SECTION A

1. Choose and write the correct option in the following questions. **$(3 \times 1 = 3)$**

(*i*) In given figure, $\angle 3$ and $\angle 7$ are known as

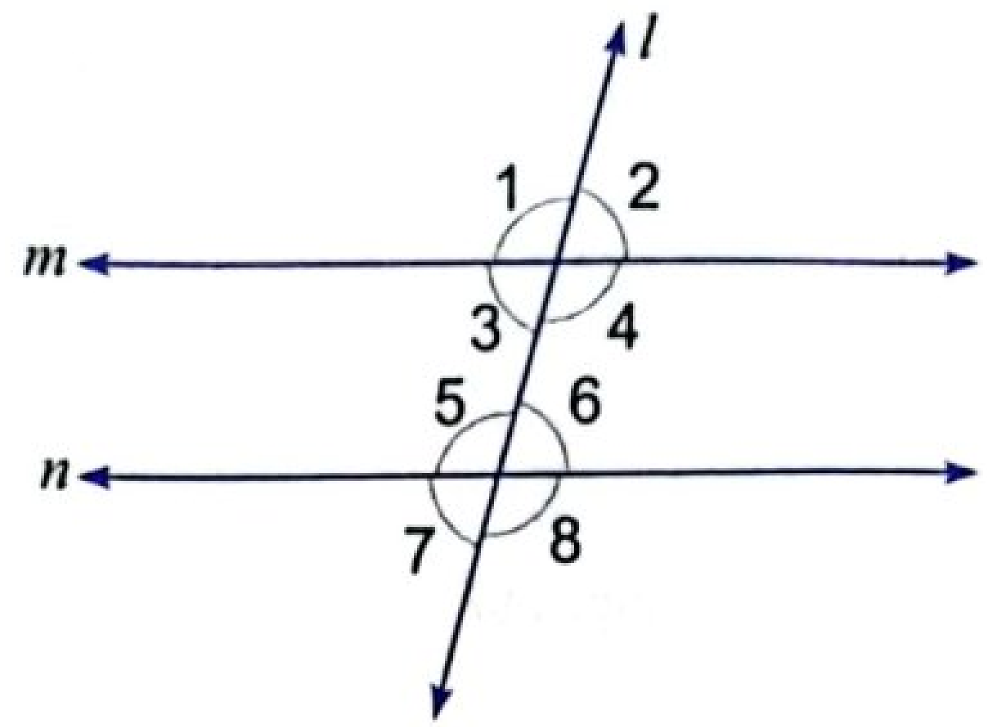


Fig. 6.90

(*a*) corresponding angles

(*b*) co-interior angles

(*c*) vertically opposite angles

(*d*) alternate angles

(*ii*) Two angles are supplementary. One of them is an acute angle. Which of these could be the measure of the other angle?

(*a*) 60°

(*b*) 120°

(*c*) 200°

(*d*) 240°

(*iii*) In given figure, *POQ* is a line. The value of *x* is

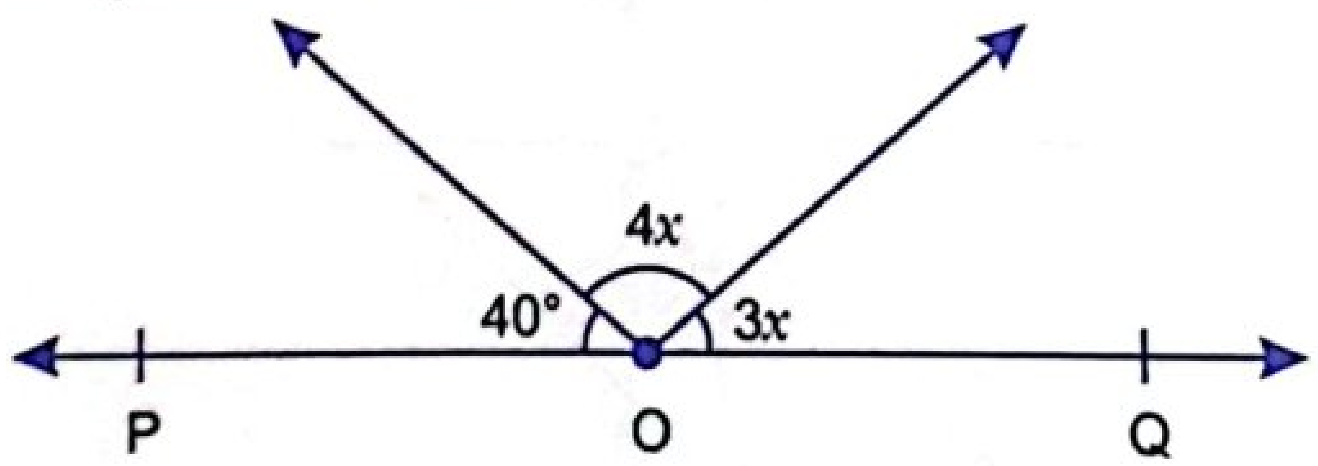


Fig. 6.91

(*a*) 20°

(*b*) 25°

(*c*) 30°

(*d*) 35°

Solve the following questions. $(2 \times 1 = 2)$

2. (*i*) In Fig. 6.92, if POQ is a line, find the value of x.

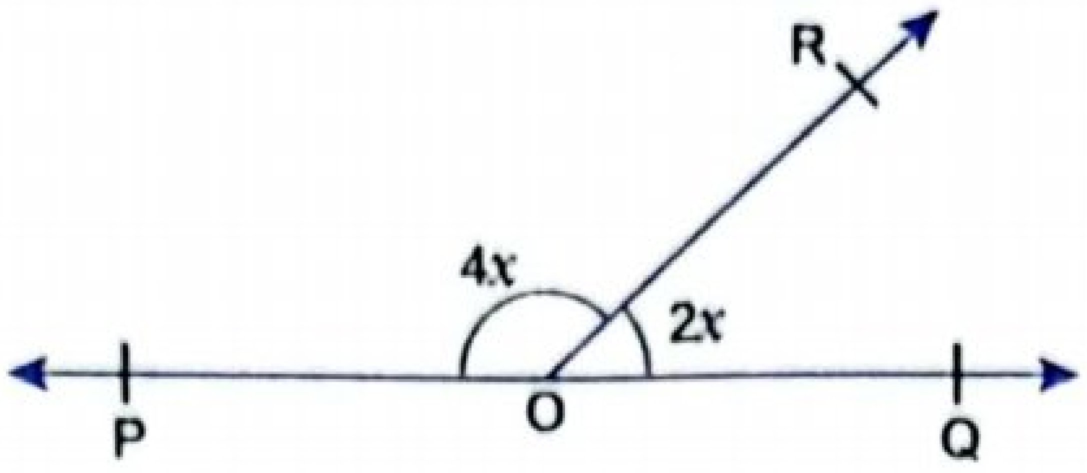


Fig. 6.92

(*ii*) Which angle is complement of itself

SECTION B

Solve the following questions. $(4 \times 2 = 8)$

3. In Fig. 6.93, if a is greater than b by one third of a right angle find the values of a and b.

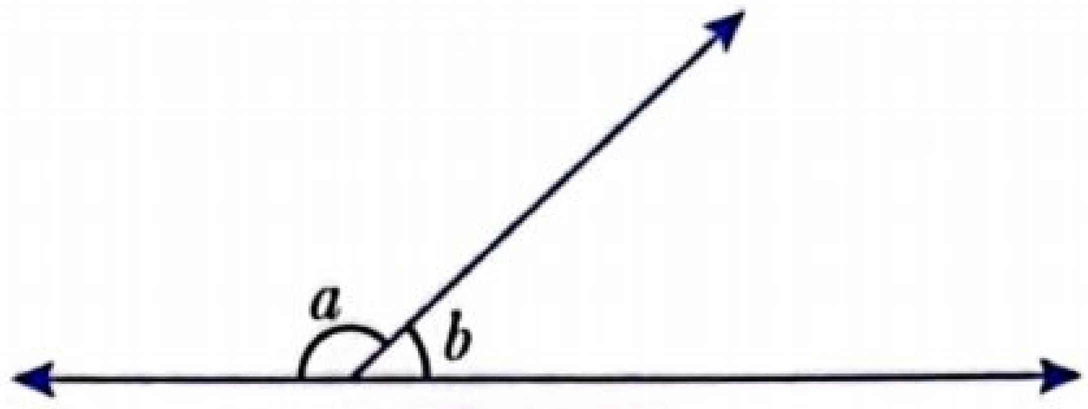


Fig. 6.93

4. Find the angle which is one-fifth of its complement.

5. In Fig. 6.94, $\angle x = \angle y$ and $\angle w = \angle z$. Prove that $l \parallel n$.

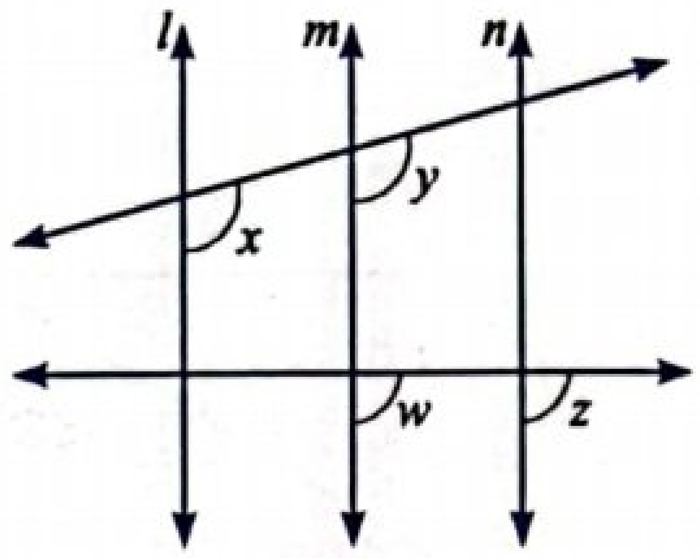


Fig. 6.94

6. In the given Fig. 6.95, if $\angle POR : \angle POS = 7 : 3$, then find the measure of $\angle ROQ$.

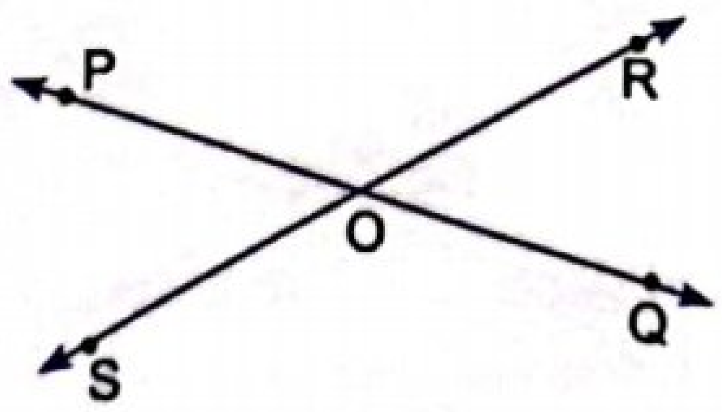


Fig. 6.95

Solve the following questions. $(4 \times 3 = 12$

7. In Fig. 6.96, $AB \parallel CD$. Find the value of $\angle FCE$.

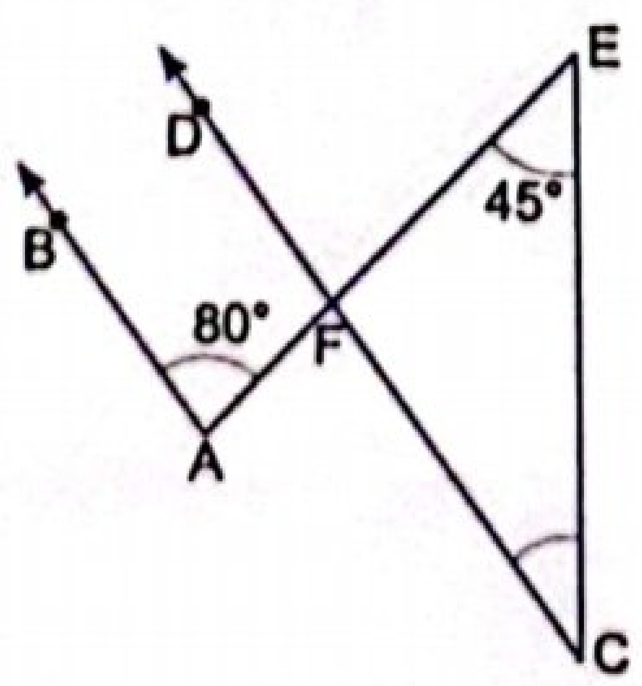


Fig. 6.96

8. In Fig. 6.97, AB, CD and EF are three lines concurrent at O. Find the value of x.

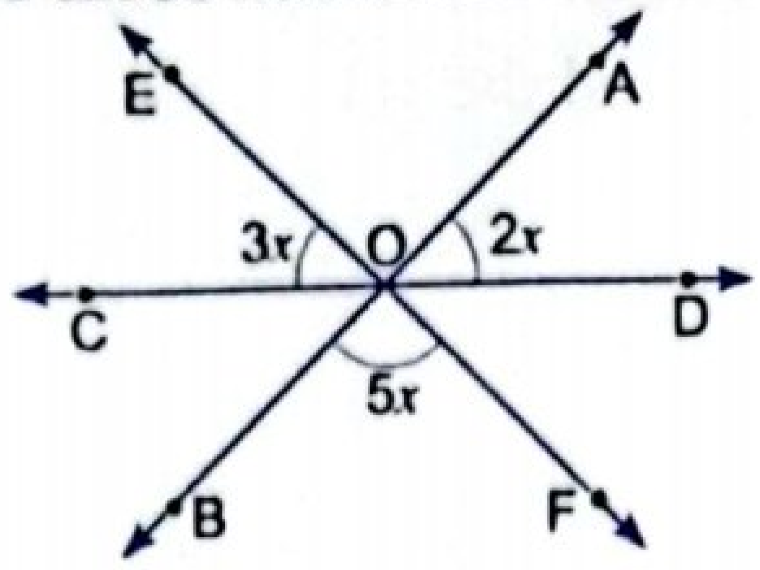


Fig. 6.97

9. In Fig. 6.98, $AB \parallel CD$, $\angle OEB = 135°$ and $\angle OFC = 40°$. Find $\angle EOF$.

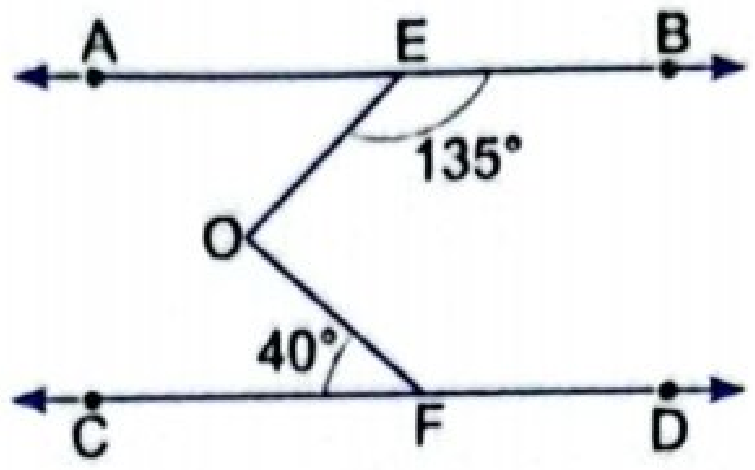


Fig. 6.98

10. Prove that if two lines intersect each other, then the vertically opposite angles are equal.

[*NCERT Exemplar*

■ **Solve the following questions.** **(3 × 5 = 15**

11. Prove that if arms of an angle are respectively parallel to the arms of another angle, then th angles are either equal or supplementary.

12. In Fig. 6.99, $AB \parallel CD$ and $CD \parallel EF$. Also, $EA \perp AB$.

If $\angle BEF = 62°$, *find the values of* w, x, y, z.

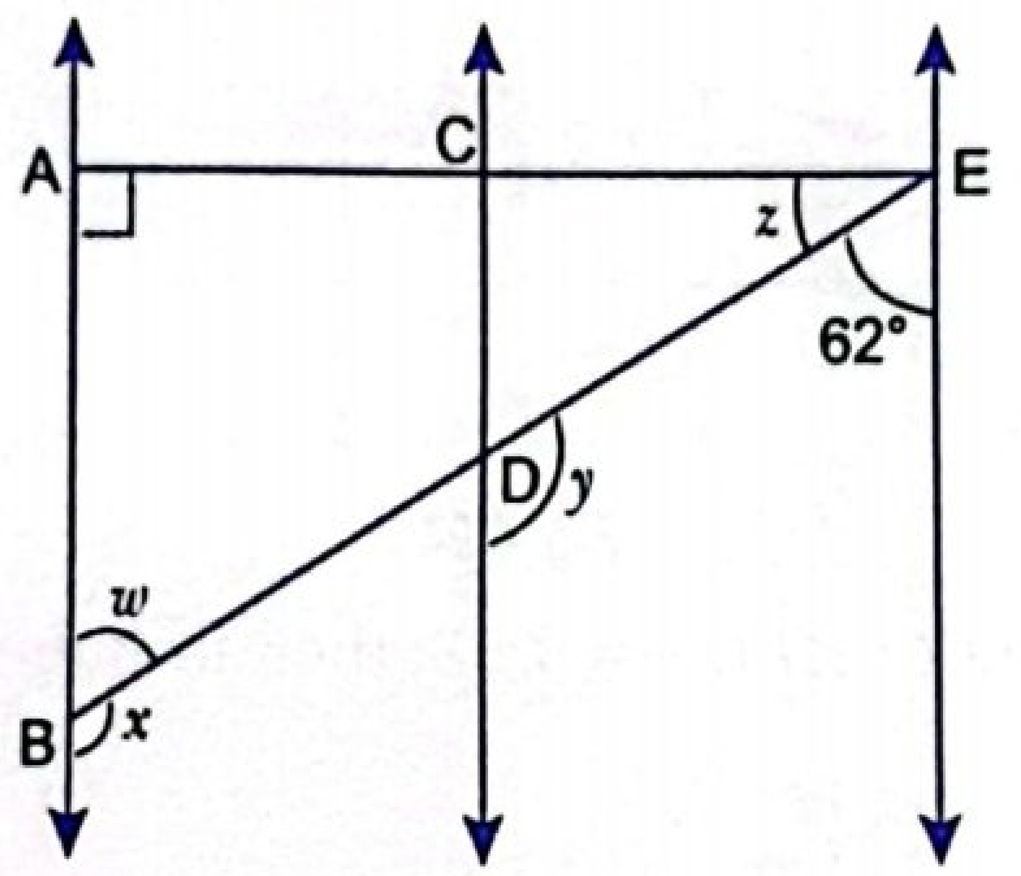


Fig. 6.99

13. If a transversal intersects two lines such that the bisectors of a pair of corresponding angles ar parallel, then prove that the two lines are parallel.

Answers

1. (*i*) (*a*) (*ii*) (*b*) (*iii*) (*a*) **2.** (*i*) 30° (*ii*) 45° **3.** 105°, 75°

4. 15° **6.** 54° **7.** 35° **8.** 18° **9.** 85°

12. $w = 62°, x = 118°, y = 118°, z = 28°$

IX H.W-8 (Answers)

1) (i) corresponding angles (a)

(ii) 120° (b)

(iii) $40^\circ + 4x + 3x = 180^\circ$

$7x = 140^\circ$

$x = 20^\circ$ (a)

2) (i) $\angle POR + \angle ROQ = 180^\circ$ (linear pair)

$\Rightarrow 4x + 2x = 180^\circ$

$\Rightarrow 6x = 180^\circ$

$\underline{\underline{x = 30^\circ}}$

(ii) 45°

3) $a - b = \frac{1}{3} \times 90^\circ$

$\Rightarrow a - b = 30^\circ$

$\Rightarrow a = 30^\circ + b \rightarrow (1)$

$a + b = 180^\circ$ (linear pair)

$\Rightarrow 30^\circ + b + b = 180^\circ$

$\Rightarrow 2b = 150^\circ$

$b = 75^\circ$ //

$a = 105^\circ$ //

4) Let the angle be x.

Then, $x = \frac{1}{5}(90^\circ - x)$

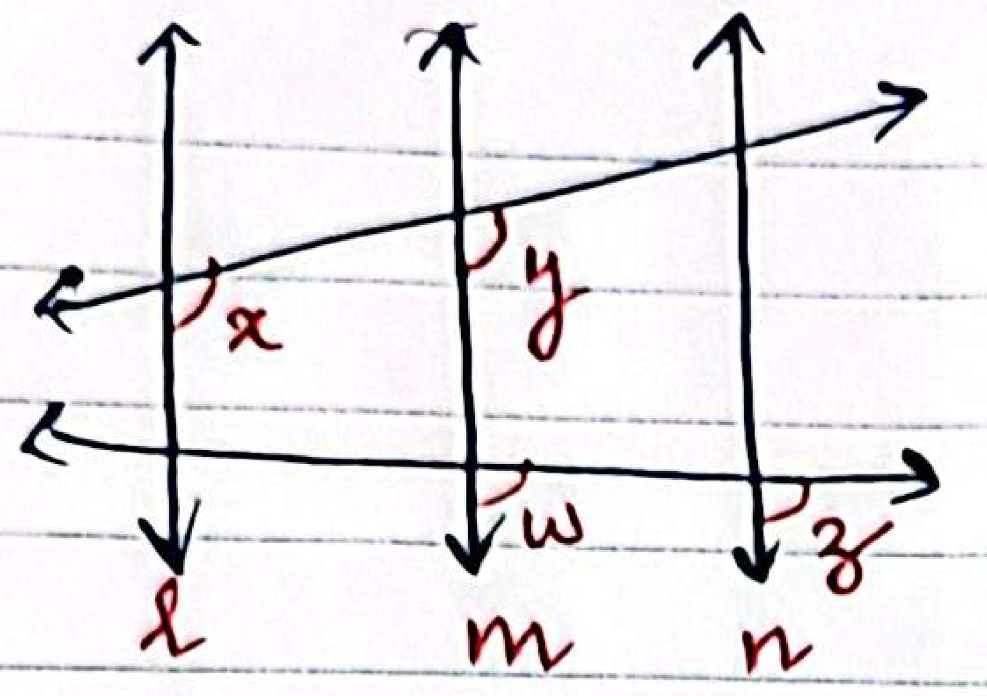
$5x = 90^\circ - x$

$6x = 90^\circ$

$x = \frac{90^\circ}{6} = 15^\circ$

Hence, the required angle is 15°

5)



Given :- $\angle x = \angle y$

$\angle w = \angle z$

To prove :- $l \parallel n$

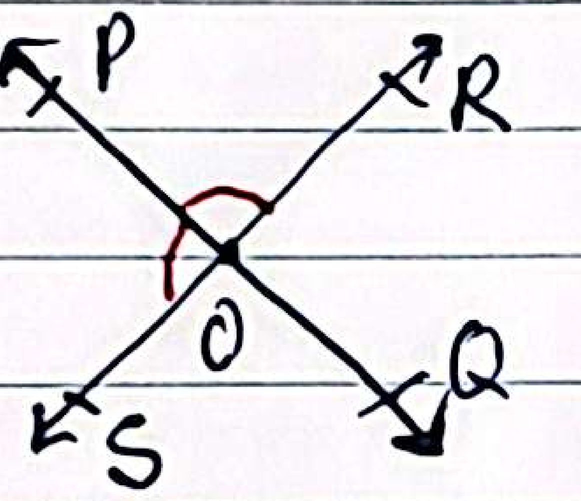
Proof :- Since $\angle x = \angle y$, these angles form a pair of corresponding angles only when $l \parallel m$.

Similarly, since $\angle w = \angle z$, these angles form a pair of corresponding angles only when $m \parallel n$

Thus, $l \parallel m$ and $m \parallel n \Rightarrow l \parallel n$

Hence Proved.

6)



$\angle POR + \angle POS = 180°$ (linear pair).

$\Rightarrow 7x + 3x = 180°$

$10x = 180°$

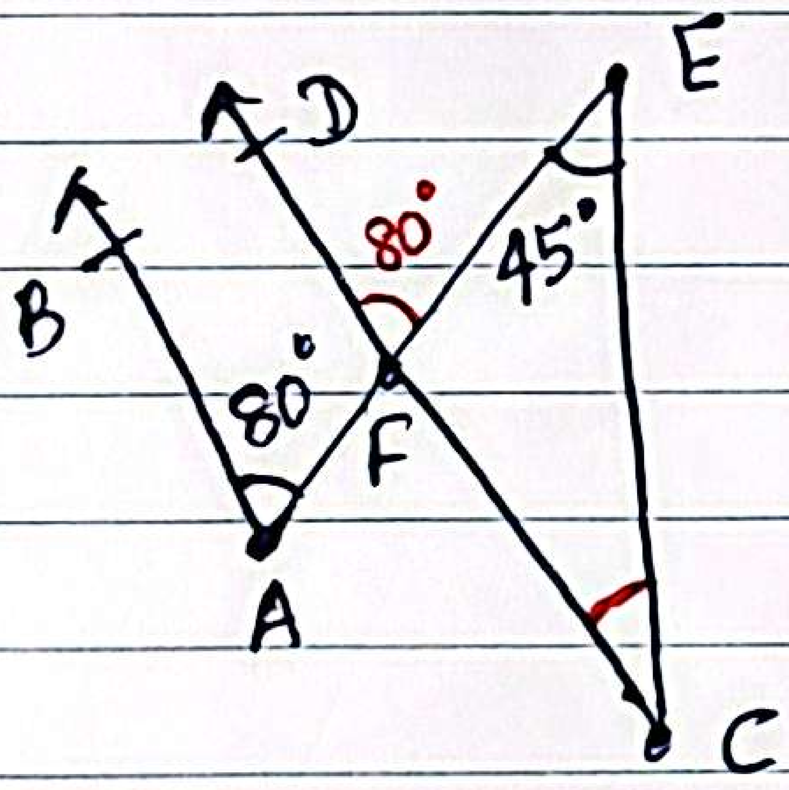
$x = 18°$

$\therefore \angle ROQ = \angle POS$ (VOA)

$= 3x = 3 \times 18°$

$= 54°$

7)



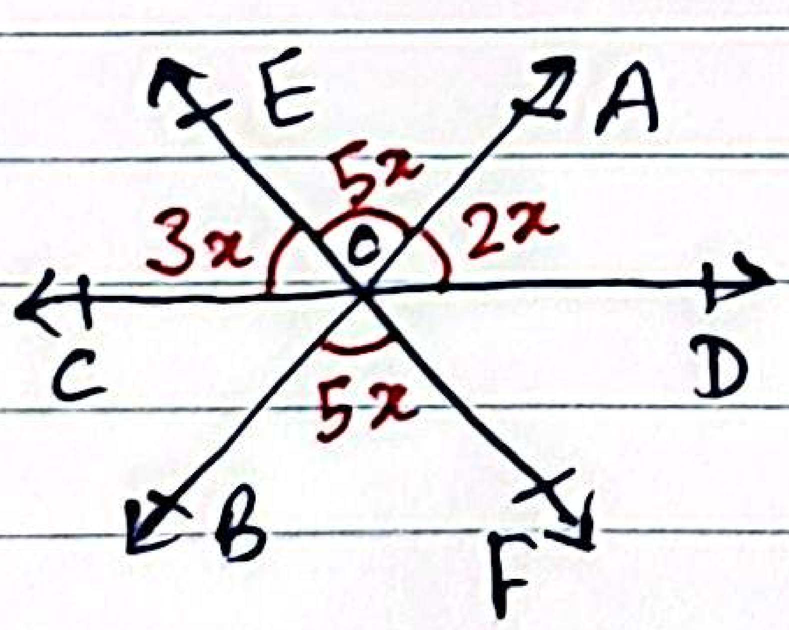
Since $AB \parallel CD$, $\angle BAF = \angle DFE = 80°$ (Corresponding angles)

Using exterior angle property in $\triangle ECF$,

$45° + \angle ECF = 80°$

$\therefore \angle FCE = 80° - 45° = 35°$

8)



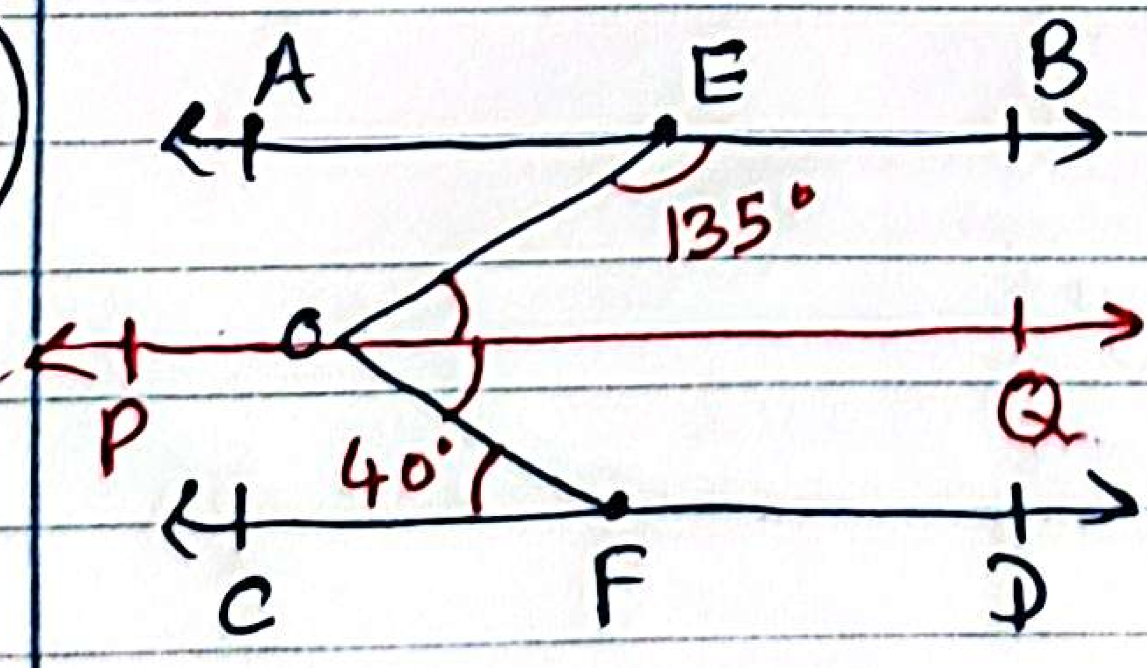
$\angle BOF = \angle AOE = 5x$ (VOA)

$3x + 5x + 2x = 180°$ (angles on a straight line)

$10x = 180°$

$x = 18°$

9)



Construction: draw $PQ \parallel AB$

Since $AB \parallel CD$ and $PQ \parallel AB$, $AB \parallel PQ \parallel CD$.

Since $AB \parallel PQ$, $\angle BEO + \angle EOQ = 180°$ (co-interior angles)

$\Rightarrow 135° + \angle EOQ = 180°$

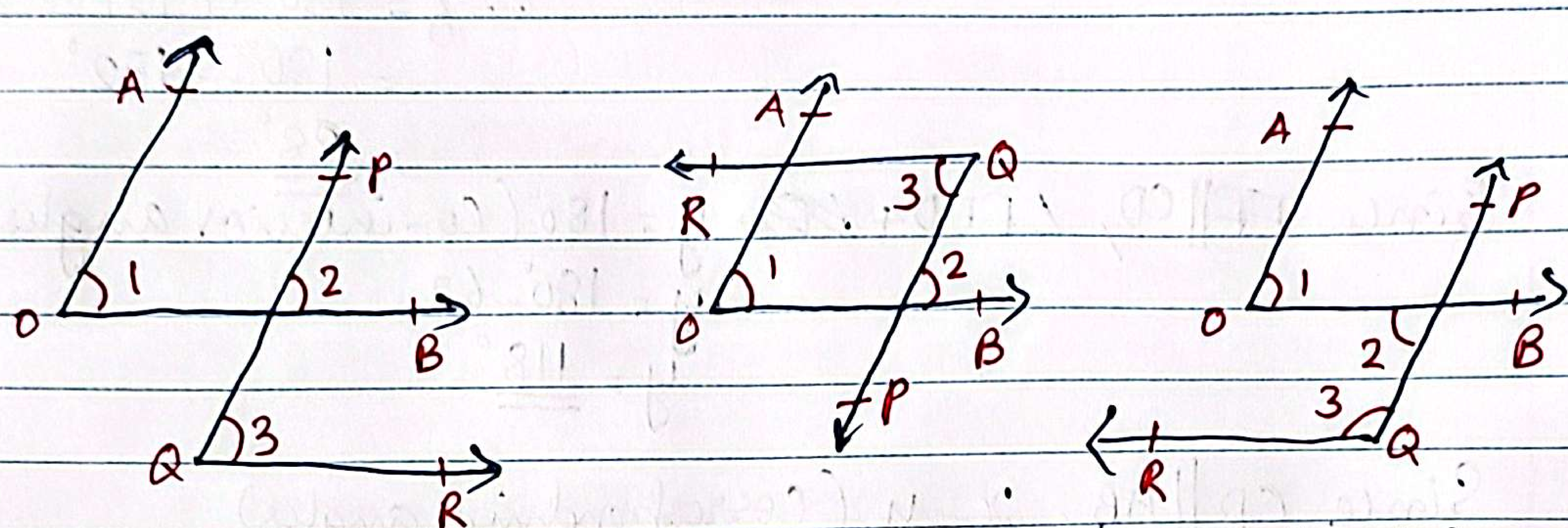
$\angle EOQ = 45°$

Similarly, since $PQ \parallel CD$, $\angle QOF = \angle OFC$ (alternate interior angles) $= 40^\circ$

$\therefore \angle EOF = \angle EOQ + \angle QOF = 45^\circ + 40^\circ = \underline{\underline{85^\circ}}$

10) (do yourself)

11)



Case (i) Case (ii). Case (iii)

Given :- $AO \parallel PQ$ and $OB \parallel QR$

To prove :- $\angle AOB = \angle PQR$ or $\angle AOB + \angle PQR = 180^\circ$

Proof :-

Case 1 :- Since $OA \parallel PQ$, $\angle 1 = \angle 2$ (corresponding angles)

Since $OB \parallel QR$, $\angle 2 = \angle 3$ (corresponding angles)

$\therefore \angle 1 = \angle 3$

$\Rightarrow \underline{\underline{\angle AOB = \angle PQR}}$

Case 2 :- Since $OA \parallel PQ$, $\angle 1 = \angle 2$ (corresponding angles)

Since $OB \parallel QR$, $\angle 2 = \angle 3$ (alternate interior angles)

$\therefore \angle 1 = \angle 3$

$\Rightarrow \underline{\underline{\angle AOB = \angle PQR}}$

Case 3 :- Since $OA \parallel PQ$, $\angle 1 = \angle 2$ (alternate interior angles)

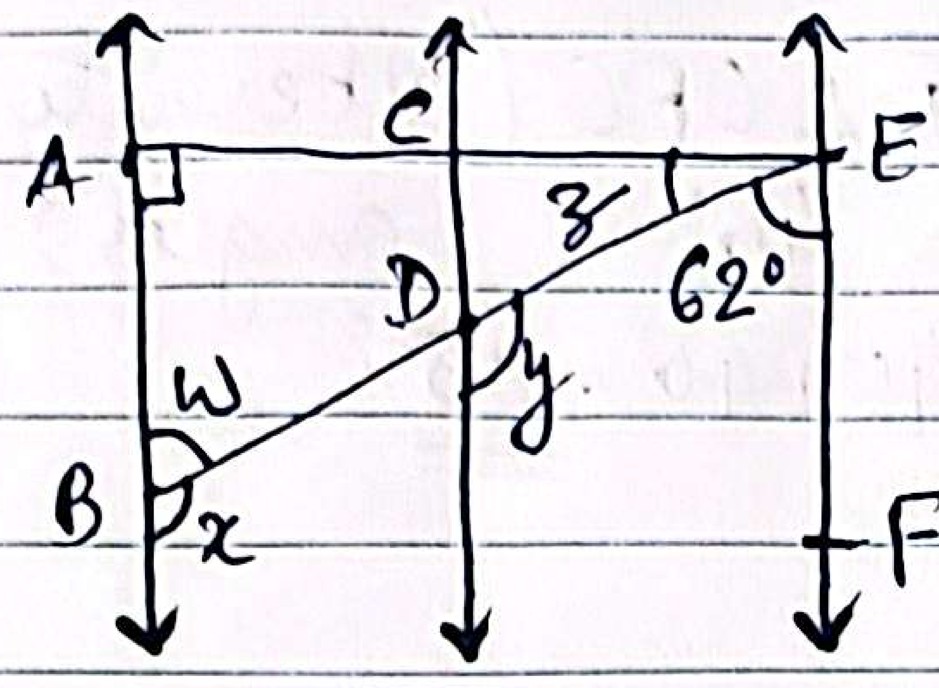
Since $OB \parallel QR$, $\angle 2 + \angle 3 = 180^\circ$ (Co-interior angles)

$\Rightarrow \angle 1 + \angle 3 = 180^\circ$

$\Rightarrow \underline{\underline{\angle AOB + \angle PQR = 180^\circ}}$

Hence Proved.

12)



Since $AB \parallel CD$ and $CD \parallel EF$,
$AB \parallel CD \parallel EF$
$\Rightarrow \angle EAB + \angle AEF = 180°$ (co-interior angles)

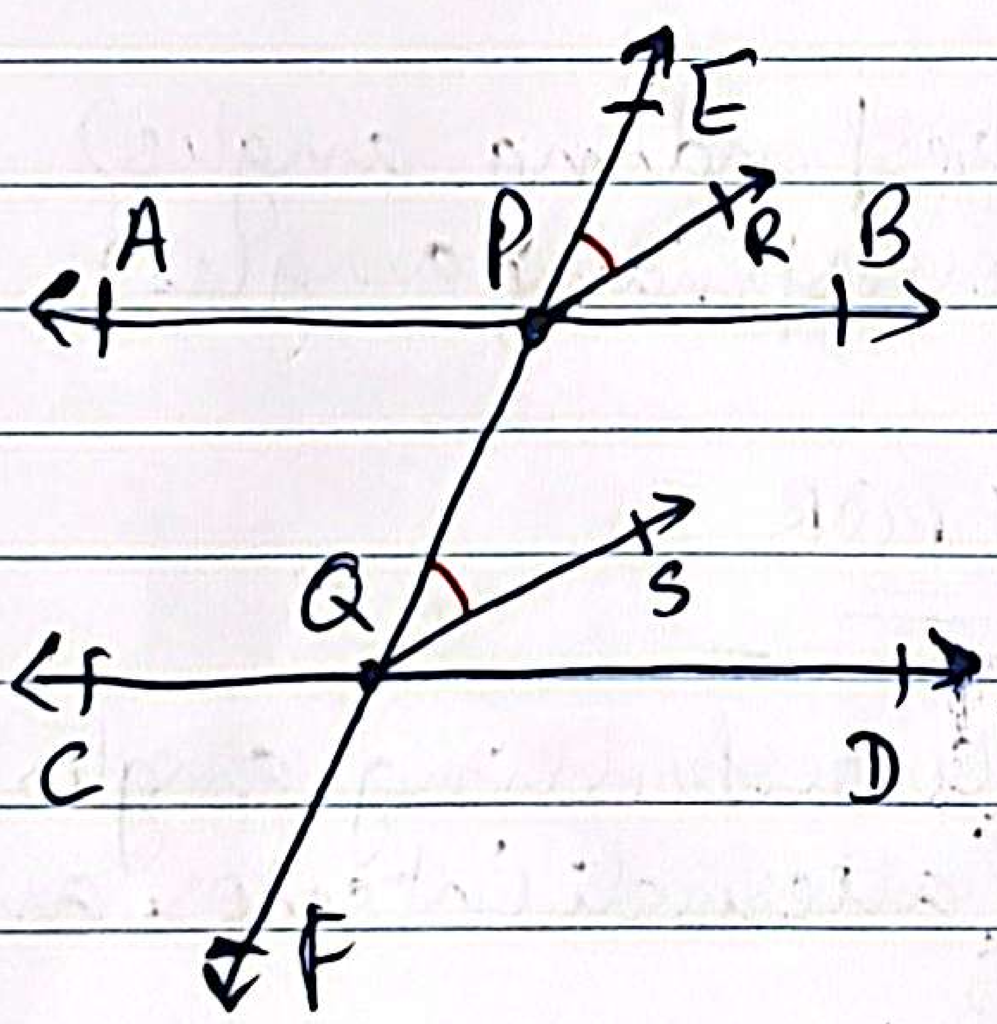
$\Rightarrow 90° + z + 62° = 180°$
$\therefore z = 180° - (90° + 62°)$
$= 180° - 152°$
$= \underline{\underline{28°}}$

Since $EF \parallel CD$, $\angle FED + \cancel{\angle ED}\ y = 180°$ (co-interior angles)
$y = 180° - 62$
$y = \underline{118°}$

Since $CD \parallel AB$, $x = y$ (corresponding angles)
$= \underline{\underline{118°}}$

$x + w = 180°$ (linear pair)
$\therefore w = 180° - 118° = \underline{\underline{62°}}$

13)



Given :- PR and QS are the angle bisectors of corresponding angles $\angle EPB$ and $\angle PQD$. $PR \parallel QS$
To prove : $AB \parallel CD$
Proof :- Since $PR \parallel QS$ and EF is the transversal,
$\angle EPR = \angle PQS$ (corresponding angles)
$\Rightarrow 2\angle EPR = 2\angle PQS$
$\Rightarrow \angle EPB = \angle PQD$ [$\because$ PR and QS are angle bisectors]
These angles form a pair of corresponding angles only when $AB \parallel CD$.
Hence proved.