

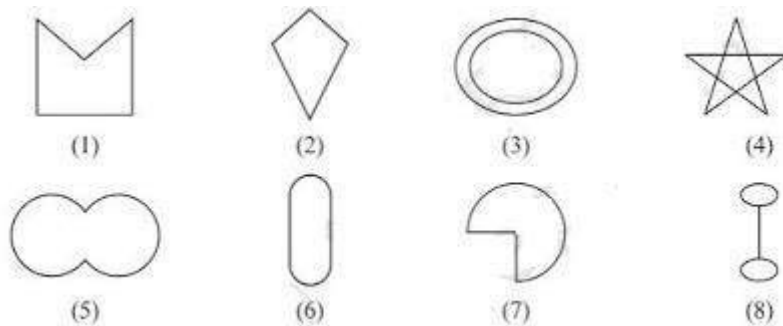
## Chapter 3: Understanding Quadrilaterals

NCERT · Class 8 · Maths

### Exercise 3.1 · Textbook page 41

#### Question 1

Given here are some figures.



Classify each of them on the basis of the following.

Simple curve (b) Simple closed curve (c) Polygon

(d) Convex polygon (e) Concave polygon

#### Solution

a) Simple curve: 1, 2, 5, 6 and 7

b) Simple closed curve: 1, 2, 5, 6 and 7

c) Polygon: 1 and 2

d) Convex polygon: 2

e) Concave polygon: 1

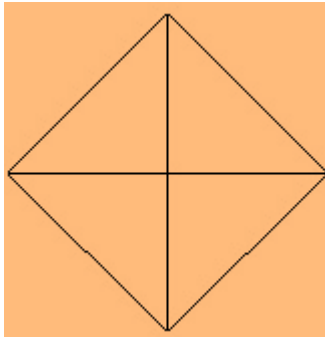
#### Question 2

How many diagonals does each of the following have?

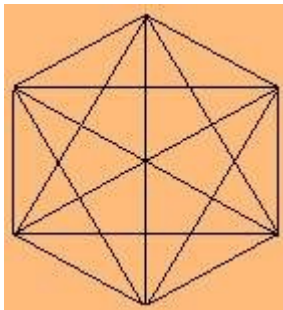
a) A convex quadrilateral (b) A regular hexagon (c) A triangle

## Solution

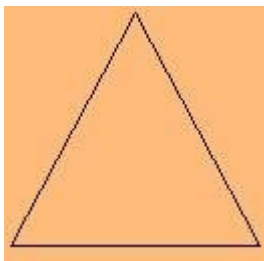
a) A convex quadrilateral: 2.



b) A regular hexagon: 9.



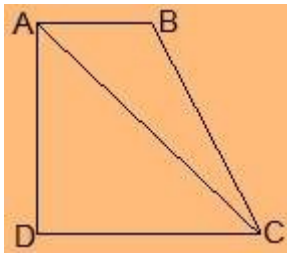
c) A triangle: 0



## Question 3

What is the sum of the measures of the angles of a convex quadrilateral? Will this property hold if the quadrilateral is not convex? (Make a non-convex quadrilateral and try!)

## Solution



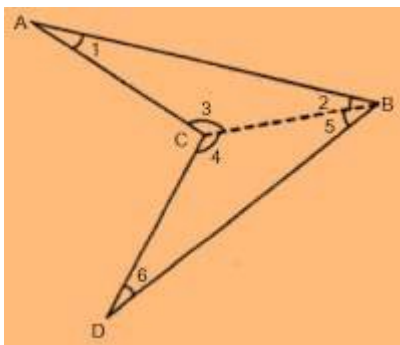
Let ABCD be a convex quadrilateral.

From the figure, we infer that the quadrilateral ABCD is formed by two triangles,

i.e.  $\triangle ADC$  and  $\triangle ABC$ .

Since we know that sum of the interior angles of a triangle is  $180^\circ$ ,

the sum of the measures of the angles is  $180^\circ + 180^\circ = 360^\circ$



Let us take another quadrilateral ABCD which is not convex .

Join BC, such that it divides ABCD into two triangles  $\triangle ABC$  and  $\triangle BCD$ . In  $\triangle ABC$ ,

$$\angle 1 + \angle 2 + \angle 3 = 180^\circ \text{ (angle sum property of triangle)}$$

In  $\triangle BCD$ ,

$$\angle 4 + \angle 5 + \angle 6 = 180^\circ \text{ (angle sum property of triangle)}$$

$$\therefore, \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 180^\circ + 180^\circ$$

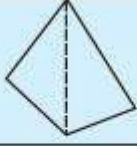
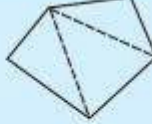
$$\Rightarrow \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 360^\circ$$

$$\Rightarrow \angle A + \angle B + \angle C + \angle D = 360^\circ$$

Thus, this property holds if the quadrilateral is not convex.

**Question 4**

Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

| Figure    |  |  |  |  |
|-----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Side      | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                   |
| Angle sum | $180^\circ$                                                                       | $2 \times 180^\circ$<br>$= (4 - 2) \times 180^\circ$                              | $3 \times 180^\circ$<br>$= (5 - 2) \times 180^\circ$                              | $4 \times 180^\circ$<br>$= (6 - 2) \times 180^\circ$                                |

What can you say about the angle sum of a convex polygon with number of sides? (a) 7 (b) 8 (c) 10 (d) n

**Solution**

The angle sum of a polygon having side n =  $(n-2) \times 180^\circ$

a) 7

Here, n = 7

Thus, angle sum =  $(7-2) \times 180^\circ = 5 \times 180^\circ = 900^\circ$

b) 8

Here, n = 8

Thus, angle sum =  $(8-2) \times 180^\circ = 6 \times 180^\circ = 1080^\circ$

c) 10

Here, n = 10

Thus, angle sum =  $(10-2) \times 180^\circ = 8 \times 180^\circ = 1440^\circ$

d) n

Here, n = n

Thus, angle sum =  $(n-2) \times 180^\circ$

**Question 5**

What is a regular polygon?

State the name of a regular polygon of

(i) 3 sides (ii) 4 sides (iii) 6 sides

**Solution**

Regular polygon: A polygon having sides of equal length and angles of equal measures is called a regular polygon. A regular polygon is both equilateral and equiangular.

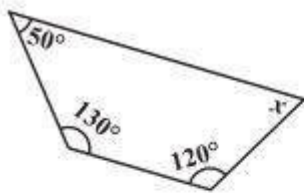
(i) A regular polygon of 3 sides is called an equilateral triangle.

(ii) A regular polygon of 4 sides is called a square.

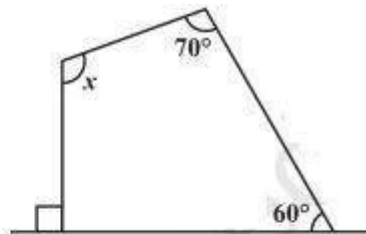
(iii) A regular polygon of 6 sides is called a regular hexagon.

**Question 6**

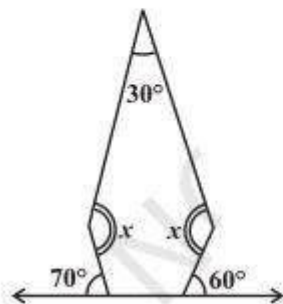
Find the angle measure of  $x$  in the following figures.



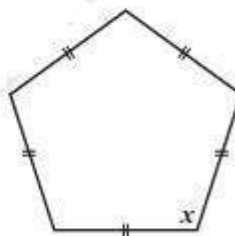
(a)



(b)



(c)



(d)

**Solution**

a) The figure has 4 sides. Hence, it is a quadrilateral. Sum of angles of the quadrilateral =  $360^\circ$

$$\Rightarrow 50^\circ + 130^\circ + 120^\circ + x = 360^\circ$$

$$\Rightarrow 300^\circ + x = 360^\circ$$

$$\Rightarrow x = 360^\circ - 300^\circ = 60^\circ$$

b) The figure has 4 sides. Hence, it is a quadrilateral. Also, one side is perpendicular forming a right angle.

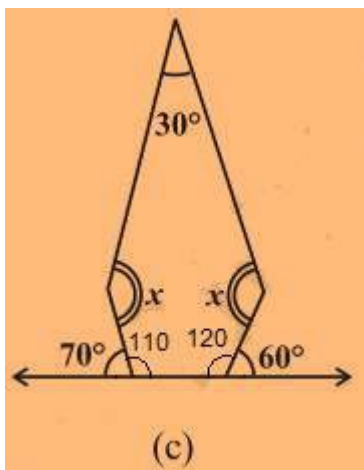
Sum of angles of the quadrilateral =  $360^\circ$

$$\Rightarrow 90^\circ + 70^\circ + 60^\circ + x = 360^\circ$$

$$\Rightarrow 220^\circ + x = 360^\circ$$

$$\Rightarrow x = 360^\circ - 220^\circ = 140^\circ$$

c) The figure has 5 sides. Hence, it is a pentagon.



Sum of angles of the pentagon =  $540^\circ$  Two angles at the bottom are a linear pair.

$$\therefore, 180^\circ - 70^\circ = 110^\circ$$

$$180^\circ - 60^\circ = 120^\circ$$

$$\Rightarrow 30^\circ + 110^\circ + 120^\circ + x + x = 540^\circ$$

$$\Rightarrow 260^\circ + 2x = 540^\circ$$

$$\Rightarrow 2x = 540^\circ - 260^\circ = 280^\circ$$

$$\Rightarrow 2x = 280^\circ$$

$$= 140^\circ$$

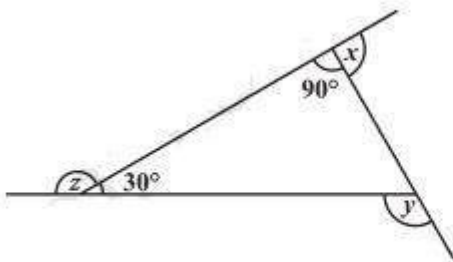
d) The figure has 5 equal sides. Hence, it is a regular pentagon. Thus, all its angles are equal.

$$5x = 540^\circ$$

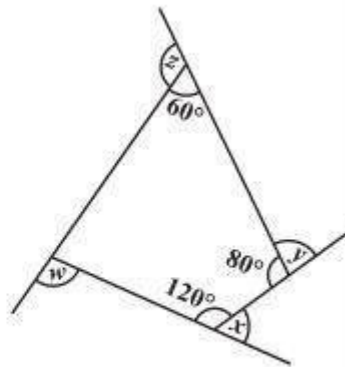
$$\Rightarrow x = 540^\circ/5$$

$$\Rightarrow x = 108^\circ$$

7.



(a) Find  $x + y + z$



(b) Find  $x + y + z + w$

a) Sum of all angles of triangle =  $180^\circ$

$$\text{One side of triangle} = 180^\circ - (90^\circ + 30^\circ) = 60^\circ$$

$$x + 90^\circ = 180^\circ \Rightarrow x = 180^\circ - 90^\circ = 90^\circ$$

$$y + 60^\circ = 180^\circ \Rightarrow y = 180^\circ - 60^\circ = 120^\circ$$

$$z + 30^\circ = 180^\circ \Rightarrow z = 180^\circ - 30^\circ = 150^\circ$$

$$x + y + z = 90^\circ + 120^\circ + 150^\circ = 360^\circ$$

b) Sum of all angles of quadrilateral =  $360^\circ$

$$\text{One side of quadrilateral} = 360^\circ - (60^\circ + 80^\circ + 120^\circ) = 360^\circ - 260^\circ = 100^\circ$$

$$x + 120^\circ = 180^\circ \Rightarrow x = 180^\circ - 120^\circ = 60^\circ$$

$$y + 80^\circ = 180^\circ \Rightarrow y = 180^\circ - 80^\circ = 100^\circ$$

$$z + 60^\circ = 180^\circ \Rightarrow z = 180^\circ - 60^\circ = 120^\circ$$

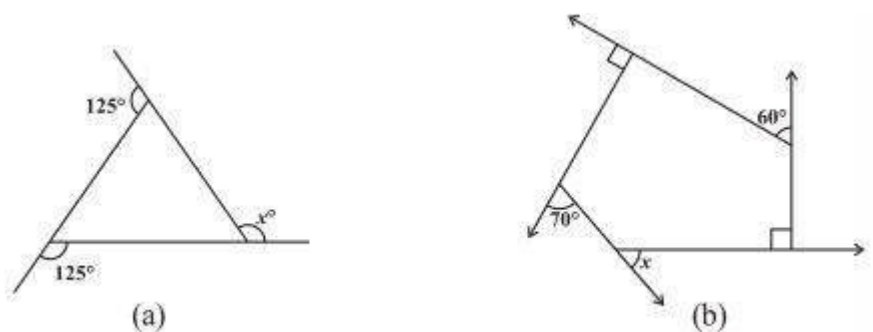
$$w + 100^\circ = 180^\circ \Rightarrow w = 180^\circ - 100^\circ = 80^\circ$$

$$x + y + z + w = 60^\circ + 100^\circ + 120^\circ + 80^\circ = 360^\circ$$

## Exercise 3.2 · Textbook page 44

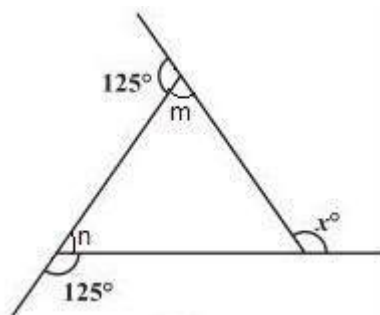
### Question 1

Find  $x$  in the following figures.



### Solution

a)



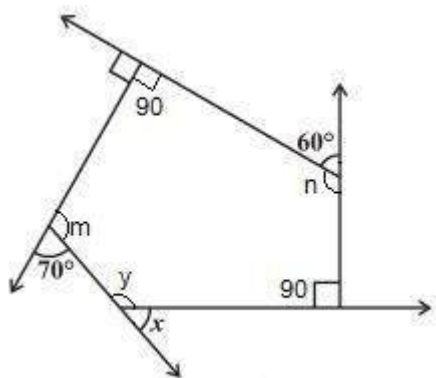
$$125^\circ + m = 180^\circ \Rightarrow m = 180^\circ - 125^\circ = 55^\circ \text{ (Linear pair)}$$

$$125^\circ + n = 180^\circ \Rightarrow n = 180^\circ - 125^\circ = 55^\circ \text{ (Linear pair)}$$

$$x = m + n \text{ (The exterior angle of a triangle is equal to the sum of the two opposite interior angles)}$$

$$\Rightarrow x = 55^\circ + 55^\circ = 110^\circ$$

b)



Two interior angles are right angles =  $90^\circ$

$$70^\circ + m = 180^\circ \Rightarrow m = 180^\circ - 70^\circ = 110^\circ \text{ (Linear pair)}$$

$$60^\circ + n = 180^\circ \Rightarrow n = 180^\circ - 60^\circ = 120^\circ \text{ (Linear pair)}$$

The figure is having five sides and is a pentagon.

Thus, sum of the angles of a pentagon =  $540^\circ$

$$\Rightarrow 90^\circ + 90^\circ + 110^\circ + 120^\circ + y = 540^\circ$$

$$\Rightarrow 410^\circ + y = 540^\circ \Rightarrow y = 540^\circ - 410^\circ = 130^\circ$$

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

$$\Rightarrow x + 130^\circ = 180^\circ$$

$$\Rightarrow x = 180^\circ - 130^\circ = 50^\circ$$

## Question 2

Find the measure of each exterior angle of a regular polygon of

(i) 9 sides (ii) 15 sides

### Solution

Sum of the angles of a regular polygon having side  $n = (n-2) \times 180^\circ$

$$(i) \text{ Sum of the angles of a regular polygon having 9 sides} = (9-2) \times 180^\circ = 7 \times 180^\circ = 1260^\circ$$

$$\text{Each interior angle} = 1260/9 = 140^\circ$$

$$\text{Each exterior angle} = 180^\circ - 140^\circ = 40^\circ$$

Or,

$$\text{Each exterior angle} = \text{Sum of exterior angles/Number of angles} = 360/9 = 40^\circ$$

(ii) Sum of angles of a regular polygon having side 15 =  $(15-2) \times 180^\circ$

$$= 13 \times 180^\circ = 2340^\circ$$

$$\text{Each interior angle} = 2340/15 = 156^\circ$$

$$\text{Each exterior angle} = 180^\circ - 156^\circ = 24^\circ$$

Or,

$$\text{Each exterior angle} = \text{sum of exterior angles/Number of angles} = 360/15 = 24^\circ$$

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### Question 3

**How many sides does a regular polygon have if the measure of an exterior angle is  $24^\circ$ ?**

#### Solution

Each exterior angle = sum of exterior angles/Number of angles

$$24^\circ = 360 / \text{Number of sides}$$

$$\Rightarrow \text{Number of sides} = 360/24 = 15$$

Thus, the regular polygon has 15 sides.

---

### Question 4

**How many sides does a regular polygon have if each of its interior angles is  $165^\circ$ ?**

#### Solution

$$\text{Interior angle} = 165^\circ$$

$$\text{Exterior angle} = 180^\circ - 165^\circ = 15^\circ$$

Number of sides = sum of exterior angles/exterior angles

$$\Rightarrow \text{Number of sides} = 360/15 = 24$$

Thus, the regular polygon has 24 sides.

---

### Question 5

**a) Is it possible to have a regular polygon with measure of each exterior angle as  $22^\circ$ ?**

**b) Can it be an interior angle of a regular polygon? Why?**

### Solution

a) Exterior angle =  $22^\circ$

Number of sides = sum of exterior angles / exterior angle

$$\Rightarrow \text{Number of sides} = 360/22 = 16.36$$

No, we can't have a regular polygon with each exterior angle as  $22^\circ$  as it is not a divisor of 360.

b) Interior angle =  $22^\circ$

$$\text{Exterior angle} = 180^\circ - 22^\circ = 158^\circ$$

No, we can't have a regular polygon with each exterior angle as  $158^\circ$  as it is not a divisor of 360.

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### Question 6

**a) What is the minimum interior angle possible for a regular polygon? Why?**

**b) What is the maximum exterior angle possible for a regular polygon?**

### Solution

a) An equilateral triangle is the regular polygon (with 3 sides) having the least possible minimum interior angle because a regular polygon can be constructed with minimum 3 sides.

Since the sum of interior angles of a triangle =  $180^\circ$

$$\text{Each interior angle} = 180/3 = 60^\circ$$

b) An equilateral triangle is the regular polygon (with 3 sides) having the maximum exterior angle because the regular polygon with the least number of sides has the maximum exterior angle possible.

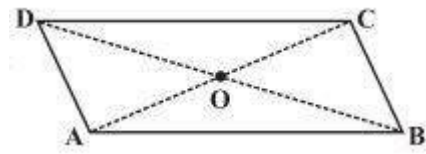
$$\text{Maximum exterior possible} = 180 - 60^\circ = 120^\circ$$

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## Exercise 3.3 · Textbook page 50

### Question 1

Given a parallelogram ABCD. Complete each statement along with the definition or property used.



(i)  $AD = \dots\dots$  (ii)  $\angle DCB = \dots\dots$

(iii)  $OC = \dots\dots$  (iv)  $m \angle DAB + m \angle CDA = \dots\dots$

### Solution

(i)  $AD = BC$  (Opposite sides of a parallelogram are equal)

(ii)  $\angle DCB = \angle DAB$  (Opposite angles of a parallelogram are equal)

(iii)  $OC = OA$  (Diagonals of a parallelogram are equal)

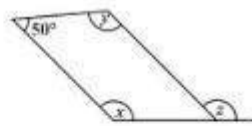
(iv)  $m \angle DAB + m \angle CDA = 180^\circ$

### Question 2

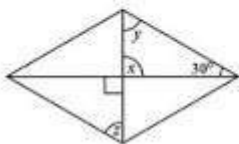
Consider the following parallelograms. Find the values of the unknown  $x$ ,  $y$ ,  $z$



(i)



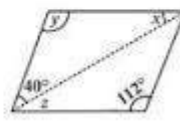
(ii)



(iii)



(iv)



(v)

### Solution

(i)



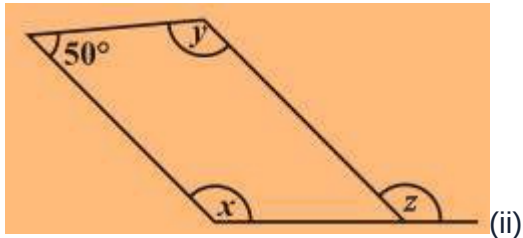
$y = 100^\circ$  (opposite angles of a parallelogram)

$$x + 100^\circ = 180^\circ \text{ (adjacent angles of a parallelogram)}$$

$$\Rightarrow x = 180^\circ - 100^\circ = 80^\circ$$

$$x = z = 80^\circ \text{ (opposite angles of a parallelogram)}$$

$$\therefore, x = 80^\circ, y = 100^\circ \text{ and } z = 80^\circ$$

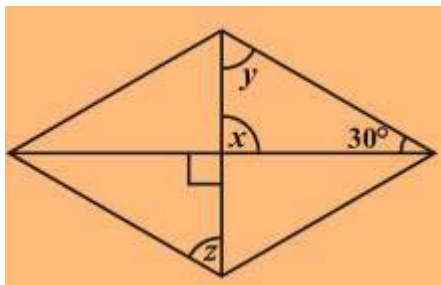


$$50^\circ + x = 180^\circ \Rightarrow x = 180^\circ - 50^\circ = 130^\circ \text{ (adjacent angles of a parallelogram)}$$

$$x = y = 130^\circ \text{ (opposite angles of a parallelogram)}$$

$$x = z = 130^\circ \text{ (corresponding angle)}$$

(iii)



$$x = 90^\circ \text{ (vertical opposite angles)}$$

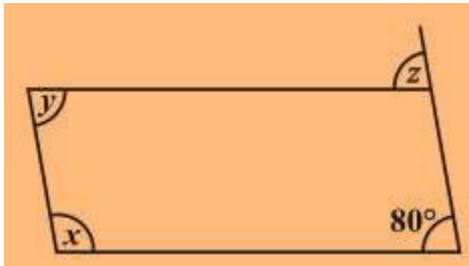
$$x + y + 30^\circ = 180^\circ \text{ (angle sum property of a triangle)}$$

$$\Rightarrow 90^\circ + y + 30^\circ = 180^\circ$$

$$\Rightarrow y = 180^\circ - 120^\circ = 60^\circ$$

$$\text{also, } y = z = 60^\circ \text{ (alternate angles)}$$

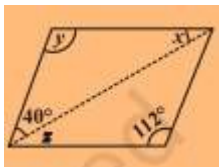
(iv)



$z = 80^\circ$  (corresponding angle)  $z = y = 80^\circ$  (alternate angles)  $x + y = 180^\circ$  (adjacent angles)

$$\Rightarrow x + 80^\circ = 180^\circ \Rightarrow x = 180^\circ - 80^\circ = 100^\circ$$

(v)



$$x = 280$$

$$y = 1120 \quad z = 280$$

### Question 3

Can a quadrilateral ABCD be a parallelogram if (i)  $\angle D + \angle B = 180^\circ$ ?

(ii)  $AB = DC = 8 \text{ cm}$ ,  $AD = 4 \text{ cm}$  and  $BC = 4.4 \text{ cm}$ ?

(iii)  $\angle A = 70^\circ$  and  $\angle C = 65^\circ$ ?

### Solution

(i) Yes, a quadrilateral ABCD can be a parallelogram if  $\angle D + \angle B = 180^\circ$  but it should also fulfil some conditions, which are:

(a) The sum of the adjacent angles should be  $180^\circ$ .

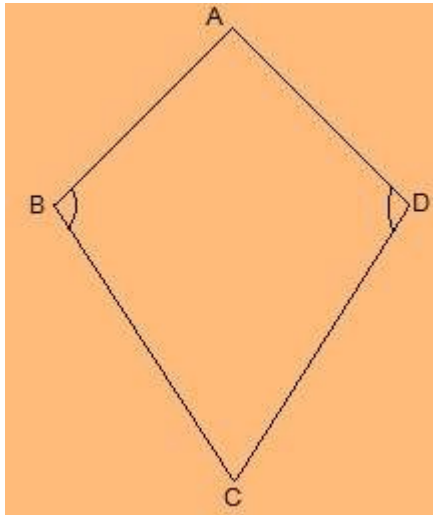
(b) Opposite angles must be equal.

(ii) No, opposite sides should be of the same length. Here,  $AD \neq BC$

(iii) No, opposite angles should be of the same measures.  $\angle A \neq \angle C$

**Question 4**

Draw a rough figure of a quadrilateral that is not a parallelogram but has exactly two opposite angles of equal measure.

**Solution**

ABCD is a figure of quadrilateral that is not a parallelogram but has exactly two opposite angles, that is,  $\angle B = \angle D$  of equal measure. It is not a parallelogram because  $\angle A \neq \angle C$ .

**Question 5**

The measures of two adjacent angles of a parallelogram are in the ratio 3 : 2. Find the measure of each of the angles of the parallelogram.

**Solution**

Let the measures of two adjacent angles  $\angle A$  and  $\angle B$  be  $3x$  and  $2x$ , respectively in parallelogram ABCD.

$$\angle A + \angle B = 180^\circ$$

$$\Rightarrow 3x + 2x = 180^\circ$$

$$\Rightarrow 5x = 180^\circ$$

$$\Rightarrow x = 36^\circ$$

We know that opposite sides of a parallelogram are equal.

$$\angle A = \angle C = 3x = 3 \times 36^\circ = 108^\circ$$

$$\angle B = \angle D = 2x = 2 \times 36^\circ = 72^\circ$$

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### Question 6

Two adjacent angles of a parallelogram have equal measure. Find the measure of each of the angles of the parallelogram.

### Solution

Let ABCD be a parallelogram.

Sum of adjacent angles of a parallelogram =  $180^\circ$

$$\angle A + \angle B = 180^\circ$$

$$\Rightarrow 2\angle A = 180^\circ$$

$$\Rightarrow \angle A = 90^\circ$$

$$\text{also, } 90^\circ + \angle B = 180^\circ$$

$$\Rightarrow \angle B = 180^\circ - 90^\circ = 90^\circ$$

$$\angle A = \angle C = 90^\circ$$

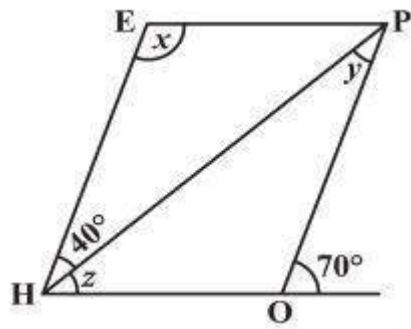
$$\angle B = \angle D = 90^\circ$$

◦

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### Question 7

The adjacent figure HOPE is a parallelogram. Find the angle measures x, y and z. State the properties you use to find them.



### Solution

$$y = 40^\circ \text{ (alternate interior angle)}$$

$$\angle P = 70^\circ \text{ (alternate interior angle)}$$

$$\angle P = \angle H = 70^\circ \text{ (opposite angles of a parallelogram)}$$

$$z = \angle H - 40^\circ = 70^\circ - 40^\circ = 30^\circ$$

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

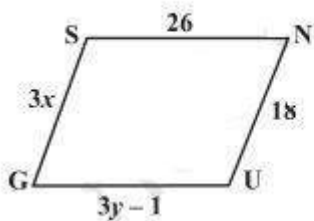
$$\Rightarrow 70^\circ + x = 180^\circ$$

$$\Rightarrow x = 180^\circ - 70^\circ = 110^\circ$$

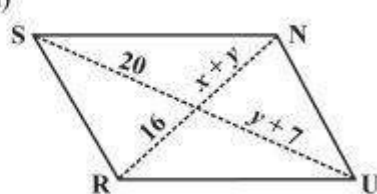
### Question 8

The following figures GUNS and RUNS are parallelograms. Find  $x$  and  $y$ . (Lengths are in cm)

(i)



(ii)



### Solution

(i)  $SG = NU$  and  $SN = GU$  (opposite sides of a parallelogram are equal)  $3x = 18$

$$x = 18/3$$

$$\Rightarrow x = 6$$

$$3y - 1 = 26$$

$$\Rightarrow 3y = 26 + 1$$

$$\Rightarrow y = 27/3 = 9$$

$$x = 6 \text{ and } y = 9$$

(ii)  $20 = y + 7$  and  $16 = x + y$  (diagonals of a parallelogram bisect each other)  $y + 7 = 20$

$$\Rightarrow y = 20 - 7 = 13 \text{ and,}$$

$$x + y = 16$$

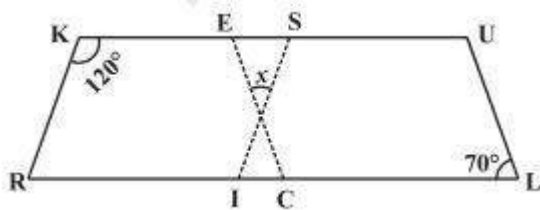
$$\Rightarrow x + 13 = 16$$

$$\Rightarrow x = 16 - 13 = 3$$

$$x = 3 \text{ and } y = 13$$

### Question 9

In the above figure both RISK and CLUE are parallelograms. Find the value of  $x$ .



### Solution

$\angle K + \angle R = 180^\circ$  (adjacent angles of a parallelogram are supplementary)

$$\Rightarrow 120^\circ + \angle R = 180^\circ$$

$$\Rightarrow \angle R = 180^\circ - 120^\circ = 60^\circ$$

also,  $\angle R = \angle SIL$  (corresponding angles)

$$\Rightarrow \angle SIL = 60^\circ$$

also,  $\angle ECR = \angle L = 70^\circ$  (corresponding angles)  $x + 60^\circ + 70^\circ = 180^\circ$  (angle sum of a triangle)

$$\Rightarrow x + 130^\circ = 180^\circ$$

$$\Rightarrow x = 180^\circ - 130^\circ = 50^\circ$$

**Question 10**

Explain how this figure is a trapezium. Which of its two sides are parallel? (Fig 3.32)

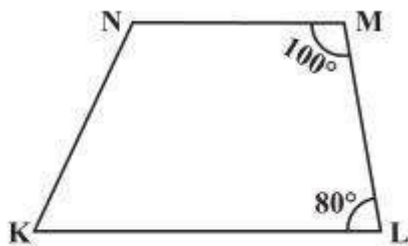


Fig 3.32

**Solution**

When a transversal line intersects two lines in such a way that the sum of the adjacent angles on the same side of transversal is  $180^\circ$ , then the lines are parallel to each other. Here,  $\angle M + \angle L = 100^\circ + 80^\circ = 180^\circ$

Thus,  $MN \parallel LK$

As the quadrilateral KLMN has one pair of parallel lines, it is a trapezium. MN and LK are parallel lines.

**Question 11**

Find  $m\angle C$  in Fig 3.33 if  $AB \parallel DC$ .

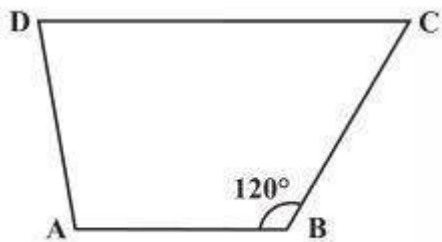


Fig 3.33

**Solution**

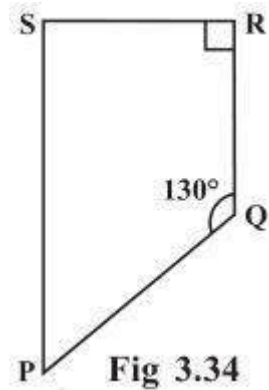
$$m\angle C + m\angle B = 180^\circ \text{ (angles on the same side of transversal)}$$

$$\Rightarrow m\angle C + 120^\circ = 180^\circ$$

$$\Rightarrow m\angle C = 180^\circ - 120^\circ = 60^\circ$$

### Question 12

Find the measure of  $\angle P$  and  $\angle S$  if  $SP \parallel RQ$  ? in Fig 3.34. (If you find  $m\angle R$ , is there more than one method to find  $m\angle P$ ?)



### Solution

$\angle P + \angle Q = 180^\circ$  (angles on the same side of transversal)

$$\Rightarrow \angle P + 130^\circ = 180^\circ$$

$$\Rightarrow \angle P = 180^\circ - 130^\circ = 50^\circ$$

also,  $\angle R + \angle S = 180^\circ$  (angles on the same side of transversal)

$$\Rightarrow 90^\circ + \angle S = 180^\circ$$

$$\Rightarrow \angle S = 180^\circ - 90^\circ = 90^\circ$$

Thus,  $\angle P = 50^\circ$  and  $\angle S = 90^\circ$

Yes, there are more than one method to find  $m\angle P$ .

PQRS is a quadrilateral. Sum of measures of all angles is  $360^\circ$ .

Since, we know the measurement of  $\angle Q$ ,  $\angle R$  and  $\angle S$ .

$$\angle Q = 130^\circ, \angle R = 90^\circ \text{ and } \angle S = 90^\circ$$

$$\angle P + 130^\circ + 90^\circ + 90^\circ = 360^\circ$$

$$\Rightarrow \angle P + 310^\circ = 360^\circ$$

$$\Rightarrow \angle P = 360^\circ - 310^\circ = 50^\circ$$

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### Exercise 3.4 · Textbook page 55

#### Question 1

State whether True or False.

- (a) All rectangles are squares.
- (b) All rhombuses are parallelograms.
- (c) All squares are rhombuses and also rectangles.
- (d) All squares are not parallelograms.
- (e) All kites are rhombuses.
- (f) All rhombuses are kites.
- (g) All parallelograms are trapeziums.
- (h) All squares are trapeziums.

#### Solution

- (a) False

Because all squares are rectangles but all rectangles are not squares.

- (b) True

- (c) True

- (d) False

Because all squares are parallelograms as opposite sides are parallel and opposite angles are equal.

- (e) False.

Because, for example, the length of the sides of a kite are not of the same length.

- (f) True

- (g) True

(h) True

---

### Question 2

Identify all the quadrilaterals that have.

(a) four sides of equal length (b) four right angles

### Solution

(a) Rhombus and square have all four sides of equal length.

(b) Square and rectangle have four right angles.

---

### Question 3

Explain how a square is

(i) a quadrilateral (ii) a parallelogram (iii) a rhombus (iv) a rectangle

### Solution

(i) Square is a quadrilateral because it has four sides.

(ii) Square is a parallelogram because its opposite sides are parallel and opposite angles are equal.

(iii) Square is a rhombus because all the four sides are of equal length and diagonals bisect at right angles.

(iv) Square is a rectangle because each interior angle, of the square, is  $90^\circ$

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### Question 4

Name the quadrilaterals whose diagonals.

(i) bisect each other (ii) are perpendicular bisectors of each other (iii) are equal

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## Solution

- (i) Parallelogram, Rhombus, Square and Rectangle
- (ii) Rhombus and Square
- (iii) Rectangle and Square

## Question 5

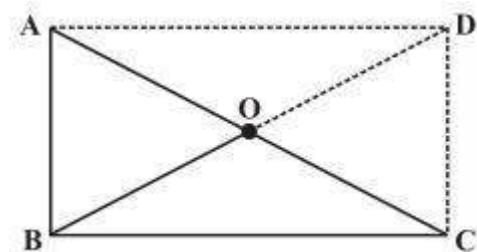
Explain why a rectangle is a convex quadrilateral.

## Solution

A rectangle is a convex quadrilateral because both of its diagonals lie inside the rectangle.

## Question 6

ABC is a right-angled triangle and O is the mid-point of the side opposite to the right angle. Explain why O is equidistant from A, B and C. (The dotted lines are drawn additionally to help you).



## Solution

AD and DC are drawn so that  $AD \parallel BC$  and  $AB \parallel DC$

$AD = BC$  and  $AB = DC$

ABCD is a rectangle as opposite sides are equal and parallel to each other and all the interior angles are of  $90^\circ$ .

In a rectangle, diagonals are of equal length and also bisect each other.

Hence,  $AO = OC = BO = OD$

Thus, O is equidistant from A, B and C.

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