

**Class: VII**  
**Subject: Math's**  
**Topic: Lines and angles**  
**No. of Questions: 20**

Q1 In fig 5.4, are the angles 1 and 2 of the letter N forming a pair of adjacent angles? Give reasons.

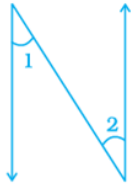


Fig. 5.4

Sol. No,  $\angle 1$  and  $\angle 2$  are not forming a pair of adjacent angles as they do not have a common vertex.

Q2. In fig. 5.6  $AB \parallel EF$ ,  $ED \parallel CD$  and  $\angle APE$  is  $39^\circ$ . Find  $\angle CQF$ .

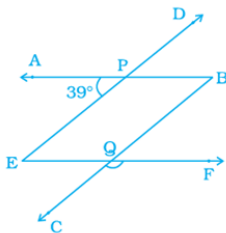


Fig. 5.6

Sol. Since  $ED \parallel BE$  and  $AB$  is a transversal. So [Corresponding angles]

$$\text{Or } \angle QBP = 39^\circ$$

Now  $AB \parallel EF$  and  $BC$  is a transversal.

$$\text{Therefore, } \angle FQB = \angle QBP$$

[Alternate interior angles]

$$\text{Or } \angle FQB = 39^\circ$$

$$\text{Also, } \angle CQF + \angle FQB = 180^\circ$$

$$\text{Or } \angle CQF = 180^\circ - 39^\circ$$

Or  $\angle CQF = 141^\circ$

Q3 In fig. 5.7, CD intersects the line AB at F,  $\angle CFB = 50^\circ$  and  $\angle EFA = \angle AFD$ . Find the measure of  $\angle EFC$ .

Sol. Let  $\angle EFA = x$

Then  $\angle AFD = x$ .

It is given that CD intersects line AB at F. Therefore,  $\angle CFB = \angle AFD$

(Vertically opposite angles)

So,  $x = 50^\circ$

But  $\angle EFA = \angle AFD$  which gives  $\angle EFA = 50^\circ$

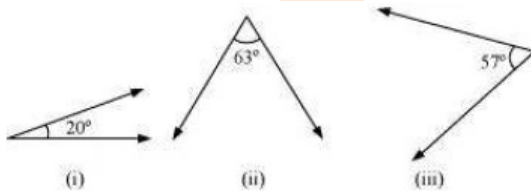
Now,  $\angle CFB + \angle EFA + \angle EFC = 180^\circ$  [As AB is a straight line].

Or,  $50^\circ + 50^\circ + \angle EFC = 180^\circ$

Or,  $\angle EFC = 180^\circ - 100^\circ$

Thus,  $\angle EFC = 80^\circ$ .

Q4. Find the complement of each of the following angles:



Sol. The sum of the measures of complementary angles is  $90^\circ$

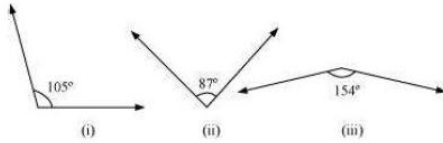
(i)  $20^\circ$   
Complement =  $90^\circ - 20^\circ$   
=  $70^\circ$

(ii)  $63^\circ$   
Complement =  $90 - 63^\circ$   
=  $27^\circ$

(iii)  $57^\circ$   
Complement =  $90^\circ - 57^\circ$

$$= 33^\circ$$

Q5. Find the supplement of each of the following angles:



Sol. The sum of the measures of supplementary angles is  $180^\circ$

- (i)  $105^\circ$   
Supplement =  $180^\circ - 105^\circ$   
 $= 75^\circ$
- (ii)  $87^\circ$  Supplement =  $180^\circ - 87^\circ$   
 $= 93^\circ$
- (iii)  $154^\circ$   
Supplement =  $180^\circ - 87^\circ$   
 $= 26^\circ$

Q6. Find the angle which is equal to its supplement

Sol. Let the angle be  $x$ .

Supplement of this angle is also  $x$ .

The sum of the measures of a supplementary angles pair is  $180^\circ$

$$\therefore x + x = 180^\circ$$

Q7. Can two angles be supplementary if both of them are:

- (i) Acute?  
(ii) Obtuse?  
(iii) Right?

Sol.

- (i) No. Acute angle is always lesser than  $90^\circ$ . It can be observed that two angles, even of  $89^\circ$ , cannot add up to  $180^\circ$ . Therefore, two acute angles cannot be in a supplementary angle pair.

- (ii) No. Obtuse angle is always greater than  $90^\circ$ . It can be observed that two angles, even of  $91^\circ$ , will always add up to more than  $180^\circ$ . Therefore, two obtuse angles cannot be in a supplementary angle pair.
- (iii) Yes, Right angles are of  $90^\circ + 90^\circ = 180^\circ$

Therefore, two right angles for a supplementary angle pair together.

Q8. An angle is greater than  $45^\circ$ . Is its complementary angle greater than  $45^\circ$  or equal to  $45^\circ$ ?

Sol. Let A and B are two angles making a complementary angle pair and A is greater than  $45^\circ$ .

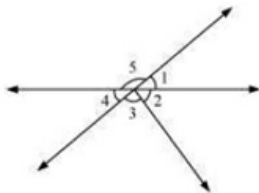
$$A + B = 90^\circ$$

$$B = 90^\circ - A$$

Therefore, B will be lesser than  $45^\circ$ .

Q9. Indicate which pairs of angles are:

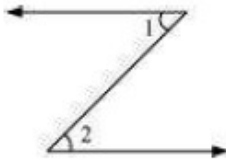
- (i) Vertically opposite angles
- (ii) Linear pairs.



Sol.

- (i)  $\angle 1$  and  $\angle 4$ , and  $\angle 5$  and  $\angle 2 + \angle 3$  are vertically opposite angles as these are formed due to the intersection of two straight lines.
- (ii)  $\angle 1$  and  $\angle 5$ , and  $\angle 5$  and  $\angle 4$  as these have a common vertex and also have non-common arms opposite to each other.

Q10. In the following figure, is  $\angle 1$  adjacent to  $\angle 2$ ? Give reason.



Sol.  $\angle 1$  and  $\angle 2$  are adjacent angle because their vertex is not common.

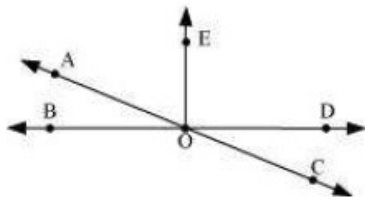
Q11. Fill in the blank:

- (i) If two angles are complementary, then the sum of their measures is -----.
- (ii) If two angles are supplementary, then the sum of their measure is -----.
- (iii) Two angles forming a linear pair are -----.
- (iv) If two adjacent angles are supplementary, they form a -----.
- (v) If two lines intersect at a point, then the vertically opposite angles are always -----.
- (vi) If two lines intersect at a point, and if one pair of vertically opposite angles are acute angles, then the other of vertically opposite angles are -----.

Sol.

- (i)  $90^\circ$
- (ii)  $180^\circ$
- (iii) Supplementary
- (iv) Linear pair
- (v) Equal
- (vi) Obtuse angles

Q12. In the adjoining figure, name the following pairs of angles.



- (i) Obtuse vertically opposite angles
- (ii) Adjacent complementary angles
- (iii) Equal Supplementary angles
- (iv) Unequal supplementary angles

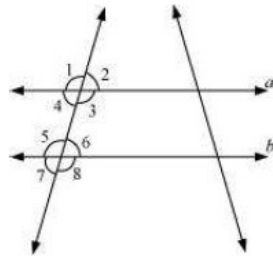
- (v) Adjacent angles that do not form a linear pair

Sol.

- (i)  $\angle AOD, \angle BOC$   
(ii)  $\angle EOA, \angle AOB$   
(iii)  $\angle EOB, \angle EOD$   
(iv)  $\angle EOA, \angle EOC$   
(v)  $\angle AOB$  and  $\angle AOE, \angle AOE$  and  $\angle EOD, \angle EOD$  and  $\angle COD$

Q13. State the property that is used in each of the following statements?

- (i) If  $a \parallel b$ , then  $\angle 1 = \angle 5$   
(ii) If  $\angle 4 = \angle 6$ , then  $a \parallel b$   
(iii) If  $\angle 4 + \angle 5 = 180^\circ$ , then  $a \parallel b$



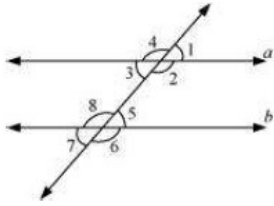
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Sol.

- (i) Corresponding angles property  
(ii) Alternate interior angles property  
(iii) Interior angles on the same side of transversal are supplementary.

Q14. In the adjoining figure, identify

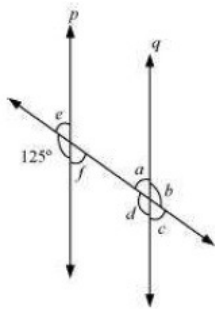
- (i) The pairs of corresponding angles  
(ii) The pairs of alternate interior angles  
(iii) The pairs of interior angles on the same side of the transversal  
(iv) The vertically opposite angles



Sol.

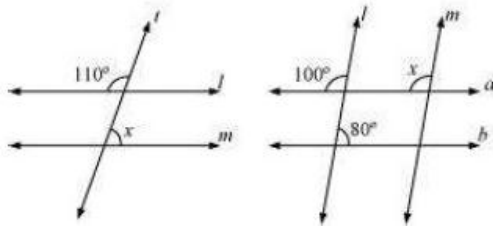
- (i)  $\angle 1$  and  $\angle 5$ ,  $\angle 2$  and  $\angle 6$ ,  $\angle 3$  and  $\angle 7$ ,  $\angle 4$  and  $\angle 8$
- (ii)  $\angle 2$  and  $\angle 8$ ,  $\angle 3$  and  $\angle 5$
- (iii)  $\angle 2$  and  $\angle 5$ ,  $\angle 3$  and  $\angle 8$
- (iv)  $\angle 1$  and  $\angle 3$ ,  $\angle 2$  and  $\angle 4$ ,  $\angle 5$  and  $\angle 7$ ,  $\angle 6$  and  $\angle 8$

Q15. In the adjoining figure,  $p \parallel q$ . Find the unknown angles.



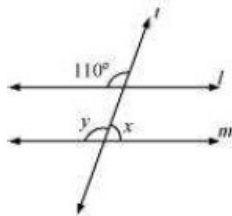
- Sol.
- $\angle d = 125^\circ$  (Corresponding angles)
  - $\angle e = 180^\circ - 125^\circ = 50^\circ$  (Linear pair)
  - $\angle f = \angle e = 55^\circ$  (Vertically opposite angles)
  - $\angle c = \angle f = 55^\circ$  (Corresponding angles)
  - $\angle a = \angle e = 55^\circ$  (Corresponding angles)
  - $\angle b = \angle d = 125^\circ$  (Vertically opposite angles)

Q16. Find the value of  $x$  in each of the following figures if  $l \parallel m$ .



Sol.

(i)



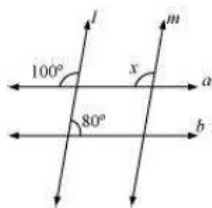
$$\angle y = 110^\circ \text{ (Corresponding angles)}$$

$$\angle x + \angle y = 180^\circ \text{ (Linear pair)}$$

$$\angle y = 180^\circ - 110^\circ$$

$$= 70^\circ$$

(ii)



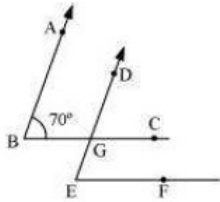
$$\angle x = 100^\circ \text{ (Corresponding angles)}$$



Q17. In the given figure, the arms of two angles are parallel.

If  $\angle ABC = 70^\circ$ , then find

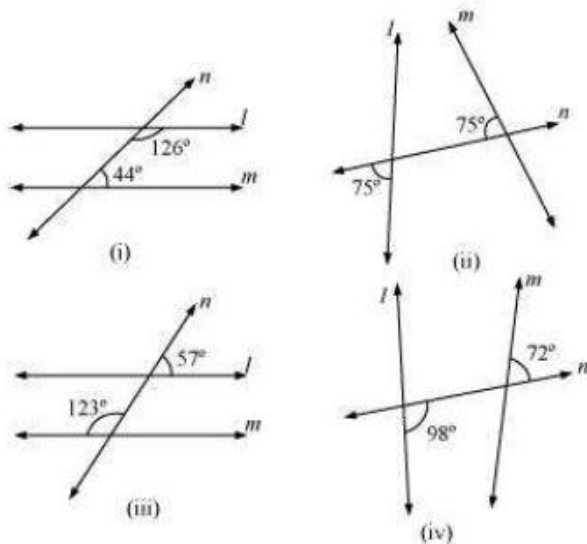
- (i)  $\angle DGC$
- (ii)  $\angle DEF$



Sol.

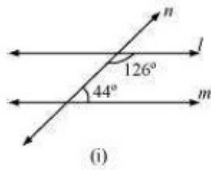
- (i) Consider that  $AB \parallel DG$  and a transversal line  $BC$  is intersecting them.  
 $\angle DGC = \angle ABC$  (Corresponding angles)  
 $\angle DGC = 70^\circ$
- (ii) Consider that  $BC \parallel EF$  and a transversal line  $DE$  is intersecting them.  
 $\angle DEF = \angle DGC$  (Corresponding angles)  
 $\angle DEF = 70^\circ$

Q18. In the given figures below, decide whether  $l$  is parallel to  $m$ .



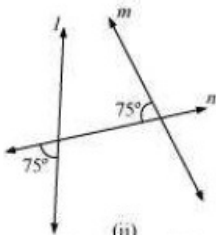
Sol.

- (i)



Consider two lines,  $l$  and  $m$ , and a transversal line  $n$  which is intersecting them. Sum of the interior angles on the same side of transversal =  $126^\circ + 44^\circ = 170^\circ$ . As the sum of interior angles on the same side of transversal is not  $180^\circ$ , therefore,  $l$  is not parallel to  $m$ .

(ii)

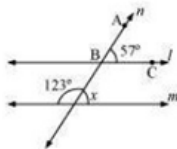


$$x + 75^\circ = 180^\circ \text{ (Linear pair on line)}$$

$$x = 180^\circ - 75^\circ = 105^\circ$$

For  $l$  and  $m$  to be parallel to each other, corresponding angles ( $\angle ABC$  and  $\angle x$ ) should be equal. However, here their measures are  $75^\circ$  and  $105^\circ$  respectively. Hence, these lines are not parallel to each other.

(iii)

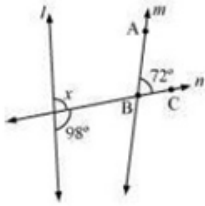


$$\angle x + 123^\circ = 180^\circ \text{ (Linear pair)}$$

$$\angle x = 180^\circ - 123^\circ = 57^\circ$$

For  $l$  and  $m$  to be parallel to each other, corresponding angles ( $\angle ABC$  and  $\angle x$ ) should be equal. Here, their measures are  $57^\circ$  and  $57^\circ$  respectively. Hence, these are parallel to each other.

(iv)



$$98 + \angle x = 180^\circ \text{ (Linear pair)}$$

$$\angle x = 82^\circ$$

For  $l$  and  $m$  to be parallel to each other, corresponding angles ( $\angle ABC$  and  $\angle x$ ) should be equal. However, here their measures are  $72^\circ$  and  $82^\circ$  respectively. Hence, these lines are not parallel to each other.

Q19. If a ray stands on a line, then the sum of two adjacent angles so formed is -----  
( $0^\circ/90^\circ/180^\circ/360^\circ$ )

Sol.  $180^\circ$

Q20. Two lines in a plane can be \_\_\_\_\_ (only intersecting/only parallel/both intersecting parallel) lines.

Sol. Both intersecting or parallel