1. Complementary angle $= 90° -$ given angle
    (i)   Complement of $20° = 90° - 20° = 70°$
    (ii)   Complement of $63° = 90° - 63° = 27°$
    (iii)   Complement of $57° = 90° - 57° = 33°$

2. Supplementary angle $= 180° -$ given angle
    (i)   Supplement of $105° = 180° - 105° = 75°$
    (ii)   Supplement of $87° = 180° - 87° = 93°$
    (iii)   Supplement of $154° = 180° - 154° = 26°$

3. If sum of two angles is $180°$, then they are called supplementary angles.
    If sum of two angles is $90°$, then they are called complementary angles.
    (i) $65° + 115° = 180°$ These are supplementary angles.
    (ii) $63° + 27° = 90°$ These are complementary angles.
    (iii) $112° + 68° = 180°$ These are supplementary angles.
    (iv) $130° + 50° = 180°$ These are supplementary angles.
    (v) $45° + 45° = 90°$ These are complementary angles.
    (vi) $80° + 10° = 90°$ These are complementary angles.

4. Let one of the two equal complementary angles be x.
    $$\therefore \qquad x + x = 90° \quad \Rightarrow \quad 2x = 90° \quad \Rightarrow \quad x = \frac{90°}{2} = 45°$$
    Thus, $45°$ is equal to its complement.

5. Let x be two equal angles of its supplement.
    Therefore, $x + x = 180°$ [Supplementary angles]
    $\Rightarrow$ $2x = 180°$
    $\Rightarrow$ $x = \dfrac{180°}{2} = 90°$
    Thus, $90°$ is equal to its supplement.

6. I f $\angle 1$ is decreased then, $\angle 2$ will increase with the same measure, so that both the angles still remain supplementary.

7. (i)   No, because sum of two acute angles is less than $180°$.
    (ii)   No, because sum of two obtuse angles is more than $180°$.
    (iii)   Yes, because sum of two right angles is $180°$.

8. Let the complementary angles be x and y, i.e., $x + y = 90°$
    It is given that $x > 45°$
    Adding y both sides, $x + y > 45° + y$
    $\Rightarrow$ $90° > 45° + y$ $\Rightarrow$ $90° - 45° > y$ $\Rightarrow$ $y < 45°$
    Thus, its complementary angle is less than $45°$.

9. (i)   Yes, in ∠AOE, OC is common arm.
   (ii)   No, they have no non-common arms on opposite side of common arm.
   (iii) Yes, they form linear pair.
   (iv)   Yes, they are supplementary.
   (v)   Yes, they are vertically opposite angles.
   (vi)   Vertically opposite angles of ∠5 is ∠COB.
10. (i)   Vertically opposite angles, ∠1, ∠4;   ∠5,   ∠2 + ∠3.
    (ii) Linear pairs ∠1, ∠5;   ∠5, ∠4.
11. ∠1 and ∠2 are not adjacent angles because their vertex is not common.
12. (i) $x = 55°$ [Vertically opposite angles]
          Now $55° + y = 180°$ [Linear pair]
          $\Rightarrow$ $y = 180° - 55° = 125°$
          Also $y = z = 125°$ [Vertically opposite angles]
          Thus, $x = 55°, y = 125°$ and $z = 125°$.

    (ii) $40° + x + 25° = 180°$ [Angles on straight line]
          $\Rightarrow$ $65° + x = 180°$
          $\Rightarrow$ $x = 180° - 65° = 115°$
          Now $40° + y = 180°$ [Linear pair]
          $\Rightarrow$ $y = 180° - 40° = 140°$ ....(i)
          Also $y + z = 180°$ [Linear pair]
          $\Rightarrow$ $140° + z = 180°$ [From eq. (i)]
          $\Rightarrow$ $z = 180° - 140° = 40°$
       Thus, $x = 115°, y = 140°$ and $z = 40°$.

13. (i) $90°$ (ii)   180°   (iii) supplementary
    (iv) linear pair   (v)   equal   (vi)   obtuse angles
14. (i)   Obtuse vertically opposite angles means greater than $90°$ and equal ∠AOD = ∠BOC.
    (ii) Adjacent complementary angles means angles have common vertex, common arm, non-common arms are on either side of common arm and sum of angles is $90°$.
    (iii) Equal supplementary angles means sum of angles is 180° and supplement angles are equal.
    (iv) Unequal supplementary angles means sum of angles is 180° and supplement angles are unequal.
          i.e.,   ∠AOE, ∠EOC;   ∠AOD, ∠DOC and ∠AOB, ∠BOC
    (v)   Adjacent angles that do not form a linear pair mean, angles have common ray but the angles in a linear pair are not supplementary.
          i.e.,   ∠AOB, ∠AOE;   ∠AOE, ∠EOD and ∠EOD, ∠COD

1. (i)   Given, $a \parallel b$ then $\angle 1 = \angle 5$ [Corresponding angles]

    If two parallel lines are cut by a transversal, each pair of corresponding angles are equal in measure.

    (ii)   Given, $\angle 4 = \angle 6$, then $a \parallel b$ [Alternate interior angles]

    When a transversal cuts two lines such that pairs of alternate interior angles are equal, the lines have to be parallel.

    (iii)   Given, $\angle 4 + \angle 5 = 180°$, then $a \parallel b$ [

    When a transversal cuts two lines, such that pairs of interior angles on the same side of transversal are supplementary, the lines have to be parallel.

2. (i)   The pairs of corresponding angles:

    $\angle 1, \angle 5;$ $\angle 2, \angle 6;$ $\angle 4, \angle 8$ and $\angle 3, \angle 7$

    (ii)   The pairs of alternate interior angles are:

    $\angle 3, \angle 5$ and $\angle 2, \angle 8$

    (iii)   The pair of interior angles on the same side of the transversal:

    $\angle 3, \angle 8$ and $\angle 2, \angle 5$

    (iv)   The vertically opposite angles are:

    $\angle 1, \angle 3;$ $\angle 2, \angle 4;$ $\angle 6, \angle 8$ and $\angle 5, \angle 7$

3. Given, $p \parallel q$ and cut by a transversal line.

    $\because$ $125° + e = 180°$ [Linear pair]

    $\therefore$ $e = 180° - 125° = 55°$ ....(i)

    Now $e = f = 55°$ [Vertically opposite angles]

    Also $a = f = 55°$ [Alternate interior angles]

    $a + b = 180°$ [Linear pair]

    $\Rightarrow$ $55° + b = 180°$ [From eq. (i)]

    $\Rightarrow$ $b = 180° - 55° = 125°$

    Now $a = c = 55°$ and $b = d = 125°$ [Vertically opposite angles]

    Thus, $a = 55°, b = 125°, c = 55°, d = 125°, e = 55°$ and $f = 55°$.

4. (i)   Given, $l \parallel m$ and t is transversal line.

    $\therefore$ Interior vertically opposite angle between lines l and $t = 110°$.

    $\therefore$ $110° + x = 180°$ [Supplementary angles]

    $\Rightarrow$ $x = 180° - 110° = 70°$

    (ii)   Given, $l \parallel m$ and t is transversal line.

    $x + 2x = 180$ [Interior opposite angles]

    $\Rightarrow$ $3x = 180°$ $\Rightarrow$ $x = \dfrac{180°}{3} = 60°$

(iii)   Given, $l \parallel m$ and $a \parallel b$.

$\qquad x = 100°$ [Corresponding angles]

5. (i)   Given, AB ∥ DE and BC is a transversal line and $\angle ABC = 70°$

$\qquad$ ∵ $\qquad \angle ABC = \angle DGC$ [Corresponding angles]

$\qquad$ ∴ $\qquad \angle DGC = 70°$ ....(i)

(ii)   Given, BC ∥ EF and DE is a transversal line and $\angle DGC = 70°$

$\qquad$ ∵ $\qquad \angle DGC = \angle DEF$ [Corresponding angles]

$\qquad$ ∴ $\qquad \angle DEF = 70°$ [From eq. (i)]

6. (i) $126° + 44° = 170°$

l is not parallel to m because sum of interior opposite angles should be 180°.

(ii) $75° + 75° = 150°$

l is not parallel to m because sum of angles does not obey the property of parallel lines.

(iii) $57° + 123° = 180°$

l is parallel to m due to supplementary angles property of parallel lines.

(iv) $98° + 72° = 170°$

l is not parallel to m because sum of angles does not obey the property of parallel lines.