

WORK SHEET

FA₃

or $\frac{4x}{3} = 180^\circ$

or

$180^\circ \times 3$

\therefore

LINES AND ANGLES

Class 7

Ch. - 5

INTERNATIONAL INDIAN SCHOOL, RIYADH

Exercise 5.1

→ FA-3

1. From figure 5.15, write the name of the.

- (i) supplementary angles
- (ii) pairs of vertically opposite angles
- (iii) angles which form linear pairs
- (iv) pairs of adjacent angles

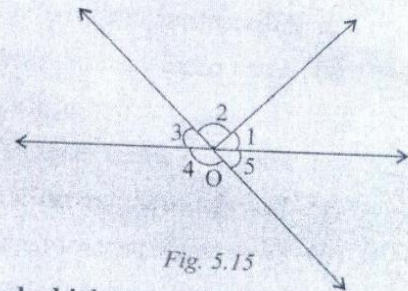


Fig. 5.15

2. Identify which of the following pairs of angles are complementary and which are supplementary.

- (i) $63^\circ, 27^\circ$
- (ii) $120^\circ, 60^\circ$
- (iii) $45^\circ, 135^\circ$
- (iv) $65^\circ, 25^\circ$
- (v) $90^\circ, 90^\circ$
- (vi) $40^\circ, 50^\circ$

3. Find the supplement of each of the following angles.

- (i) 108°
- (ii) 78°
- (iii) 180°
- (iv) 135°
- (v) 90°
- (vi) 45°
- (vii) 145°
- (viii) 65°

4. Find the complement of each of the following angles.

- (i) 35°
- (ii) 90°
- (iii) 45°
- (iv) 50°
- (v) 12°
- (vi) 70°
- (vii) 65°
- (viii) 68°

5. Find the degree measure of an angle which is $\frac{1}{2}$ of its complement.

6. Find the degree measure of an angle which is equal to its supplement.

7. Find the degree measure of an angle which is $\frac{4}{5}$ of its supplement.

8. Find the value of x in the following figures:

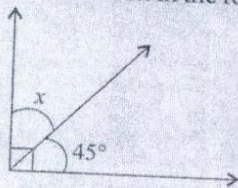


Fig. 5.16

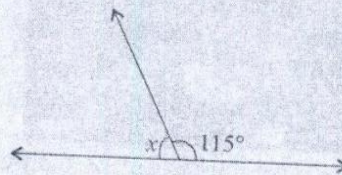


Fig. 5.17

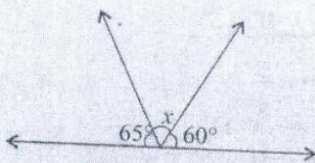


Fig. 5.18

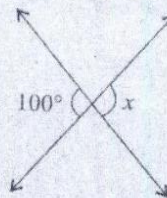


Fig. 5.19

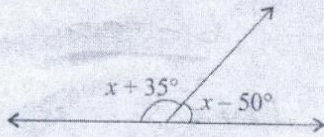


Fig. 5.20

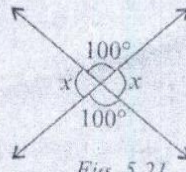


Fig. 5.21

9. State which of the following statements are true and which are false.

- (i) Adjacent angles can be complementary.
- (ii) A pair of adjacent angles always forms a pair of straight angles.
- (iii) The supplement of an acute angle is always an obtuse angle.
- (iv) The complement of 90° is 90° .
- (v) Two obtuse angles can be supplementary.
- (vi) Two complementary angles always form a linear pair.
- (vii) Vertically opposite angles are always equal.

10. In figure 5.22, if $\angle 1 = 75^\circ$, then find the measure of the other angles.

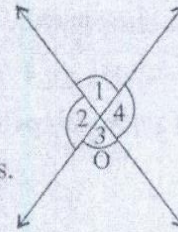


Fig. 5.22

Parallel Lines

We have already learnt that parallel lines are those lines which never meet. The distinct characteristic of parallel lines is that the perpendicular distance between them is same everywhere.

For example;

If two lines \overleftrightarrow{PQ} and \overleftrightarrow{RS} are parallel, then we write $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$. In Figure, \overleftrightarrow{PQ} and \overleftrightarrow{RS} are two parallel lines.

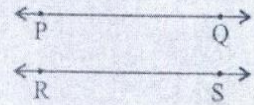
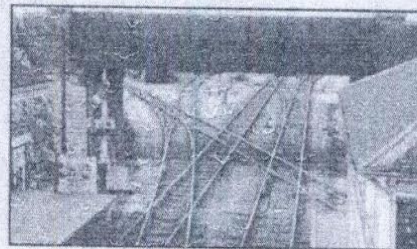
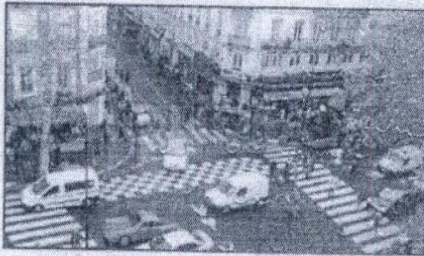


Fig. 5.23

Transversals

You might have seen a road crossing two or more roads or a railway line crossing several other lines. These give an idea of a transversal.



A line which cuts two or more lines in a plane at different points is called a transversal as shown in figure.

The given lines may be parallel or non-parallel.

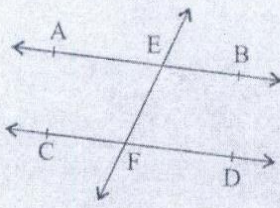


Fig. 5.24

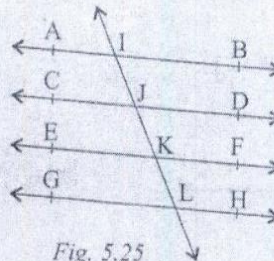


Fig. 5.25

Solved Examples

Example 1: In figure 5.32, $AB \parallel CD$ and l is a transversal. If $\angle 1$ is 55° , then find all the other angles.

Given, $\angle 1 = 55^\circ$
 $\angle 1 + \angle 2 = 180^\circ$
 $\Rightarrow 55^\circ + \angle 2 = 180^\circ$
 $\Rightarrow \angle 2 = 180^\circ - 55^\circ = 125^\circ$
 $\angle 3 = \angle 1 = 55^\circ$
 $\angle 4 = \angle 2 = 125^\circ$
 $\angle 5 = \angle 3 = 55^\circ$
 $\angle 6 = \angle 2 = 125^\circ$
 $\angle 7 = \angle 1 = 55^\circ$
 $\angle 8 = \angle 2 = 125^\circ$

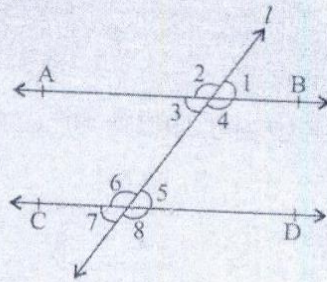


Fig. 5.32

(Linear pair)
 (Vertically opposite angles)
 (Vertically opposite angles)
 (Alternate interior angles)
 (Corresponding angles)
 (Alternate exterior angles)
 (Alternate exterior angles)

Hence, $\angle 2 = 125^\circ$, $\angle 3 = 55^\circ$, $\angle 4 = 125^\circ$, $\angle 5 = 55^\circ$, $\angle 6 = 125^\circ$, $\angle 7 = 55^\circ$ and $\angle 8 = 125^\circ$.

Example 2: In figure 5.33, $AB \parallel CD$. Find the value of x . Also find the angles $\angle 1$, $\angle 2$ and $\angle 3$.

$3x + 15^\circ = 135^\circ$
 or $3x = 135^\circ - 15^\circ$
 or $3x = 120^\circ$
 $\therefore x = \frac{120^\circ}{3} = 40^\circ$
 $\therefore x + 5^\circ = 40^\circ + 5^\circ = 45^\circ$
 $\angle 1 = 180^\circ - 45^\circ = 135^\circ$
 $\angle 2 = x + 5^\circ = 45^\circ$
 $\therefore \angle 3 = \angle 2 = 45^\circ$

Hence, $\angle 1 = 135^\circ$, $\angle 2 = 45^\circ$ and $\angle 3 = 45^\circ$.

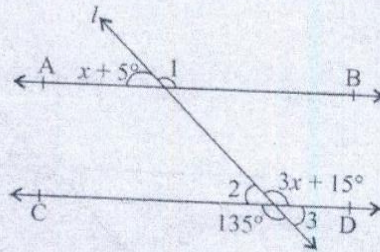


Fig. 5.33

[Vertically opposite angles]

[Corresponding angles]

[Vertically opposite angles]

Handwritten notes: 710, 180, 45, 135

Exercise 5.2

1. In figure 5.34, AB and CD are parallel lines intersected by a transversal l at points E and F respectively. If $\angle 1 = 45^\circ$, find the measure of all other angles.

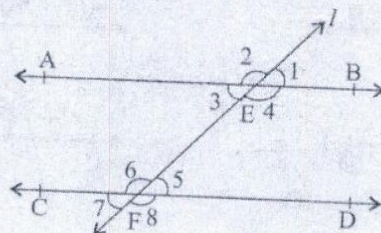


Fig. 5.34

2. In figure 5.35, $AB \parallel CD$ and l is a transversal.

$\angle MND = 65^\circ$. Find $\angle x$.

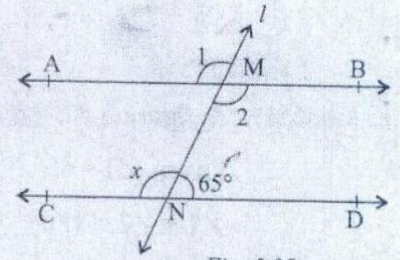


Fig. 5.35

3. In figure 5.36, $AB \parallel CD$, $\angle AEC = 45^\circ$ and $\angle BED = 60^\circ$.

Find the values of x and y .

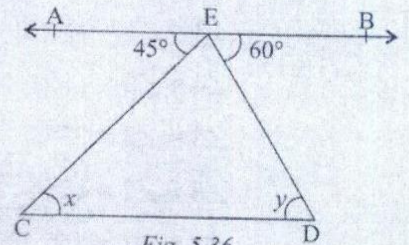


Fig. 5.36

FA-3

4. Fill in the blanks.

- (i) A line which intersects two or more lines at different points is called a _____.
- (ii) The distance between two parallel lines is the _____ everywhere.
- (iii) A pair of vertically opposite angles is always _____ in measure.
- (iv) If the sum of the measures of two angles is 180° , they are called _____.
- (v) A pair of _____ angles always has a common vertex.
- (vi) In figure 5.37, $p \parallel q$. Find.

(a) $\angle 1 + \angle 2 =$ _____.

(b) If $\angle 3 = 45^\circ$, then $\angle 4 =$ _____.

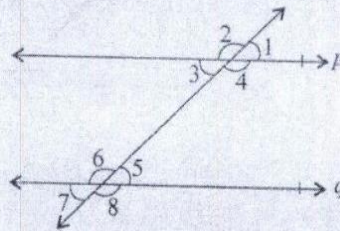


Fig. 5.37

5. In figure 5.38, $AB \parallel CD$, find the value of x and the angles marked as 1, 2, 3 and 4.

6. In figure 5.39, if $AB \parallel CD$, then find $\angle 1$ and $\angle 2$.

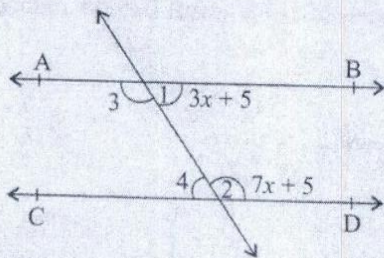


Fig. 5.38

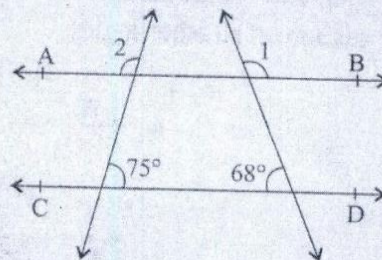


Fig. 5.39

Objective Type Questions

I. Multiple Choice Questions.

- The sum of a linear pair is:
 - (i) 90°
 - (ii) 120°
 - (iii) 180°
 - (iv) 360°
- If two parallel lines are intersected by a transversal, then a pair of alternate angles is
 - (i) equal
 - (ii) complementary
 - (iii) supplementary
 - (iv) none of these
- Two lines perpendicular to the same line in a plane are:
 - (i) intersecting
 - (ii) parallel
 - (iii) concurrent
 - (iv) none of these
- If two parallel lines are intersected by a transversal, then a pair of corresponding angles is
 - (i) complementary
 - (ii) supplementary
 - (iii) equal
 - (iv) unequal
- A line which intersects two or more given lines in a plane at different points is called a:
 - (i) parallel line
 - (ii) concurrent line
 - (iii) transversal
 - (iv) none of these

II. Fill in the blanks.

- Lines parallel to the same line are _____ to each other.
- Supplement of _____ is 0° .
- The angles whose arms do not contain the segment of the transversal in between the two lines are called _____.
- The _____ between two parallel lines is the same everywhere.
- If two parallel lines are cut by a transversal, the corresponding angles, thus formed are _____ in measure.

III. Tick (✓) for 'True' and (×) for 'False'.

- Linear pair of angles is always adjacent.
- If a transversal cuts two parallel lines, the sum of two corresponding angles is equal to 180° .
- Two lines in the same plane are parallel, if they never intersect each other.
- If two parallel lines are intersected by a transversal, then the sum of the interior angles on the same side of the transversal is equal to 180° .
- If two lines intersect, then vertically opposite angles are unequal.

IV. Match the following.

Measure of an angle

- (i) 210°
- (ii) 135°
- (iii) 50°
- (iv) 360°
- (v) 180°
- (vi) 330°
- (vii) 105°
- (viii) 90°

Type of the angle

- (a) obtuse angle
- (b) reflex angle
- (c) acute angle
- (d) straight angle
- (e) reflex angle
- (f) complete angle
- (g) right angle
- (h) obtuse angle



7. In figure 5.40, the arms of two angles are parallel. If $\angle ABC = 60^\circ$, then find $\angle DEF$.

8. In figure 5.41, find the values of x and y .

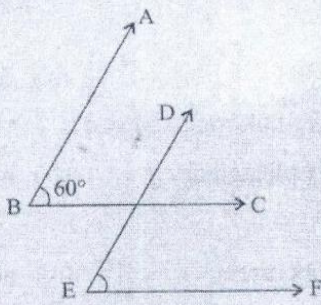


Fig. 5.40

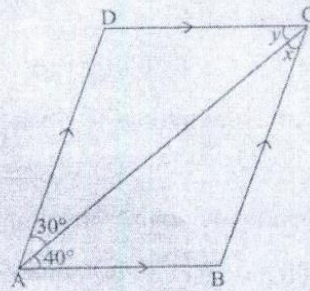


Fig. 5.41

9. In figure 5.42, $AB \parallel CD$. Find the measures of x and y .

10. Find the values of x and y in the following figures 5.43, 5.44. It is given that $AB \parallel CD$ and transversal l intersects them.

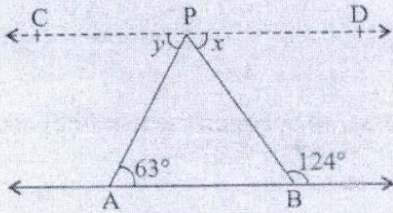


Fig. 5.42

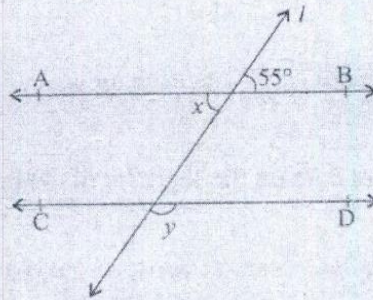


Fig. 5.43

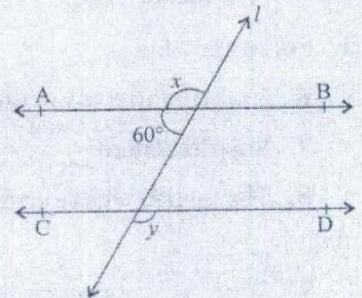


Fig. 5.44

QUICK RECALL

- Two angles whose sum is 90° are called complementary angles.
- Two angles whose sum is 180° are called supplementary angles.
- Vertically opposite angles are equal.
- Two lines in a plane either intersect at exactly one point or are parallel.
- The distance between two parallel lines is the same everywhere.
- The distance between parallel lines is measured by the perpendicular distance between them.
- If two parallel lines are intersected by a transversal, then
 - any pair of corresponding angles are equal;
 - any pair of alternate angles are equal; and
 - a pair of interior angles (or exterior angles) on the same side of the transversal is supplementary.

