



PRACTICE PAPER 06
CHAPTER 06 LINES AND ANGLES

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : IX

DURATION : 1½ hrs

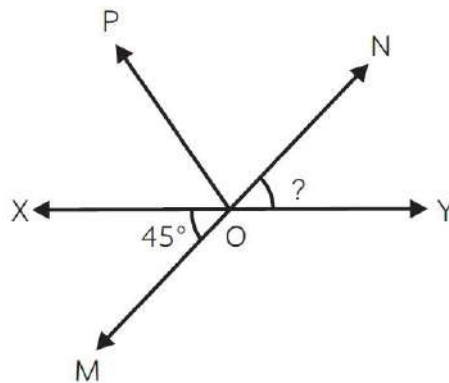
General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 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

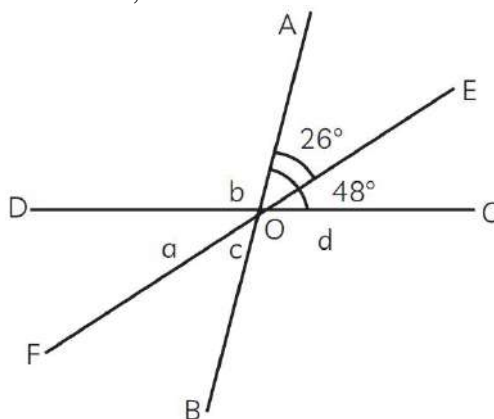
SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Aditya was given a riddle by Pragma 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°
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°
3. In the given figure, lines XY and MN intersect at O. If $\angle XOP + \angle YON = 85^\circ$ and $\angle XOM = 45^\circ$, $\angle YON$ is:



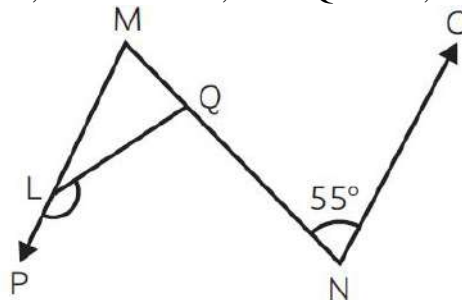
- (a) 55° (b) 45° (c) 75° (d) 65°
4. In the adjoining figure, if $\angle AOC = 48^\circ$, then the value of a is:



- (a) 26° (b) 22° (c) 42° (d) 24°

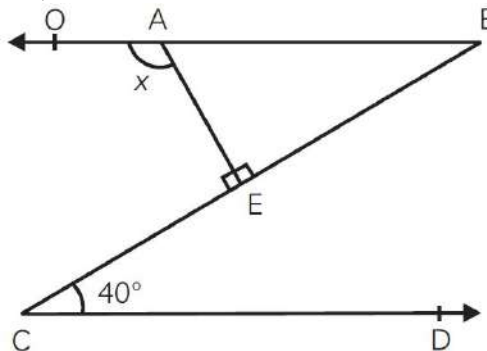


5. In the given figure, if $PM \parallel NO$, $\angle MNO = 55^\circ$, and $LQ \perp MN$, then $\angle PLQ$ is equal to:



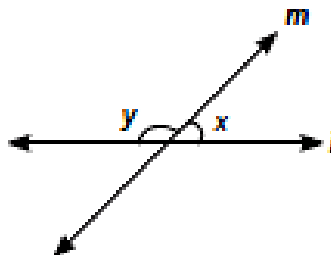
- (a) 110° (b) 125° (c) 145° (d) 115°

6. In the given figure, if $OB \parallel CD$, $\angle BCD = 40^\circ$ and $AE \perp BC$ then $\angle OAE$ is equal to:



- (a) 110° (b) 135° (c) 130° (d) 115°

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°

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

- (a) $\frac{70^\circ}{4}, \frac{290^\circ}{4}$ (b) $40^\circ, 140^\circ$ (c) $60^\circ, 120^\circ$ (d) $40^\circ, 50^\circ$

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.

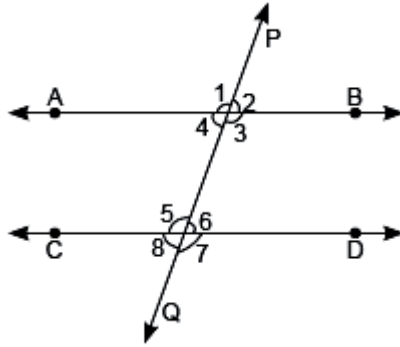
10. **Assertion (A):** If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio $5 : 4$, then the greater of the two angles is 100° .

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° .

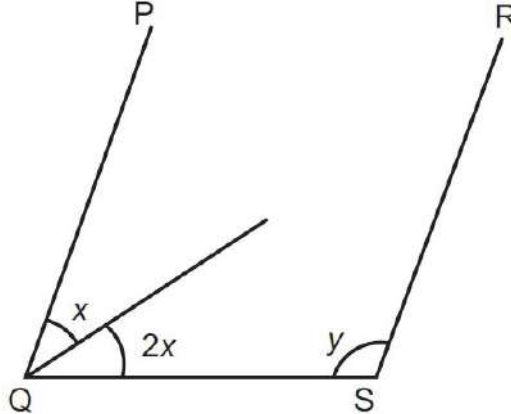
SECTION – B

Questions 11 to 14 carry 2 marks each.

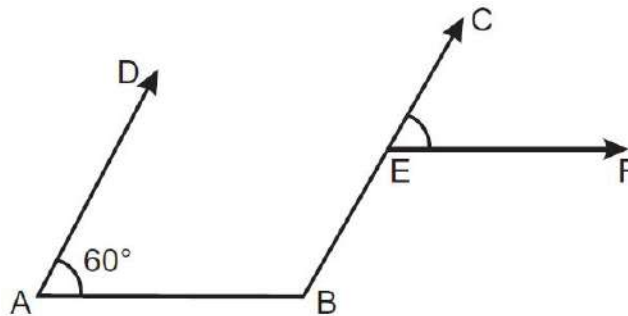
11. In the given figure, $AB \parallel CD$, $\angle 2 = 120^\circ + x$ and $\angle 6 = 6x$. Find the measure of $\angle 2$ and $\angle 6$.



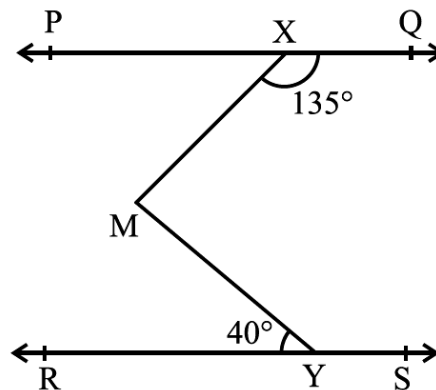
12. In the given figure, $PQ \parallel RS$, and $x : y = 2 : 3$, then find the value of y .



13. In given figure, $AD \parallel BC$ and $EF \parallel AB$. $\angle DAB = 60^\circ$. Find $\angle CEF$.



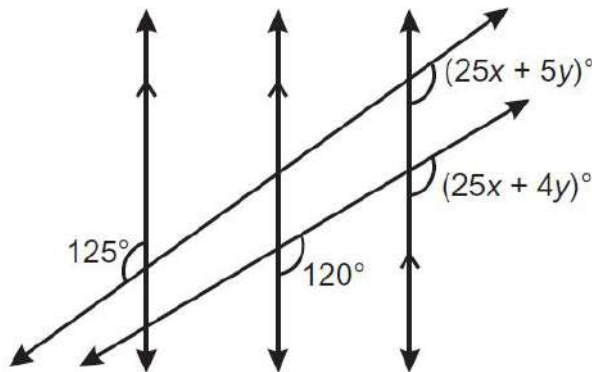
14. In the below figure, if $PQ \parallel RS$, $\angle MXQ = 135^\circ$ and $\angle MYR = 40^\circ$, find $\angle XMY$.



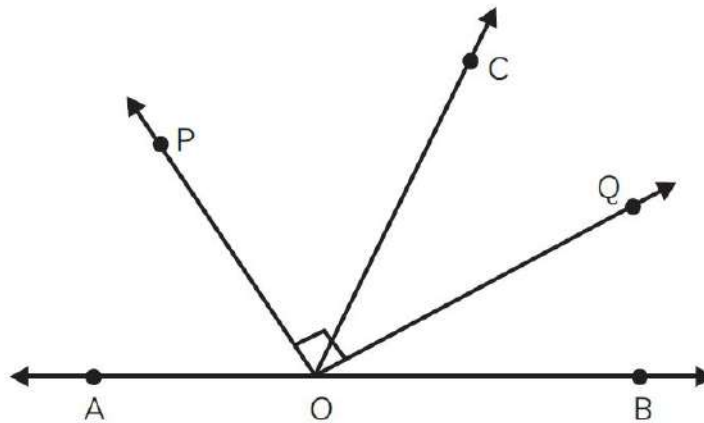
SECTION – C

Questions 15 to 17 carry 3 marks each.

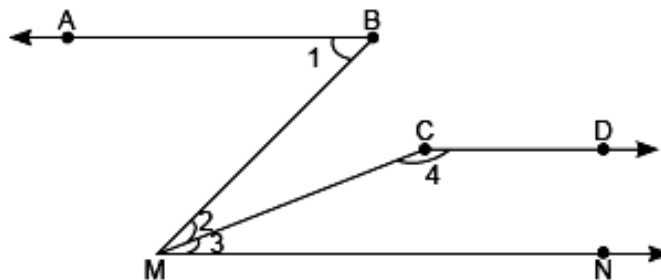
15. While playing piano Arijit Singh's daughter found that the treble strings of a grand piano are parallel. When view from the above, the bass strings are transversal. Find the x and y in the figure given below.



16. In figure, OP bisects $\angle AOC$, OQ bisects $\angle BOC$ and $OP \perp OQ$. Show that the points A , O and B are collinear.



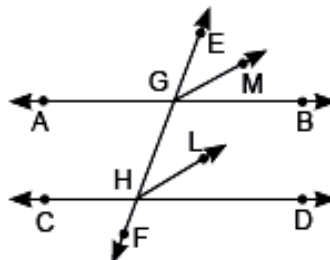
17. In the given figure, $\angle 1 = 55^\circ$, $\angle 2 = 20^\circ$, $\angle 3 = 35^\circ$ and $\angle 4 = 145^\circ$. Prove that $AB \parallel CD$.



SECTION – D

Questions 18 carry 5 marks.

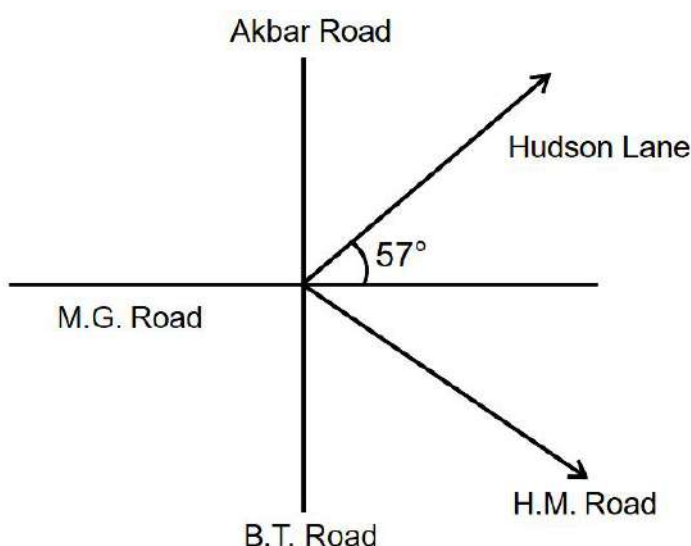
18. In the given figure, EF is the transversal to two parallel lines AB and CD . GM and HL are the bisectors of the corresponding angles EGB and EHD . Prove that $GM \parallel HL$.



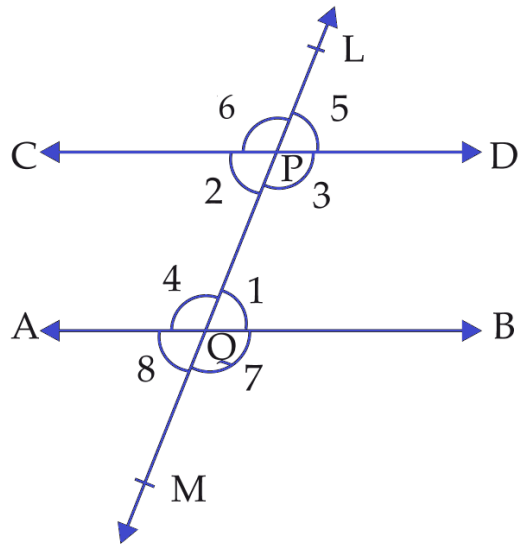
SECTION – E (Case Study Based Questions)

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.



- (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]
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 $\angle 5 = 65^\circ$. Then what is the $\angle 8$? (1)
- (b) If $\angle 6 = 2x$ and $\angle 1 = 70^\circ$. Then find the value of x . (1)
- (c) If $\angle 6 : \angle 5 = 2 : 3$ then find the value of $\angle 7$. (2)



PRACTICE PAPER 06
CHAPTER 06 LINES AND ANGLES
(ANSWERS)

SUBJECT: MATHEMATICS
CLASS : IX

MAX. MARKS : 40
DURATION : 1½ hrs

General Instructions:

- All questions are compulsory.
- This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- 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.
- There is no overall choice.
- Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Aditya was given a riddle by Pragma 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 = $x + 24^\circ$

$$\Rightarrow x + x + 24^\circ = 90^\circ$$

$$\Rightarrow 2x = 90^\circ - 24^\circ \Rightarrow 2x = 66^\circ \Rightarrow x = 33^\circ$$

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 $8x$

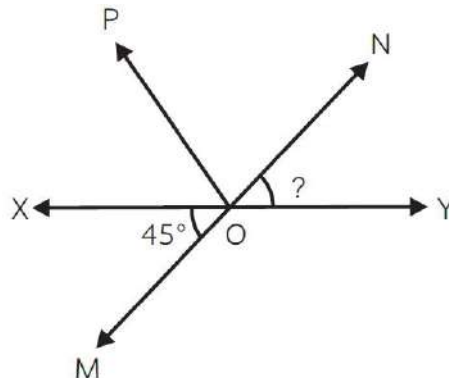
Sum of co-interior angles is 180°

$$\Rightarrow 7x + 8x = 180^\circ$$

$$\Rightarrow 15x = 180^\circ \Rightarrow x = 12^\circ$$

$$\text{Bigger angle is } 8x = 8 \times 12^\circ = 96^\circ$$

3. In the given figure, lines XY and MN intersect at O. If $\angle XOP + \angle YON = 85^\circ$ and $\angle XOM = 45^\circ$, $\angle YON$ is:



(a) 55° (b) 45° (c) 75° (d) 65°

Ans. (b) 45°

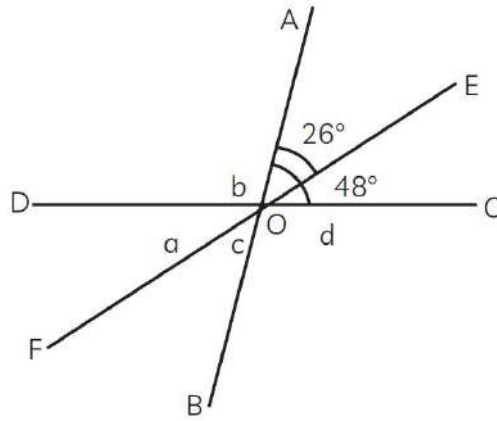
Since $\angle XOM$ and $\angle YON$ are vertically opposite angles, they are equal.

$$\therefore \angle XOM = 45^\circ$$

$$\text{Hence, } \angle YON = 45^\circ$$



4. In the adjoining figure, if $\angle AOC = 48^\circ$, then the value of a is:



- (a) 26° (b) 22° (c) 42° (d) 24°

Ans. (b) 22°

$$\angle AOC = \angle AOE + \angle EOC$$

$$\Rightarrow 48^\circ = 26^\circ + \angle EOC$$

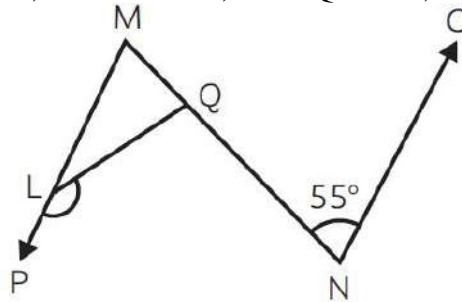
$$\Rightarrow \angle EOC = 48^\circ - 26^\circ$$

$$\Rightarrow \angle EOC = 22^\circ$$

$$\Rightarrow a = \angle EOC \text{ [Vertically opposite angle]}$$

$$\Rightarrow a = 22^\circ$$

5. In the given figure, if $PM \parallel NO$, $\angle MNO = 55^\circ$, and $LQ \perp MN$, then $\angle PLQ$ is equal to:



- (a) 110° (b) 125° (c) 145° (d) 115°

Ans. (c) 145°

Given: $PM \parallel NO$, $\angle MNO = 55^\circ$ and $LQ \perp MN$,

Since, $PM \parallel NO$

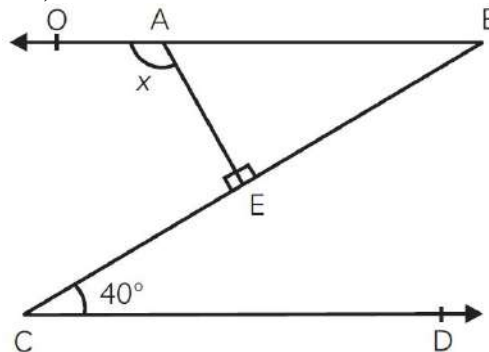
$$\therefore \angle MNO = \angle LMN \text{ [Alternate angles]}$$

$$\text{i.e., } \angle MNO = \angle LMN = 55^\circ$$

$$\angle PLQ = \angle LQM + \angle LMQ \text{ [Exterior angle property of triangles]}$$

$$\Rightarrow \angle PLQ = 90^\circ + 55^\circ \Rightarrow \angle PLQ = 145^\circ$$

6. In the given figure, if $OB \parallel CD$, $\angle BCD = 40^\circ$ and $AE \perp BC$ then $\angle OAE$ is equal to:



- (a) 110° (b) 135° (c) 130° (d) 115°

Ans. (c) 130°

Given: $OB \parallel CD$, $\angle BCD = 40^\circ$ and $AE \perp BC$,

Since, $OB \parallel CD$ and BC is a transversal

$\therefore \angle BCD = \angle OBC$ [Alternate angles]

$\Rightarrow \angle BCD = \angle ABE$

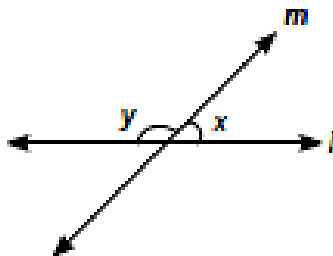
$\Rightarrow \angle BCD = \angle ABE = 40^\circ$ [Given]

Now, $\angle OAE = \angle AEB + \angle ABE$ [Exterior angle property of a triangle]

$\Rightarrow \angle OAE = 90^\circ + 40^\circ$

$\Rightarrow \angle OAE = 130^\circ$

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, $x + y = 180^\circ$ (Linear pair axiom)

$$\Rightarrow k + 4k = 180^\circ \Rightarrow 5k = 180^\circ \Rightarrow k = 36^\circ$$

Hence, $x = k = 36^\circ$

and $y = 4k = 4 \times 36^\circ = 144^\circ$

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) $\frac{70^\circ}{4}, \frac{290^\circ}{4}$ (b) $40^\circ, 140^\circ$ (c) $60^\circ, 120^\circ$ (d) $40^\circ, 50^\circ$

Ans: Let an angle be x . Then, other angle = $3x + 20^\circ$

Since the two angles are supplementary, so

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

So, one angle = 40° . Then, other angle = $3x + 20^\circ = 3 \times 40^\circ + 20^\circ = 120^\circ + 20^\circ = 140^\circ$

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° .

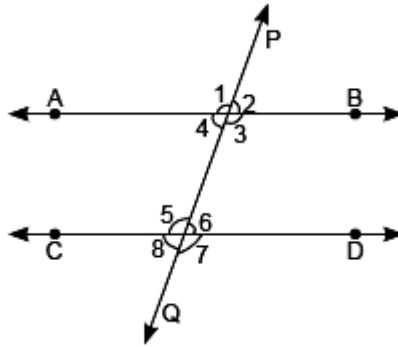
Reason (R): If a transversal intersects two parallel lines, then the sum of the interior angles on the same side of the transversal is 180° .

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, $AB \parallel CD$, $\angle 2 = 120^\circ + x$ and $\angle 6 = 6x$. Find the measure of $\angle 2$ and $\angle 6$.



Ans: Given $AB \parallel CD$,

$\Rightarrow \angle 2 = \angle 6$ (corresponding angles)

$\Rightarrow 120^\circ + x = 6x$ ($\angle 2 = 120 + x$)

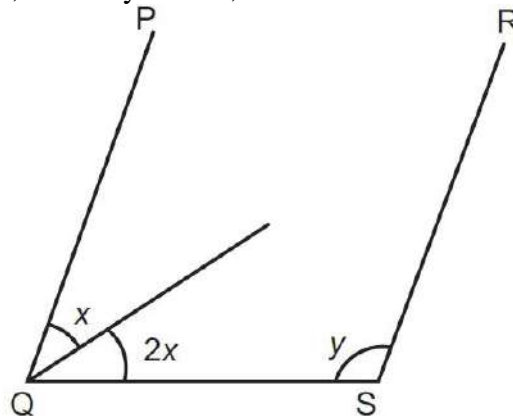
$\Rightarrow 120^\circ = 6x - x = 5x$

$\Rightarrow x = \frac{120^\circ}{5} = 24^\circ$

$\therefore \angle 2 = 120^\circ + x = 120^\circ + 24^\circ = 144^\circ$

and $\angle 6 = 6x = 6 \times 24^\circ = 144^\circ$

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



Ans. In the given figure, $PQ \parallel RS$, then,

$\angle PQS + \angle RSQ = 180^\circ$ [Sum of interior angles]

$\Rightarrow (x + 2x) + y = 180^\circ$

$\Rightarrow 3x + y = 180^\circ$

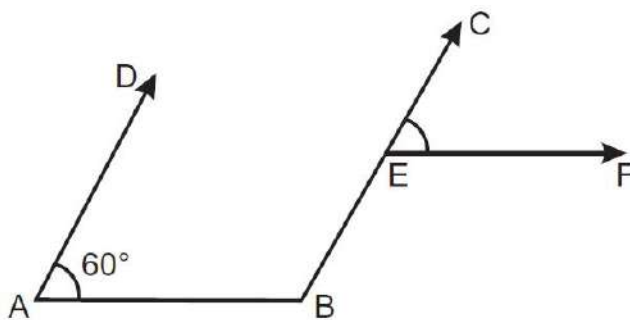
Since, $x : y = 2 : 3$, let $x = 2a$, $y = 3a$

$\therefore 3 \times (2a) + 3a = 180^\circ$

$\Rightarrow 9a = 180^\circ \Rightarrow a = 20^\circ$

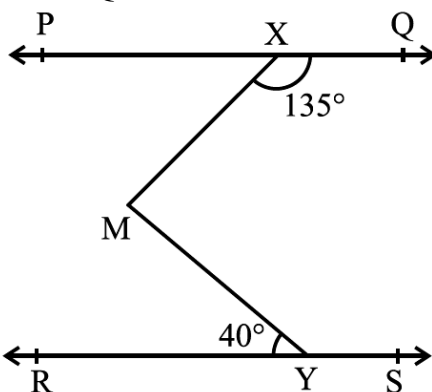
Thus, the value of $y = 3 \times 20^\circ = 60^\circ$

13. In given figure, $AD \parallel BC$ and $EF \parallel AB$. $\angle DAB = 60^\circ$. Find $\angle CEF$.

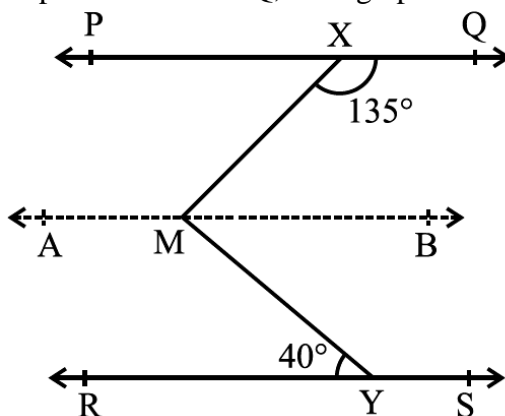


Ans. $\angle DAB + \angle CBA = 180^\circ$ [Co-interior angles]
 $\Rightarrow 60^\circ + \angle CBA = 180^\circ \Rightarrow \angle CBA = 180^\circ - 60^\circ \Rightarrow \angle CBA = 120^\circ$
 Since, $EF \parallel AB$,
 $\therefore \angle ABE = \angle BEF = 120^\circ$ [Alternate angles]
 Now, $\angle BEF + \angle CEF = 180^\circ$ [Linear pair]
 $\Rightarrow 120^\circ + \angle CEF = 180^\circ$
 $\Rightarrow \angle CEF = 60^\circ$

14. In the below figure, if $PQ \parallel RS$, $\angle MXQ = 135^\circ$ and $\angle MYR = 40^\circ$, find $\angle XMY$.



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

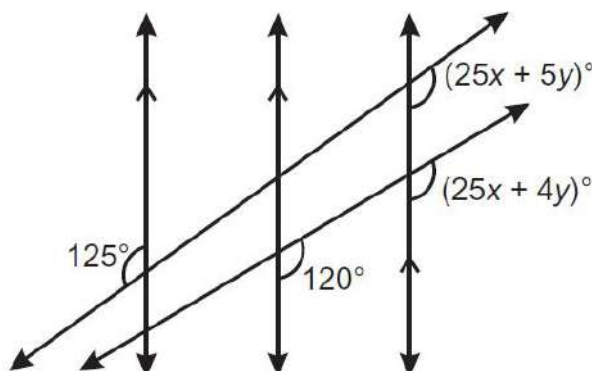


Therefore, $AB \parallel RS$ (Why?)
 Now, $\angle QXM + \angle XMB = 180^\circ$
 ($AB \parallel PQ$, Interior angles on the same side of the transversal XM)
 But $\angle QXM = 135^\circ$
 So, $135^\circ + \angle XMB = 180^\circ$
 Therefore, $\angle XMB = 45^\circ$ (1)
 Now, $\angle BMY = \angle MYR$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

SECTION – C

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

$$[25x + 5y]^\circ = 125^\circ \dots(i)$$

By the corresponding angles

$$[25x + 4y]^\circ = 120^\circ \dots(ii)$$

Subtract eq. (ii) from the eq. (i) we get

$$[25x + 5y]^\circ - [25x + 4y]^\circ = 125^\circ - 120^\circ$$

$$\Rightarrow y = 5^\circ$$

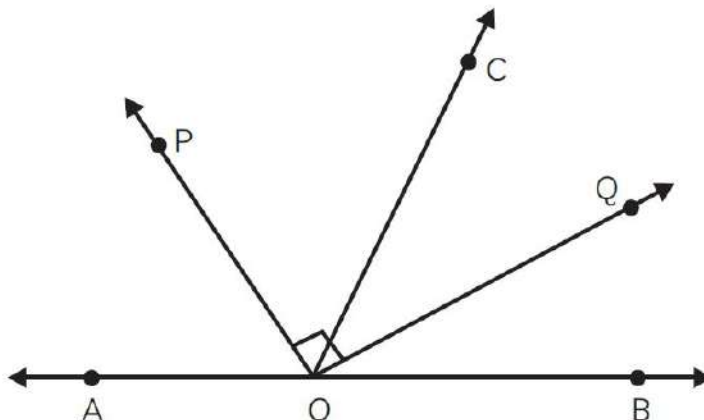
Putting the value of x in eq. (i), we get $25x + 5[5] = 125$

$$\Rightarrow 25x + 25 = 125$$

$$\Rightarrow 25x = 125 - 25$$

$$\Rightarrow 25x = 100 \Rightarrow x = 4$$

16. In figure, OP bisects $\angle AOC$, OQ bisects $\angle BOC$ and $OP \perp OQ$. Show that the points A , O and B are collinear.



Ans. OP bisects $\angle AOC$

$$\therefore \angle AOP = \angle COP \dots(i)$$

Since, OQ bisects $\angle BOC$

$$\therefore \angle BOQ = \angle COQ \dots(ii)$$

$$\text{Now, } \angle AOB = \angle AOP + \angle COP + \angle COQ + \angle BOQ$$

$$= \angle COP + \angle COP + \angle COQ + \angle COQ$$

From eqs. (i) and (ii)

$$\angle AOB = 2(\angle COP + \angle COQ) = 2\angle POQ$$

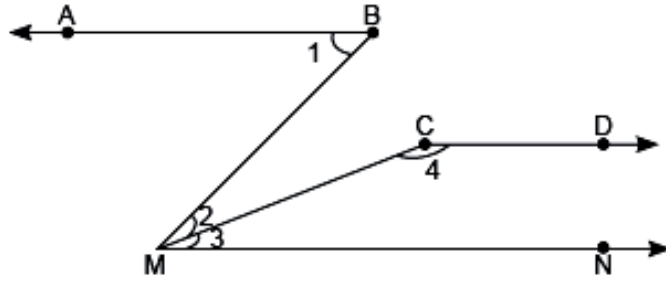
$$= 2(90^\circ) [\because OP \perp OQ]$$

$$= 180^\circ$$

\therefore The points A , O and B are collinear. [By converse of Linear Pair Axiom]



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



Ans: We have,

$$\angle BMN = \angle 2 + \angle 3 = 20^\circ + 35^\circ = 55^\circ = \angle 1 = \angle ABM.$$

But these are the alternate angles formed by transversal BM on AB and MN.

So, by converse of alternate interior angles theorem.

$$AB \parallel MN \quad \dots(i)$$

$$\text{Now, } \angle 3 + \angle 4 = 35^\circ + 145^\circ = 180^\circ$$

This, shows that sum of the co-interior angles is 180° .

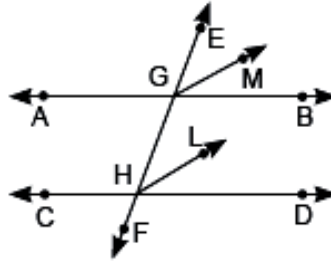
$$\text{Hence, } CD \parallel MN \quad \dots(ii)$$

From (i) and (ii), we have $AB \parallel CD$. 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 $GM \parallel HL$.



Ans: Given: $AB \parallel CD$ and EF is transversal that intersects AB and CD at G and H respectively

$$\therefore \angle EGB = \angle EHD \quad \dots(i) \text{ (Corresponding angles)}$$

Now, GM is the angle bisector of $\angle EGB$

$$\Rightarrow \angle EGM = \angle MGB = \frac{1}{2} \angle EGB$$

$$\Rightarrow \angle EGB = 2\angle EGM \quad \dots(ii)$$

Similarly, HL is the angle bisector of $\angle EHD$

$$\Rightarrow \angle GHL = \angle LHD = \frac{1}{2} \angle EHD$$

$$\Rightarrow \angle EHD = 2\angle GHL \quad \dots(iii)$$

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.

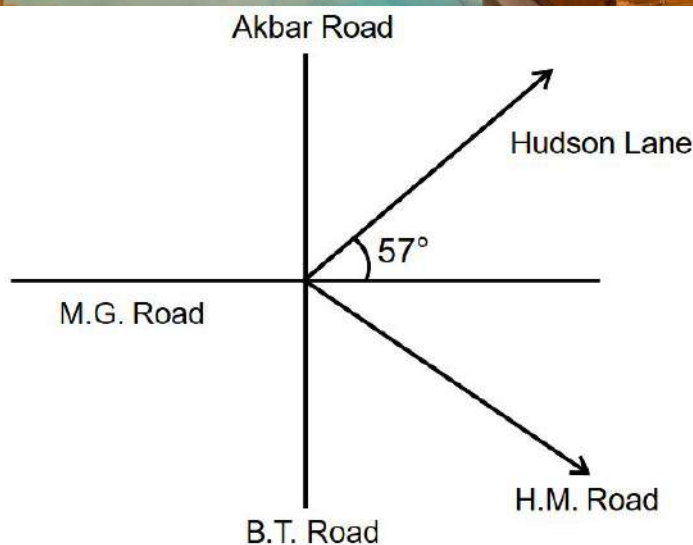
Hence, $GM \parallel HL$...(Converse of corresponding angles axiom)

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.



- (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 = $90^\circ - 57^\circ = 33^\circ$.

(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 = $37^\circ + 90^\circ + 90^\circ = 217^\circ$.

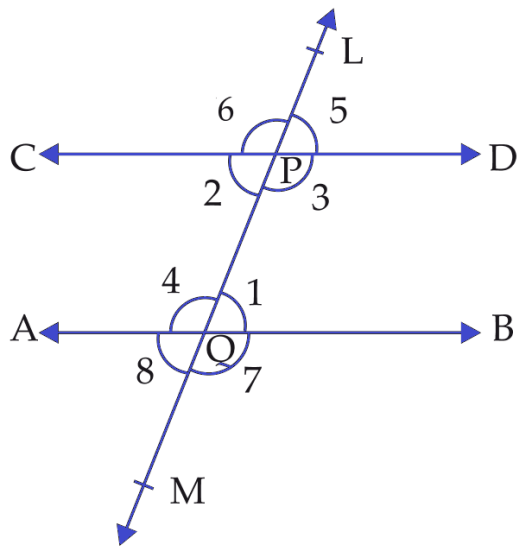
But if she goes from H.M road to south of BT road and then to M.G road [west],

Then, the measure of angle, she cover = $53^\circ + 90^\circ = 143^\circ$

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 = $360^\circ - 57^\circ = 303^\circ$.

- 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 $\angle 5 = 65^\circ$. Then what is the $\angle 8$? (1)
 (b) If $\angle 6 = 2x$ and $\angle 1 = 70^\circ$. Then find the value of x . (1)
 (c) If $\angle 6 : \angle 5 = 2 : 3$ then find the value of $\angle 7$. (2)

Ans: (a) Since $CD \parallel AB$ and LM is transversal,
 $\angle 5$ and $\angle 8$ are the alternate exterior angles.

$$\therefore \angle 5 = \angle 8 \text{ or } \angle 8 = \angle 5 = 65^\circ$$

(b) Since $CD \parallel AB$ and LM is transversal,
 $\therefore \angle 5 = 70^\circ$ (Corresponding angles)
 and $\angle 6 + \angle 5 = 180^\circ$ (Linear pair axiom)

$$\Rightarrow 2x + 70^\circ = 180^\circ$$

$$\Rightarrow 2x = 110^\circ \Rightarrow x = 55^\circ.$$

(c) Let $\angle 6 = 2k$ and $\angle 5 = 3k$

Now, $\angle 6 + \angle 5 = 180^\circ$ (Linear pair axiom)

$$\Rightarrow 2k + 3k = 180^\circ$$

$$\Rightarrow 5k = 180^\circ \Rightarrow k = 36^\circ$$

$$\therefore \angle 6 = 2k = 2 \times 36^\circ = 72^\circ$$

Now, $\angle 6$ and $\angle 7$ are the alternate exterior angles.

$$\therefore \angle 6 = \angle 7 \text{ or } \angle 7 = \angle 6 = 72^\circ$$

