1) For what value of $x + y$ in Fig. 6.4 will ABC be a line? Justify your answer.

2) Can a triangle have all angles less than 60°? Give reason for your answer.

3) Can a triangle have two obtuse angles? Give reason for your answer.

4) How many triangles can be drawn having its angles as 45°, 64° and 72°? Give reason for your answer.

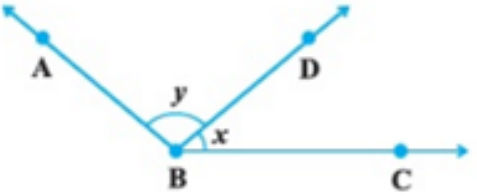

Fig. 6.4

5) How many triangles can be drawn having its angles as 53°, 64° and 63°? Give reason for your answer.

6) In Fig. 6.5, find the value of x for which the lines l and m are parallel.

7) Two adjacent angles are equal. Is it necessary that each of these angles will be a right angle? Justify your answer.

8) If one of the angles formed by two intersecting lines is a right angle, what can you say about the other three angles? Give reason for your answer.

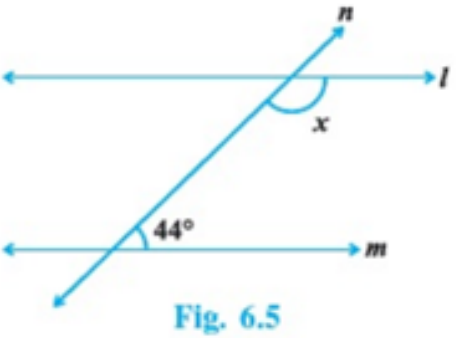

Fig. 6.5

9) In Fig.6.6, which of the two lines are parallel and why?

Fig. 6.6

10) Two lines l and m are perpendicular to the same line n. Are l and m perpendicular to each other? Give reason for your answer.

11) In Fig. 6.9, OD is the bisector of $\angle AOC$, OE is the bisector of $\angle BOC$ and $OD \perp OE$. Show that the points A, O and B are collinear.

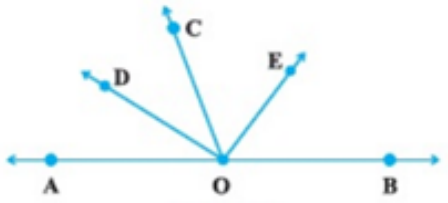

Fig. 6.9

12) In Fig. 6.10, $\angle 1 = 60°$ and $\angle 6 = 120°$. Show that the lines m and n are parallel.

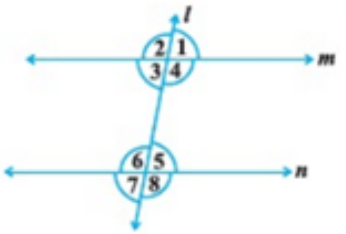

Fig. 6.10

13) AP and BQ are the bisectors of the two alternate interior angles formed by the intersection of a transversal t with parallel lines l and m (Fig. 6.11). Show that AP ∥ BQ.

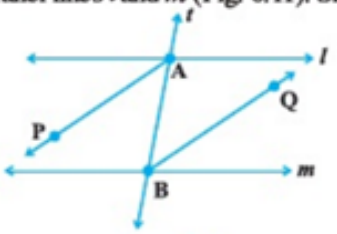

Fig. 6.11

14) If in Fig. 6.11, bisectors AP and BQ of the alternate interior angles are parallel, then show that $l \parallel m$.

15) In Fig. 6.12, BA ∥ ED and BC ∥ EF. Show that $\angle ABC = \angle DEF$

[Hint: Produce DE to intersect BC at P (say)].

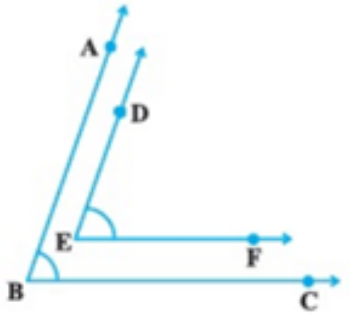

Fig. 6.12

16) In Fig. 6.13, BA ‖ ED and BC ‖ EF. Show that $\angle ABC + \angle DEF = 180°$

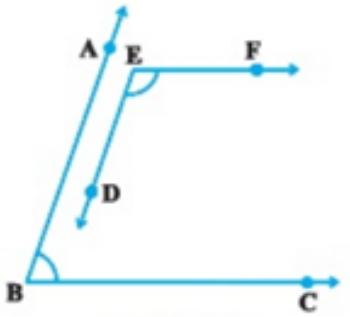

Fig. 6.13

17) In Fig. 6.14, DE ‖ QR and AP and BP are bisectors of $\angle$ EAB and $\angle$ RBA, respectively. Find $\angle APB$.

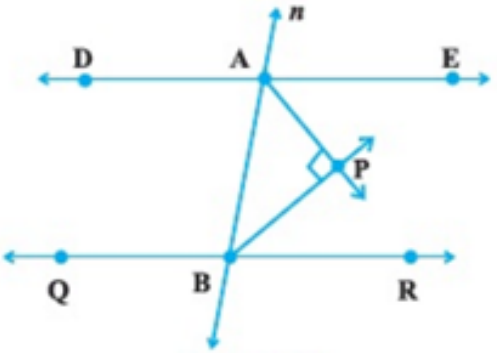

Fig. 6.14

18) The angles of a triangle are in the ratio 2 : 3 : 4. Find the angles of the triangle.

19) A triangle ABC is right angled at A. L is a point on BC such that AL $\perp$ BC. Prove that $\angle BAL = \angle ACB$.

20) Two lines are respectively perpendicular to two parallel lines. Show that they are parallel to each other.

21) If two lines intersect, prove that the vertically opposite angles are equal.

22) Bisectors of interior $\angle B$ and exterior $\angle ACD$ of a ΔABC intersect at the point T. Prove that

$$\angle BTC = \frac{1}{2} \angle BAC.$$

23) A transversal intersects two parallel lines. Prove that the bisectors of any pair of corresponding angles so formed are parallel.

24) Prove that through a given point, we can draw only one perpendicular to a given line.

[Hint: Use proof by contradiction].

25) Prove that two lines that are respectively perpendicular to two intersecting lines intersect each other.

[Hint: Use proof by contradiction].

26) Prove that a triangle must have atleast two acute angles.

27) In Fig. 6.17, $\angle Q > \angle R$, PA is the bisector of $\angle QPR$ and $PM \perp QR$. Prove that

$$\angle APM = \frac{1}{2} (\angle Q - \angle R).$$

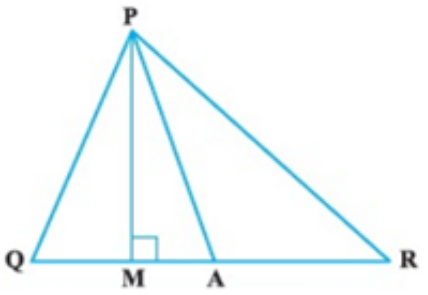

Fig. 6.17