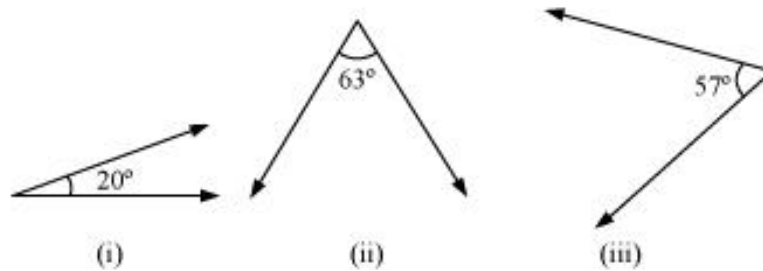




NCERT Solutions For Class 7 Maths Lines And Angles Exercise 5.1

**Q1.** Find the complement of each of the following angles:



**Ans:**

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

(i)  $20^\circ$

$$\text{Complement} = 90^\circ - 20^\circ$$

$$= 70^\circ$$

(ii)  $63^\circ$

$$\text{Complement} = 90^\circ - 63^\circ$$

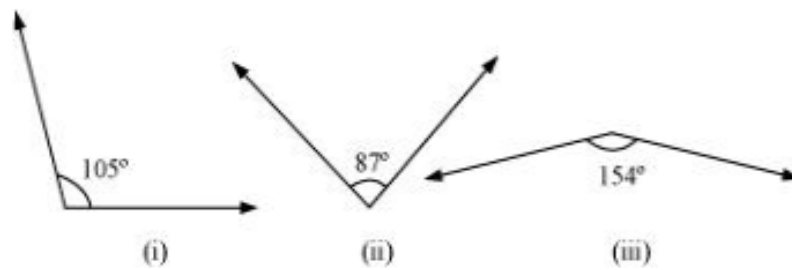
$$= 27^\circ$$

(iii)  $57^\circ$

$$\text{Complement} = 90^\circ - 57^\circ$$

$$= 33^\circ$$

**Q2.** Find the supplement of each of the following angles:



**Ans:**

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

(i)  $105^\circ$

$$\begin{aligned}\text{Supplement} &= 180^\circ - 105^\circ \\ &= 75^\circ\end{aligned}$$

(ii)  $87^\circ$

$$\begin{aligned}\text{Supplement} &= 180^\circ - 87^\circ \\ &= 93^\circ\end{aligned}$$

(iii)  $154^\circ$

$$\begin{aligned}\text{Supplement} &= 180^\circ - 154^\circ \\ &= 26^\circ\end{aligned}$$

**Q3.** Identify which of the following pairs of angles are complementary and which are supplementary.

(i)  $65^\circ$ ,  $115^\circ$  (ii)  $63^\circ$ ,  $27^\circ$

(iii)  $112^\circ$ ,  $68^\circ$  (iv)  $130^\circ$ ,  $50^\circ$

(v)  $45^\circ$ ,  $45^\circ$  (vi)  $80^\circ$ ,  $10^\circ$

**Ans:**

The sum of the measures of complementary angles is  $90^\circ$  and that of supplementary angles is  $180^\circ$ .

(i)  $65^\circ, 115^\circ$

Sum of the measures of these angles =  $65^\circ + 115^\circ = 180^\circ$

$\therefore$  These angles are supplementary angles.

(ii)  $63^\circ, 27^\circ$

Sum of the measures of these angles =  $63^\circ + 27^\circ = 90^\circ$

$\therefore$  These angles are complementary angles.

(iii)  $112^\circ, 68^\circ$

Sum of the measures of these angles =  $112^\circ + 68^\circ = 180^\circ$

$\therefore$  These angles are supplementary angles.

(iv)  $130^\circ, 50^\circ$

Sum of the measures of these angles =  $130^\circ + 50^\circ = 180^\circ$

$\therefore$  These angles are supplementary angles.

(v)  $45^\circ, 45^\circ$

Sum of the measures of these angles =  $45^\circ + 45^\circ = 90^\circ$

$\therefore$  These angles are complementary angles.

(vi)  $80^\circ, 10^\circ$

Sum of the measures of these angles =  $80^\circ + 10^\circ = 90^\circ$

∴ These angles are complementary angles.

**Q4.** Find the angle which is equal to its complement.

**Ans:**

Let the angle be  $x$ .

Complement of this angle is also  $x$ .

The sum of the measures of a complementary angle pair is  $90^\circ$ .

$$\therefore x + x = 90^\circ$$

$$2x = 90^\circ$$

$$x = \frac{90^\circ}{2} = 45^\circ$$

**Q5.** Find the angle which is equal to its supplement.

**Ans:**

Let the angle be  $x$ .

Supplement of this angle is also  $x$ .

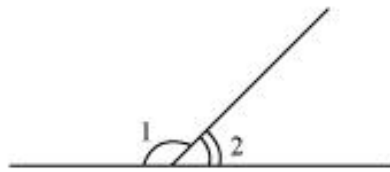
The sum of the measures of a supplementary angle pair is  $180^\circ$ .

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

$$2x = 180^\circ$$

$$x = 90^\circ$$

**Q6.** In the given figure,  $\angle 1$  and  $\angle 2$  are supplementary angles. If  $\angle 1$  is decreased, what changes should take place in  $\angle 2$  so that both the angles still remain supplementary.



**Ans:**

$\angle 1$  and  $\angle 2$  are supplementary angles.

If  $\angle 1$  is reduced, then  $\angle 2$  should be increased by the same measure so that this angle pair remains supplementary.

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

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

**Ans:**

(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  $90^\circ$  and  $90^\circ + 90^\circ = 180^\circ$

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

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

**Ans:**

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

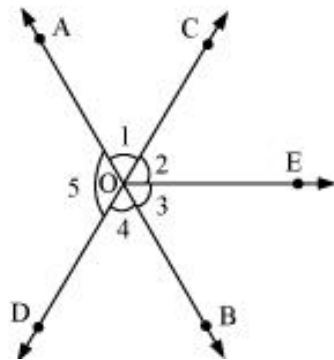
$$A + B = 90^\circ$$

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

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

**Q9.** In the adjoining figure:

- (i) Is  $\angle 1$  adjacent to  $\angle 2$ ?
- (ii) Is  $\angle AOC$  adjacent to  $\angle AOE$ ?
- (iii) Do  $\angle COE$  and  $\angle EOD$  form a linear pair?
- (iv) Are  $\angle BOD$  and  $\angle DOA$  supplementary?
- (v) Is  $\angle 1$  vertically opposite to  $\angle 4$ ?
- (vi) What is the vertically opposite angle of  $\angle 5$ ?



**Ans:**

(i) Yes. Since they have a common vertex O and also a common arm OC. Also, their non-common arms, OA and OE, are on either side of the common arm.

(ii) No. They have a common vertex O and also a common arm OA. However, their non-common arms, OC and OE, are on the same side of the common arm. Therefore, these are not adjacent to each other.

(iii) Yes. Since they have a common vertex O and a common arm OE. Also, their non-common arms, OC and OD, are opposite rays.

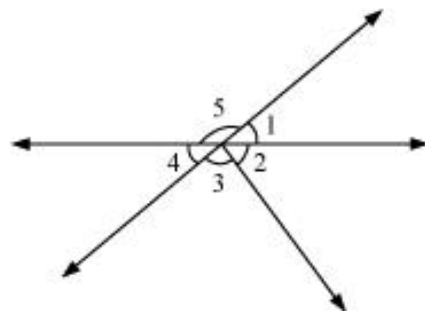
(iv) Yes. Since  $\angle BOD$  and  $\angle DOA$  have a common vertex O and their non-common arms are opposite to each other.

(v) Yes. Since these are formed due to the intersection of two straight lines (AB and CD).

(vi)  $\angle COB$  is the vertically opposite angle of  $\angle 5$  as these are formed due to the intersection of two straight lines, AB and CD.

**Q10.** Indicate which pairs of angles are:

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



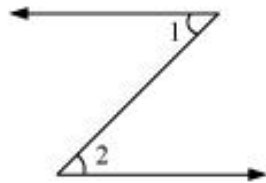
**Ans:**

(i)  $\angle 1$  and  $\angle 4$ ,  $\angle 5$  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  $\angle 5$ ,  $\angle 5$  and  $\angle 4$  as these have a common vertex and also

have non-common arms opposite to each other.

**Q11.** In the following figure, is  $\angle 1$  adjacent to  $\angle 2$ ? Give reasons.



**Ans:**

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

**Q12.** Find the value of the angles  $x$ ,  $y$ , and  $z$  in each of the following:

|     |      |
|-----|------|
|     |      |
| (i) | (ii) |



**Ans:**

(i) Since  $\angle x$  and  $\angle 55^\circ$  are vertically opposite angles,

$$\angle x = 55^\circ$$

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

$$55^\circ + \angle y = 180^\circ$$

$$\angle y = 180^\circ - 55^\circ = 125^\circ$$

$$\angle y = \angle z \text{ (Vertically opposite angles)}$$

$$\angle z = 125^\circ$$

(ii)  $\angle z = 40^\circ$  (Vertically opposite angles)

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

$$\angle y = 180^\circ - 40^\circ = 140^\circ$$

$$40^\circ + \angle x + 25^\circ = 180^\circ \text{ (Angles on a straight line)}$$

$$65^\circ + \angle x = 180^\circ$$

$$\angle x = 180^\circ - 65^\circ = 115^\circ$$

**Q13.** Fill in the blanks:

(i) If two angles are complementary, then the sum of their measures is \_\_\_\_\_.

(ii) If two angles are supplementary, then the sum of their measures 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 pair of vertically opposite angles are \_\_\_\_\_.

**Ans:**

(i)  $90^\circ$

(ii)  $180^\circ$

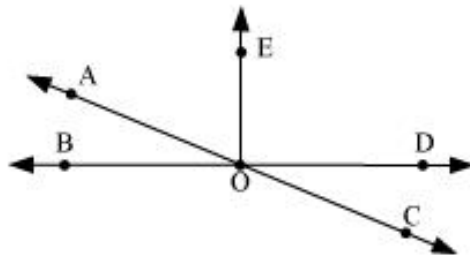
(iii) Supplementary

(iv) Linear pair

(v) Equal

(vi) Obtuse angles

**Q14.** 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

**Ans:**

(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  $\angle COD$

\*\*\*\*\* END \*\*\*\*\*