# Chapter : 15. QUADRILATERALS

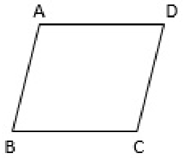
## Exercise : 15

**Question: 1**

Fill in the blank

**Solution:**

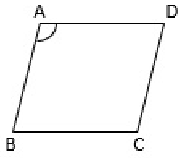
(i) Four




AB, BC, CD and DA are four sides of this quadrilateral

A quadrilateral is polygon having four sides and four corners.

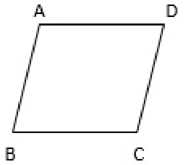
(ii) four




$\angle$A, $\angle$B, $\angle$C and $\angle$D are four angles of this quadrilateral

A quadrilateral is polygon having four sides and four corners.

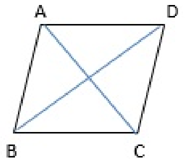
(iii) Four, collinear




A, B, C and D are the four vertices of this quadrilateral.

In quadrilateral, no three out of four vertices are collinear. If all the vertices are collinear then we will get a line segment and if three out of four vertices is collinear, we will get a triangle.

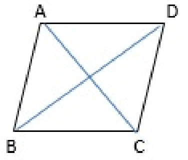
(iv) two




A diagonal is a line segment that joins two opposite vertices of the quadrilateral.

AC and BD are the two diagonals of the quadrilateral ABCD.

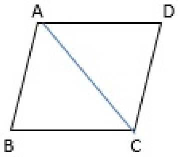
(v) opposite




A diagonal is a line segment that joins two opposite vertices of the quadrilateral.

AC and BD are the two diagonals of the quadrilateral ABCD.

(vi) 360°




ABCD is a quadrilateral and AC is a diagonal. Now, we get two triangles

Δ ABC and Δ ACD.

As we know that sum of angles of triangle is 18*0*°

*So, sum of two triangles will be* 180*° X 2 = 360°*

i.e., *the sum of the angles of a quadrilateral is 360°*

**Question: 2**

In the adjoining

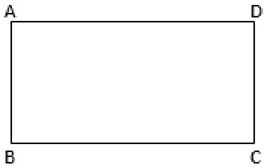
**Solution:**

(i) four; (AB, BC), (BC, CD), (CD, DA), (DA, AB)


When two sides of quadrilateral have same end point, they are called as Adjacent Sides.

(AB, BC), (BC, CD), (CD, DA), (DA, AB) are the adjacent sides of this quadrilateral.

(ii) two; (AB, DC), (AD, BC)




Two sides of quadrilateral who do have same end point are called as Opposite Sides.

(AB, DC), (AD, BC) are the opposite sides of this quadrilateral.

(iii)

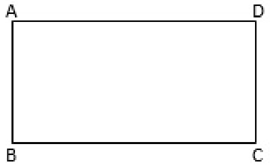
$four;\ (\angle A,\ \angle B),\ (\angle B,\ \angle C),$
$(\angle C,\ \angle D),\ (\angle D,\ \angle A)$


When two angles of quadrilateral share the common arm it is called as Adjacent angles of the quadrilateral.

(∠A, ∠B), (∠B, ∠C), (∠C, ∠D) and (∠D, ∠A) are adjacent angles of this quadrilateral.

(iv)

$two;\ (\angle A,\ \angle C),\ (\angle B,\ \angle D)$




When two angles of quadrilateral are not adjacent angles then it is called as opposite angles of the quadrilateral.

($\angle$ A, $\angle$ C) and ($\angle$ B, $\angle$ D) are opposite angles of this quadrilateral.

(v) two; (AC, BD)

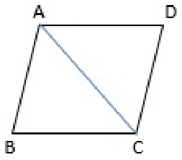
A diagonal is a line segment that joins two opposite vertices of the quadrilateral.

AC and BD are the two diagonals of the quadrilateral ABCD.

**Question: 3**

Prove that the su

**Solution:**




ABCD is a quadrilateral and AC is a diagonal. Now, we get two triangles

$\Delta$ ABC and $\Delta$ ACD.

As we know that sum of angles of triangle is $180°$

So, sum of two triangles will be $180° \times 2 = 360°$

i.e. the sum of the angles of a quadrilateral is $360°$

**Question: 4**

The three angles

**Solution:**

Let $\angle$A, $\angle$B, $\angle$C and $\angle$D are the four angles of quadrilateral.

As we know that, Sum of all four angles of quadrilateral is $360^o$.

$\angle A = 76°$

$\angle B = 54°$

$\angle C = 108°$

So, $\angle D = 360^o – (\angle A + \angle B + \angle C)$

$= 360^o – (76° + 54° + 108°)$

$= 122^o$

So, fourth angle of quadrilateral will be $122^o$.

**Question: 5**

The angles of a q

**Solution:**

Let x be the common multiple.

As per question,

$\angle A = 3x$

$\angle B = 5x$

$\angle C = 7x$

$\angle D = 9x$

As we know that, Sum of all four angles of quadrilateral is $360^o$.

$\angle A + \angle B + \angle C + \angle D = 360°$

$3x + 5x + 7x + 9x = 360°$

$24x = 360°$

$X = 360/24$

$= 15°$

$\angle A = 3 \times 15° = 45°$

$\angle B = 5 \times 15° = 75°$

$\angle C = 7 \times 15° = 105°$

$\angle D = 9 \times 15° = 135°$

So, Angles of quadrilateral are 45°, 75°, 105° and 135°.

**Question: 6**

A quadrilateral h

**Solution:**

Three angles are acute angle and each measuring is 75° means

$\angle A = \angle B = \angle C = 75°$

(Acute angle is angle whose measuring is greater than 0 and less than 90.)

As we know that, Sum of all four angles of quadrilateral is $360^o$.

$\angle A + \angle B + \angle C + \angle D = 360°$

$75° + 75° + 75° + \angle D = 360°$

$\angle D = 360° - (75° + 75° + 75°)$

$= 360° - 225°$

$= 135°$

So, fourth angle of quadrilateral is 135°.

**Question: 7**

Three angles of a

**Solution:**

Let x be the common angle of quadrilateral.

As per question,

$\angle A = \angle B = \angle C = x$

$\angle D = 120°$

As we know that, Sum of all four angles of quadrilateral is $360^o$.

$\angle A + \angle B + \angle C + \angle D = 360°$

$x + x + x + 120° = 360°$

$3x = 360° - 120°$

$3x = 240°$

$X = 240 / 3$

$= 80°$

$\angle A = \angle B = \angle C = 80°$

So, Three Angles of quadrilateral whose measuring's are equal is 80°.

**Question: 8**

Two angles of a q

**Solution:**

Let x be the common angle of quadrilateral.

As per question,

$\angle A = 85°$

$\angle B = 75°$

$\angle C = \angle D = x$

As we know that, Sum of all four angles of quadrilateral is 360°.

$\angle A + \angle B + \angle C + \angle D = 360°$

$85° + 75° + x + x = 360°$

$2x = 360° - (85° + 75°)$

$2x = 200°$

$X = 200 / 2$

$= 100°$

$\angle C = \angle D = 100°$

So, Two angles of quadrilateral whose measuring's are equal is 100°.

**Question: 9**

In the adjacent f

**Solution:**

As we know that, Sum of all four angles of quadrilateral is 360°.

$\angle A + \angle B + \angle C + \angle D = 360°$

$\angle A + \angle B + 100° + 60° = 360°$

$\angle A + \angle B = 360° - 160°$

$= 200°$

Now, according to question bisector of $\angle A$ and $\angle B$ meet in a point P and forms the triangle PAB.

So,

$1/2 \angle A + 1/2 \angle B = 200°/2$

$= 100°$

As we know that, sum of all angles of triangle is 180°.

$\angle BAP + \angle ABP + \angle APB = 180°$

$1/2 \angle A + 1/2 \angle B + \angle APB = 180°$

$100° + \angle APB = 180°$

$\angle APB = 180° - 100°$

$= 80°$

So, $\angle APB = 80°$