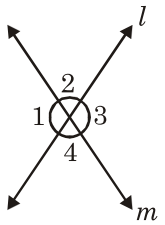
CHAPTER 5

LINES AND ANGLES

Points to Remember :

- ❑ (*i*) A line segment has two end points.
  (*ii*) A ray has only one end point.
  (*iii*) A line has no end points.
- ❑ When two lines meet at a point, they are called intersecting lines and when two lines do not meet even on extending, we call them Parallel lines.
- ❑ Vertically opposite angles formed by two intersecting lines are equal.
- ❑ Complementary angles : Two angles whose sum is 90°.
  Supplementary angles : Two angles whose sum is 180°.
- ❑ Adjacent angles : Two angles are called adjacent angles if they have
  (*i*) a common vertex (*ii*) a common arm (*iii*) Non common arms are on either side of common arm.
- ❑ When a transversal intersects two parallel lines then :
  (*a*) Each pair of corresponding angles are equal.
  (*b*) Each pair of alternate interior angles are equal.
  (*c*) Interior angles on the same side of the transversal are supplementary.

QUESTIONS



1. In the given Fig. *i.e.,* $\angle 1 = 50^\circ$ then find $\angle 2$, $\angle 3$, $\angle 4$.

2. Find complement of the following angles :
   (*a*) 20° (*b*) 66° (*c*) 40° (*d*) 35°

3. Find supplement of the following angles.

   (*a*) 105° (*b*) 87° (*c*) 154°

4. Identify which of the following pair of angles are complementary and which are supplementary :

   (*a*) 63°, 117° (*b*) 23°, 67° (*c*) 105°, 75° (*d*) 120°, 60°.

5. Two supplementary angles are in the ratio 3 : 7, find the angles.

6. Two complementary angle are in the ratio 2 : 3, find the angles.

7. Find the angle which is half of its complementary angle.

8. Find the angle which is one third of its supplementry angle.

9. Find the angle which is equal to its supplement.

10. Two angles of a linear pair are in the ratio 2 : 7, find the angles.

11. Find the angle which is equal to its complement.

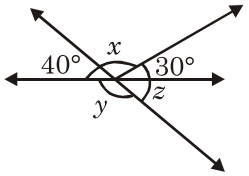
12. An angle is greater than 30° than its complement. What the measurement of complementary angles?

13. An angle is equal to 5 times its complement. Determine its measure.

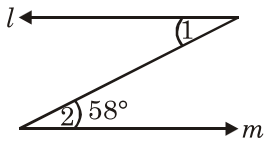
14. An angle is equal to 8 times its supplement. Determine its measure.

15. An angle is greater than 60° than its supplementary angle. What is the supplementary angle?

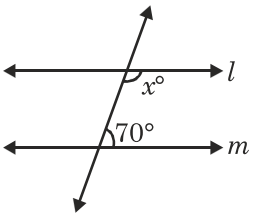
16. Determine the value of x, y and z in the following figure.



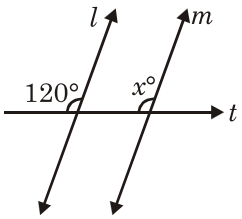
17. If $l \| m$ and $\angle 2 = 58°$ find $\angle 1$.



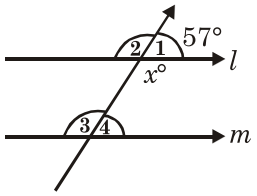
18. $l \| m$ and t is a transversal, find x.



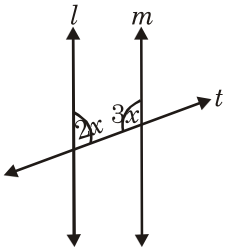
19. If $l \| m$ and t is a transversal, find x.



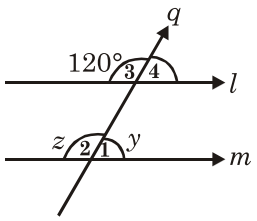
20. If $l \| m$ and $\angle 1 = 57°$, then find $\angle 2$, $\angle 3$ and $\angle 4$.



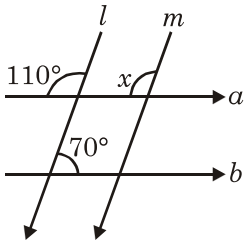
21. Find the value of x if $l \| m$.



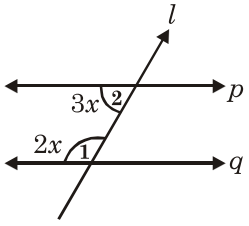
22. Find value of y and z if $l \| m$.



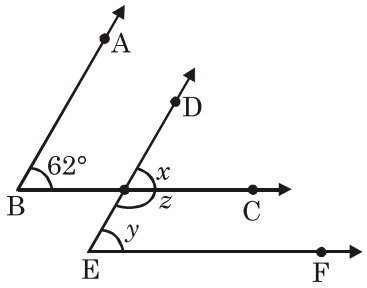
23. If $l \| m$, find x.



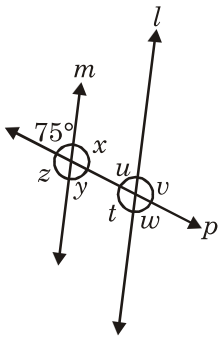
24. If $p \| q$ and l is a transversal, find x.



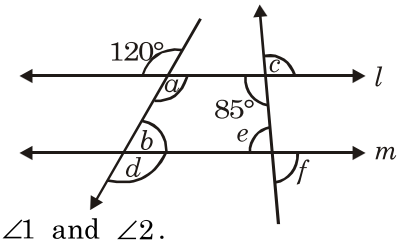
25. In the given fig $AB \| ED$ and $BC \| EF$. If $\angle ABC = 62°$, find $\angle x$, $\angle y$ and $\angle z$.



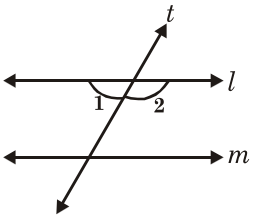
26. If $l \| m$ find x, y, z, u, v, t and w.



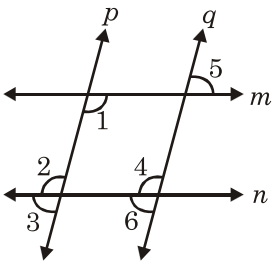
27. In the given fig $l \| m$ find value of a, b, c d, e, f



28. In fig. $l \| m$ If $\angle 1$ and $\angle 2$ are in the ratio 2 : 3, find $\angle 1$ and $\angle 2$.



29. If $m \| n$ and p and q are transversal.

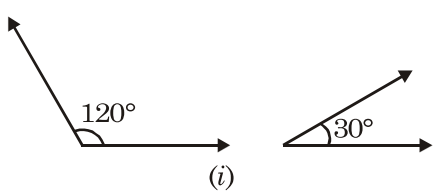


$\angle 1 = 123°$, find $\angle 2$, $\angle 3$. Also if $\angle 4 = 85°$ and $\angle 5$ and $\angle 6$.

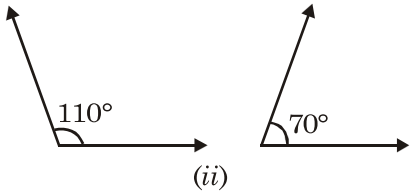
30. The difference of the measures of two complementry angles is 40°. Find the measures of the angles.

31. The difference in the measure of two supplementry angles is 80°, find the measures of the angles.

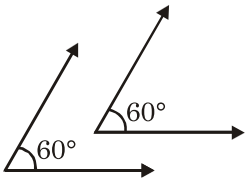
32. Find the pair of supplementary angles in the figure.



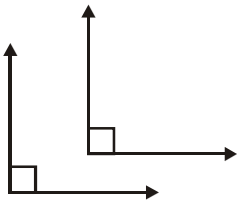
(*i*)



(*ii*)

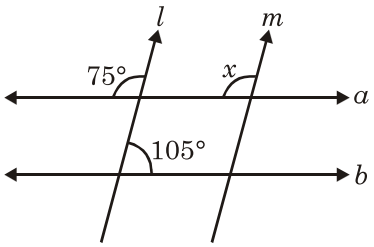


(*iii*)



(*iv*)

33. Find x if $l \| m$.



34. Two complementry angles are in the ratio 4 : 5, find the greater angle.

35. Find the angle which is 9 times of its supplementry angle.

36. Two angles of a linear pairs are in the ratio 1 : 5 find angles.

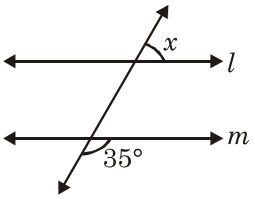
37. Two supplementry angles are in the ratio 2 : 3, find the smallest angle.

38. An angle is 20° greater than its complementry angle. What is the complementry angle.

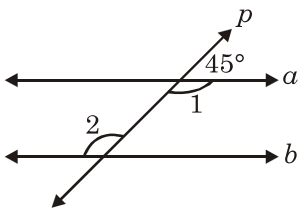
39. An angle is equal to 3 times of its supplement. Determine its measure.

40. An angle is equal to double of its complement. Determine its measure.

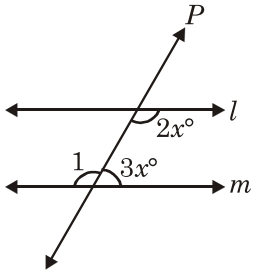
41. Find value of x, if $l \| m$.



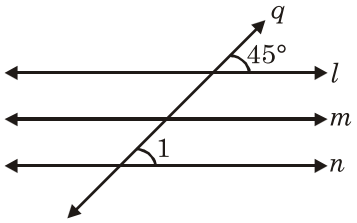
42. If $a \| b$ and P is a transversal find $\angle 1$ and $\angle 2$.



43. If $l \| m$ and P is a transversal, find $\angle 1$.



44. If $l \| m \| n$ and q is a transversal, then find $\angle 1$.

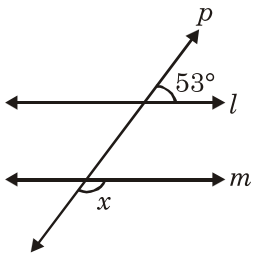


45. Find the angle which is $\frac{1}{5}$th of its complementry angle.

46. An angle is greater then 25° than its complement. What is its complementary angle?

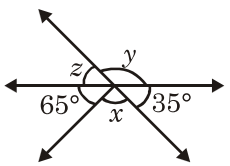
47. An angle is greater than 80° than its supplement. What is its supplementary angle.

48. If $l \| m$ and P is a transversal, find x.



49. Find the angle which is $\frac{1}{9}$th of its supplementary angle.

50. From the figure, find x, y, z.



ANSWERS

1. $\angle 2 = 130°$, $\angle 3 = 50°$, $\angle 4 = 130°$
2. (*a*) 70° (*b*) = 24° (*c*) 50° (*d*) = 55°
3. $a = 75°$; $b = 93°$; $c = 26°$.
4. Complementry = *b*, Supplementry = *a*, *c*, *d*
5. 54°, 126°
6. 36°, 54°
7. 30°
8. 45°
9. 90°
10. 40°, 140°
11. 45°
12. 60°, 30°
13. 15°, 75°
14. 20°, 160°
15. 60°
16. $x = 110°$, $y = 140°$, $z = 40°$
17. $\angle 1 = 58°$
18. 110°
19. 120°
20. $\angle 2 = 123°$, $\angle 4 = 57°$, $\angle 3 = 123°$
21. $\angle 1 = 135°$, $\angle 2 = 45°$
22. $\angle y = 60°$, $\angle z = 120°$
23. $x = 110°$
24. $x = 36°$
25. $\angle x = 62°$, $\angle y = 62°$, $\angle z = 118°$
26. $\angle x = 105°$, $\angle y = 75°$, $\angle z = 105°$, $\angle u = 75°$, $\angle v = 105°$, $\angle t = 105$, $\angle w = 75°$
27. $a = 120°$, $b = 60°$, $c = 85°$, $d = 120°$, $e = 95°$, $f = 95°$
28. 72°, 108°
29. $\angle 2 = 123°$, $\angle 3 = 57°$, $\angle 5 = 95°$, $\angle 6 = 95°$.
30. 25°, 65°.
31. 50°, 130°
32. (*ii*), (*iv*)
33. $x = 75°$
34. 50°
35. 162°
36. 30°, 150°
37. 72°
38. 35°
39. 135°
40. 60°
41. 145°
42. $\angle 1 = \angle 2 = 135°$
43. 72°
44. $\angle 1 = 45°$
45. 15°
46. 57.5°
47. 130°
48. 127°
49. 18°
50. $x = 80°$, $y = 145°$, $z = 35°$.

RAPID FIRE ROUND

1. What is the complementary angle of 25°?
2. What is supplementary angle of 135°?
3. If two lines intersect each other and $\angle 1$ and $\angle 2$ are vertically opposite angles. If $\angle 1 = 70°$ find $\angle 2$.
4. An angle is $\frac{4}{5}$ of its complement. Find the angle.
5. An angle is $\frac{2}{3}$ of its supplement. Find the angle.
6. Find the supplement of a right angle.
7. An angle is equal to its complement, what is its magnitude?
8. An angle is equal to its supplement, what is its magnitude?
9. What is the supplement of an acute angle?
10. An angle is greater than 45°, what is its complementry angle?

ANSWERS

1. 65°
2. 45°
3. 70°
4. 40°
5. 72°
6. 90°
7. 45°
8. 90°
9. obtuse angle.
10. Less than 45°