NCERT Exercises (Questions-Solutions)

Mathematics
Lines and Angles

Exercise 5.1

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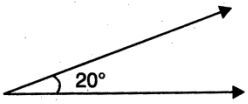
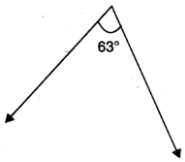
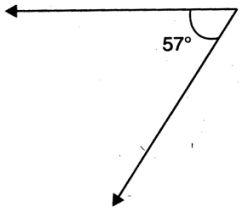
1. Find the complement of each of the following angles:



(i)



(ii)



(iii)

Sol. (i) Complement of the angle

$20^o = 90^o - 20^o = 70^o$

(ii) Complement of the angle

$63^o = 90^o - 63^o = 27^o$

(iii) Complement of the angle

$57^o = 90^o - 57^o = 33^o$

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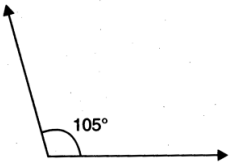
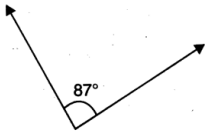
2. Find the supplement of each of the following angles:



(i)



(ii)

(iii)

Sol. (i) Supplement of the angle

$105^o = 180^o - 105^o = 75^o$

(ii) Supplement of the angle

$87^o = 180^o - 87^o = 93^o$

(iii) Supplement of the angle

$154^o = 180^o - 154^o = 26^o$.

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

(i) $65^o, 115^o$ **(ii)** $63^o, 27^o$ **(iii)** $112^o, 68^o$ **(iv)** $130^o, 50^o$

(v) $45^o, 45^o$ **(vi)** $80^o, 10^o$.

Sol. (i) $\mathbf{65^o, 115^o}$

$\because$ $65^o + 115^o = 180^o$

$\therefore$ The given pair of angles are supplementary.

(ii) $\mathbf{63^o, 27^o}$

$\because$ $63^o + 27^o = 90^o$

$\therefore$ The given pair of angles are complementary.

(iii) $\mathbf{112^o, 68^o}$

$\because$ $112^o + 68^o = 180^o$

$\therefore$ The given pair of angles are supplementary.

(iv) $\mathbf{130^o, 50^o}$

$\because$ $130^o + 50^o = 180^o$

$\therefore$ The given pair of angles are supplementary.

(v) $\mathbf{45^o, 45^o}$

$\because$ $45^o + 45^o = 90^o$

$\therefore$ The given pair of angles are complementary.

(vi) $\mathbf{80^o, 10^o}$

$\because$ $80^o + 10 = 90^o$

$\therefore$ The given pair of angles are complementary.

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

Sol. Let the angle be x^o.

Its complement $= 90^o - x^o$

According to the question,

$x^o = 90^o - x^o$

$\Rightarrow$ $x^o + x^o = 90^o$

$\Rightarrow$ $2x^o = 90^o$

$\Rightarrow$ $x^o = \frac{90^o}{2} = 45^o$

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

Sol. Let the angle be x^o.

Its supplement $= 180^o - x^o$

According to the question,

$x^o = 180^o - x^o$

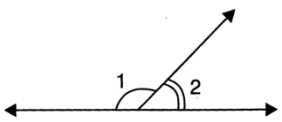
$\Rightarrow$ $x^o + x^o = 180^o$

$\Rightarrow$ $2x^o = 180^o$

$\Rightarrow$ $x^o = \frac{180^o}{2} = 90^o$

Hence, the required angle is 90^o.

6. 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.



Sol. $\angle 2$ should increase

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

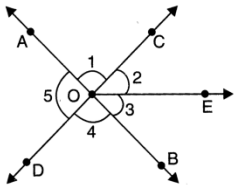
(i) acute? **(ii) obtuse?** **(iii) right?**

Sol. (i) No! Two acute angles are not supplementary.
(ii) No! Two obtuse angles are not supplementary.
(iii) Yes! Two right angles are supplementary.

8. **An angle is greater than 45^o. Is its complementary angle greater than 45^o or equal to 45^o or less than 45^o.**

Sol. Its complementary angle is less than 45^o.

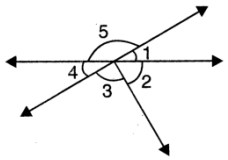
9. **In the adjoining figure:**



(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 $\angle 5$?

Sol. (i) Yes! $\angle 1$ is adjacent to $\angle 2$.
(ii) No! $\angle AOC$ is not adjacent to $\angle AOE$.
(iii) Yes! $\angle COE$ and $\angle EOD$ form a linear pair.
(iv) Yes! $\angle BOD$ and $\angle DOA$ are supplementary.
(v) Yes! $\angle 1$ is vertically opposite to $\angle 4$.
(vi) The vertically opposite angle of $\angle 5$ is $\angle 2 + \angle 3$.

10. **Indicate which pairs of angles are:**
(i) Vertically opposite angles.
(ii) Linear pairs.



Sol. (i) $\angle 1$ and $\angle 4$
(ii) $\angle 4$ and $\angle 5; \angle 5$ and $\angle 1; \angle 3$ and $(\angle 1 + \angle 2); \angle 4$ and $(\angle 3 + \angle 2)$.

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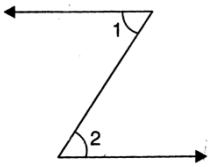
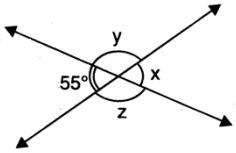
11. **In the following figure, is $\angle 1$ adjacent to $\angle 2$? Give reasons.**

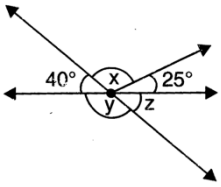


Sol. No! $\angle 1$ is not adjacent to $\angle 2$ because they are not placed next to each other.

12. Find the values of the angles x, y and z in each of the following:



(i)



(ii)

Sol. (i) $x = 55^o$

$x + y = 180^o$

$\Rightarrow \quad 55^o + y = 180^o$

$\Rightarrow \quad y = 180^o - 55^o$

$\Rightarrow \quad 125^o$

$z = y = 125^o$

(ii) $40^o + x + 25^o = 180^o$

$\Rightarrow \quad x + 65 = 180^o$

$\Rightarrow \quad x = 180^o - 65^o$

$\Rightarrow \quad x = 115^o$

$y = 180^o - 40^o$

$= 140^o$

$z + y = 180^o$

$\Rightarrow \quad z + 140^o = 180^o$

$\Rightarrow \quad z = 180^o - 140^o$

$= 40^o$

13. 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 ..... .

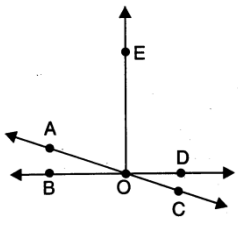
(vi) If two lines intersect at a point, and if one pair of vertically opposite angles are acute angles, then the other pair of vertically opposite angles are ..... .

Sol. (i) 90^o (ii) 180^o

(iii) supplementary (iv) linear pair

(v) equal (vi) obtuse angles

14. 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) $\angle AOD$ and $\angle BOC$
(ii) $\angle EOA$ and $\angle AOB$
(iii) $\angle BOE$ and $\angle DOE$
(iv) $\angle EOC$ and $\angle EOA$
(v) $\angle AOB$ and $\angle AOE$; $\angle AOE$ and $\angle EOD$; $\angle EOD$ and $\angle DOC$.

Exercise 5.2

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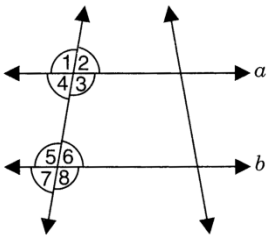
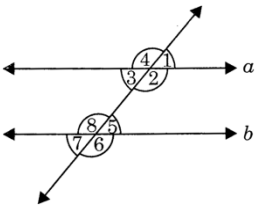
1. State the property that is used in each of the following statements



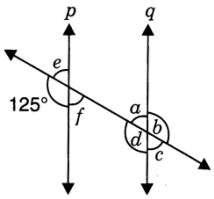
(i) if $a \| b$, then $\angle 1 = \angle 5$.
(ii) if $\angle 4 = \angle 6$, then $a \| b$.
(iii) if $\angle 4 + \angle 5 = 180^o$, then $a \| b$.

Sol. (i) If two parallel lines are cut by a transversal the corresponding angles have equal measure.
(ii) If two parallel lines are cut by a transversal, the alternate interior angles are equal.
(iii) If two parallel lines are cut by a transversal, then each pair of interior angles on the same side of the transversal are supplementary.

2. 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 $\angle 6, \angle 4$ and $\angle 8, \angle 3$ and $\angle 7$
(ii) $\angle 3$ and $\angle 5, \angle 2$ and $\angle 8$
(iii) $\angle 3$ and $\angle 8, \angle 2$ and $\angle 5$

3. In the adjoining figure, $p \| q$. Find the unknown angles.

Sol. $a = 55^o, b = 125^o,\ c = 55^o, d = 125^o, e = 55^o,\ \ f = 55^o$

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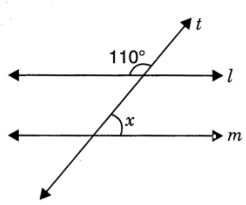
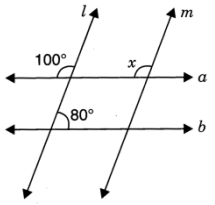
4. Find the value of x in each of the following figures if $l \| m$



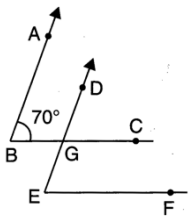
(i)



(ii)

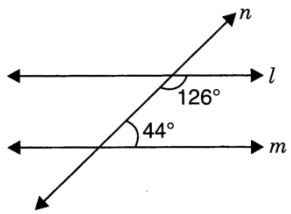
Sol. (i) $x = 70^o$ (ii) $x = 100^o$

5. In the given figure, the arms of two angles are parallel. If $\angle ABC = 70^o$, then find
(i) $\angle DGC$ (ii) $\angle DEF$.

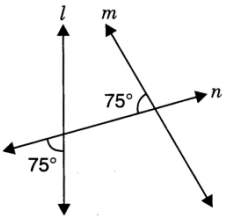


Sol. (i) 70^o
(ii) 70^o

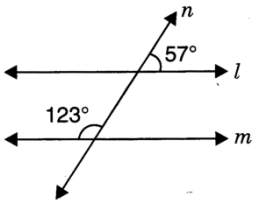
6. In the given figures below, decide whether l is parallel to m.



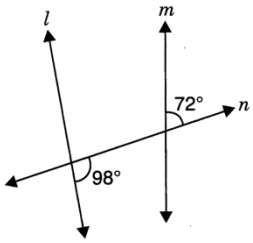
(i)



(ii)



(iii)



(iv)

Sol. (i) l is not parallel to m

(ii) l is not parallel to m

(iii) $l \parallel m$

(iv) l is not parallel to m