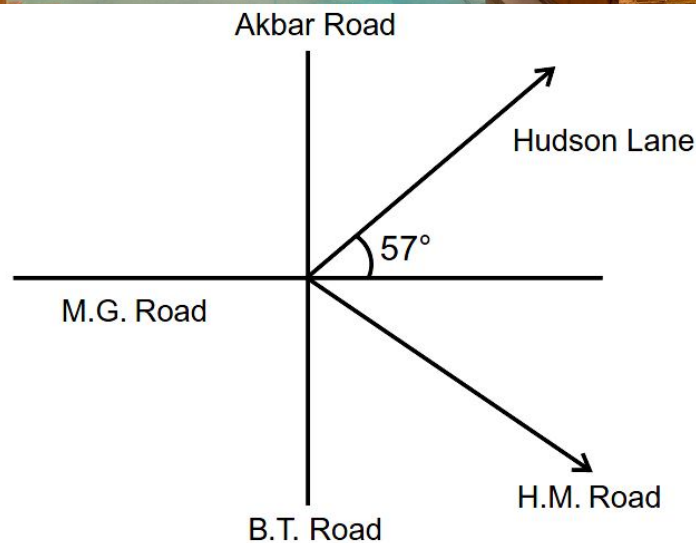
(a) What is the measure of acute angle between Akbar Road and Hudson lane? [1]
(b) If Ritesh is standing on M.G Road in the west direction and Sheetal is on H.M road, what is the shortest angle they can cover in order to meet? [2]
(c) Find the measure of reflex angle formed between M.G Road [in east direction] with Hudson lane. [1]

Ans. (a) From the given figure, Hudson Lane forms 57° with M.G road and Akbar Road and M.G Road form a 90° at their intersection point.
Therefore, the required angle between Akbar Road and Hudson lane = 90° – 57° = 33°.
(b) Sheetal travels from H.M road to M.G road [East] to Hudson to Akbar road and then to M.G road west.
So, the measure of angle she cover = 37° + 90° + 90° = 217°.
But if she goes from H.M road to south of BT road and then to M.G road [west],
Then, the measure of angle, she cover = 53° + 90° = 143°
Hence, the shortest angle she has to cover will be 143°
(c) The required measure of reflex angle formed between M.G Road [in east direction] with Hudson lane = 360° – 57° = 303°.

**20.** Two lines are parallel to each other, if the distance between these 2 lines always remains constant throughout and they never meet. There are various examples of parallel lines that we see in our daily life like railway line, 2 steps of ladder, opposite sides of a table etc. A line which cuts a pair of parallel lines is called a transversal as shown in the figure.
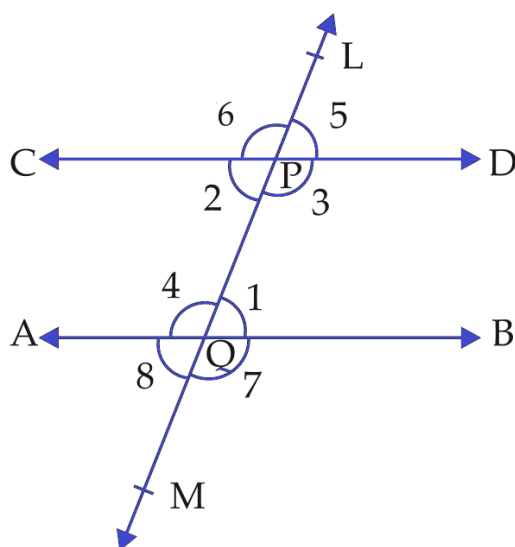
**Answer the following questions:**

(a) If ∠5 = 65°. Then what is the ∠8?     (1)

(b) If ∠6 = 2x and ∠1 = 70°. Then find the value of x. (1)

(c) If ∠6 : ∠5 = 2 : 3 then find the value of ∠7. (2)

Ans: (a)  Since $CD || AB$ and $LM$ is transversal,

∠5 and ∠8 are the alternate exterior angles.

∴ ∠5 = ∠8 or ∠8 = ∠5 = 65°

(b) Since $CD || AB$ and $LM$ is transversal,

∴ ∠5 = 70°          (Corresponding angles)

and ∠6 + ∠5 = 180° (Linear pair axiom)

⇒ $2x + 70° = 180°$

⇒ $2x = 110° \Rightarrow x = 55°$.

(c) Let ∠6 = 2k and ∠5 = 3k

Now, ∠6 + ∠5 = 180°                                    (Linear pair axiom)

⇒ $2k + 3k = 180°$

⇒ $5k = 180° \Rightarrow k = 36°$

∴ ∠6 = 2k = 2 × 36° = 72°

Now, ∠6 and ∠7 are the alternate exterior angles.

∴ ∠6 = ∠7 or ∠7 = ∠6 = 72°