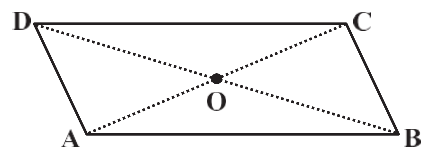
PUBLIC SCHOOL DARBHANGA
SESSION (2020-21)
CLASS-VIII
MATHEMATICS
Quadrilaterals
Revision

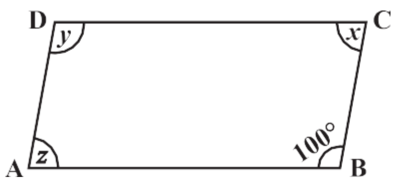
1. Given a parallelogram ABCD. Complete each statement along with the definition or property used.



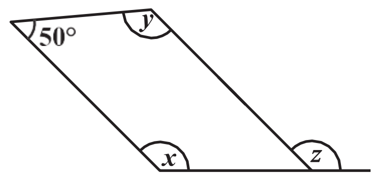
(i) AD = ... (ii) ∠ DCB = ...

(iii) OC = ... (iv) m ∠DAB + m ∠CDA = ...

2.Consider the following parallelograms. Find the values of the unknowns x, y, z.



(i)



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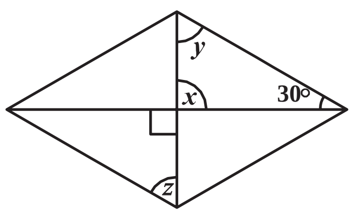

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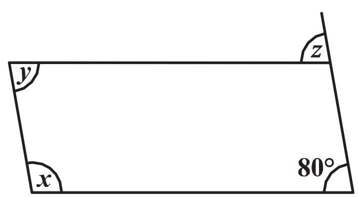

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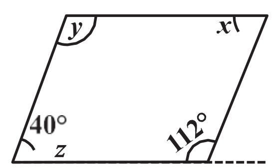
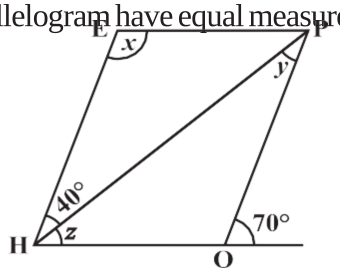


(v)

2. Can a quadrilateral ABCD be a parallelogram if
   (i) ∠D + ∠B = 180°? (ii) AB = DC = 8 cm, AD = 4 cm and BC = 4.4 cm?
   (iii) ∠A = 70° and ∠C = 65°?
3. Draw a rough figure of a quadrilateral that is not a parallelogram but has exactly two opposite angles of equal measure.
4. 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.
5. Two adjacent angles of a parallelogram have equal measure.

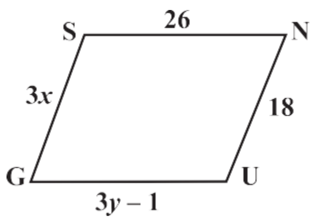


Find the measure of each of the angles of the parallelogram.

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

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

(i)



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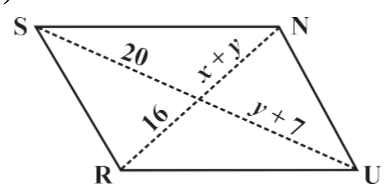
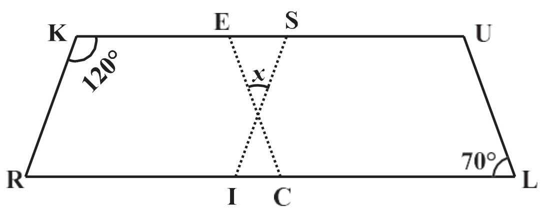
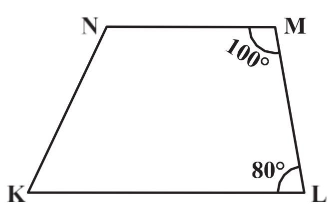


9.



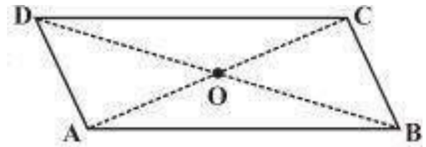
In the above figure both RISK and CLUE are parallelograms. Find the value of x.

10 Explain how this figure is a trapezium. Which of its two sides are parallel?



ANSWER KEY

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



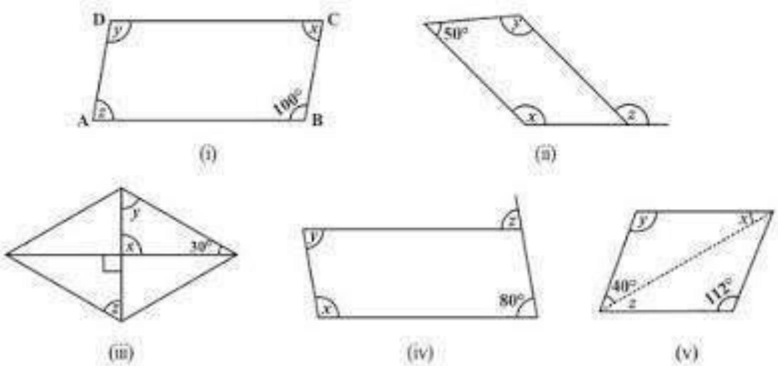
property used.

(i) AD = ... (ii) ∠DCB = ...
(iii) OC = ... (iv) m ∠DAB + m ∠CDA = ...

Solution:

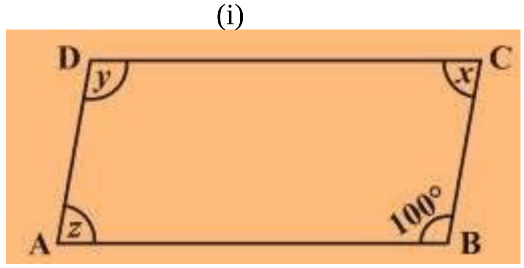
(i) AD = BC (Opposite sides of a parallelogram are equal)
(ii) ∠DCB = ∠DAB (Opposite angles of a parallelogram are equal) (iii)OC = OA (Diagonals of a parallelogram are equal)
(iv)m ∠DAB + m ∠CDA = 180°

2. Consider the following parallelograms. Find the values of the unknowns x, y, z.



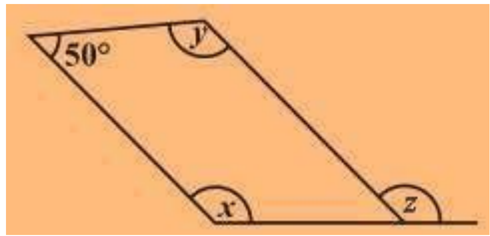
Solution:

(i)



y = 100° (opposite angles of a parallelogram)
x + 100° = 180° (Adjacent angles of a parallelogram)
⇒ x = 180° - 100° = 80°
x = z = 80° (opposite angles of a parallelogram)
∴, x = 80°, y = 100° and z = 80°

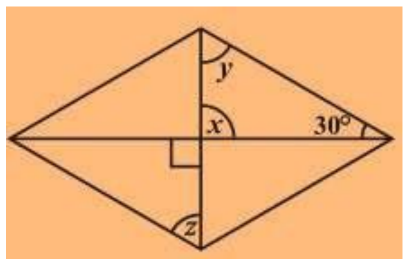
(ii)



50° + x = 180° ⇒ x = 180° - 50° = 130° (Adjacent angles of a

parallelogram) x = y = 130° (opposite angles of a parallelogram)
x = z = 130° (corresponding angle)

(iii)

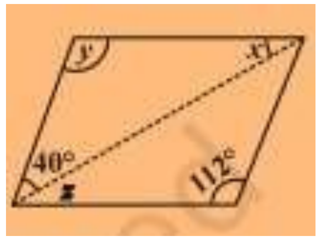


x = 90° (vertical opposite angles)
x + y + 30° = 180° (angle sum property of a triangle)
⇒ 90° + y + 30° = 180°
⇒ y = 180° - 120° = 60°
also, y = z = 60° (alternate angles)

(iv)

z = 80° (corresponding angle)
z = y = 80° (alternate angles)
x + y = 180° (adjacent angles)
⇒ x + 80° = 180° ⇒ x = 180° - 80° = 100°

(v)



x=28º

y =
=112°

z = 28°

3. **Can a quadrilateral ABCD be a parallelogram if (i) ∠D + ∠B = 180°?**
   (ii) AB = DC = 8 cm, AD = 4 cm and BC = 4.4 cm?
   (iii) ∠A = 70° and ∠C = 65°?

Solution:

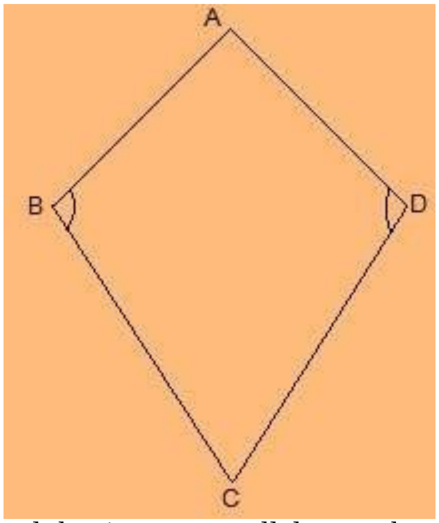
(i) Yes, a quadrilateral ABCD be a parallelogram if ∠D + ∠B = 180° but it should also fulfilled some conditions which are:
- The sum of the adjacent angles should be 180°.
- Opposite angles must be equal.

(ii) No, opposite sides should be of same length. Here, AD ≠ BC

(iii) No, opposite angles should be of same measures. ∠A ≠ ∠C

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 ∠B = ∠D of equal measure. It is not a parallelogram because ∠A ≠ ∠C.

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 ∠A and ∠B be 3x and 2x respectively in parallelogram ABCD.

$\angle A + \angle B = 180°$

$\Rightarrow 3x + 2x = 180°$

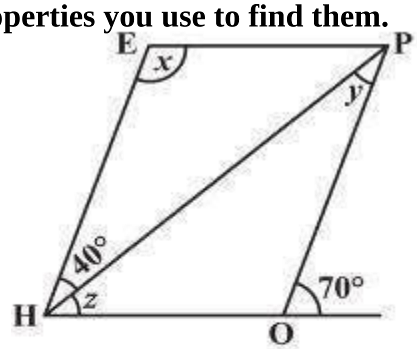
⇒ 5x = 180°
⇒ x = 36°
We know that opposite sides of a parallelogram are equal.
∠A = ∠C = 3x = 3 × 36° = 108°
∠B = ∠D = 2x = 2 × 36° = 72°

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°
∠A + ∠B = 180°
⇒ 2∠A = 180°
⇒ ∠A = 90°
also, 90° + ∠B = 180°
⇒ ∠B = 180° - 90° = 90°
∠A = ∠C = 90°
∠B = ∠D = 90°

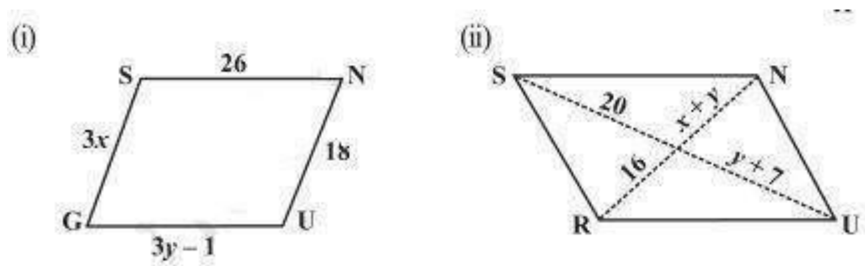
7. **The adjacent figure HOPE is a parallelogram. Find the angle measures x, y and z. State the properties you use to find them.**



Solution:

y = 40° (alternate interior angle)
∠P = 70° (alternate interior angle)
∠P = ∠H = 70° (opposite angles of a parallelogram)
z = ∠H - 40°= 70° - 40° = 30°
∠H + x = 180°
⇒ 70° + x = 180°
⇒ x = 180° - 70° = 110°

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



Solution:

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

$\Rightarrow x = \frac{18}{3} = 6$

3y - 1 = 26 and,

$\Rightarrow 3y = 26 + 1$

$\Rightarrow y = \frac{27}{3} = 9$

x = 6 and y = 9

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

$\Rightarrow y = 20 - 7 = 13$

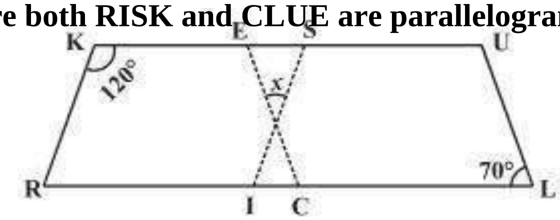
and, x + y = 16

$\Rightarrow x + 13 = 16$

$\Rightarrow x = 16 - 13 = 3$

x = 3 and y = 13

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



Solution:

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

$\Rightarrow 120° + \angle R = 180°$

$\Rightarrow \angle R = 180° - 120° = 60°$

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

$\Rightarrow \angle SIL = 60°$

also, $\angle ECR = \angle L = 70°$ (corresponding

angles) x + 60° + 70° = 180° (angle sum of a triangle)
⇒ x + 130° = 180°
⇒ x = 180° - 130° = 50°

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

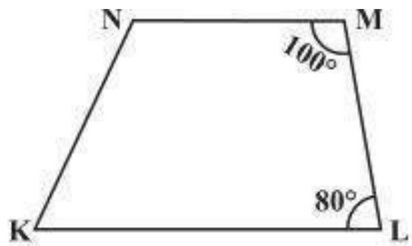


Fig 3.32

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° then the lines are parallel to each other. Here,
$\angle M + \angle L = 100° + 80° = 180°$
Thus, MN || LK
As the quadrilateral KLMN has one pair of parallel line therefore it is a trapezium. MN and LK are parallel lines.

11. Find m∠C in Fig 3.33 if AB || DC ?

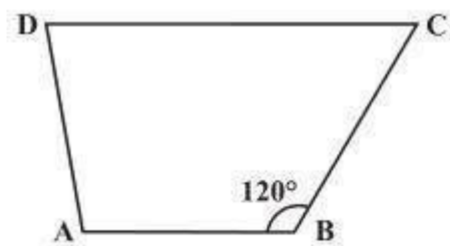


Fig 3.33

Solution:

$m\angle C + m\angle B = 180°$ (angles on the same side of transversal)
$\Rightarrow m\angle C + 120° = 180°$
$\Rightarrow m\angle C = 180° - 120° = 60°$

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

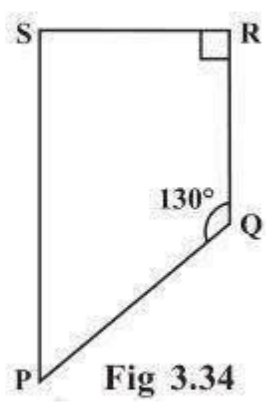


Fig 3.34

Solution:

$\angle P + \angle Q = 180°$ (angles on the same side of transversal)
$\Rightarrow \angle P + 130° = 180°$
$\Rightarrow \angle P = 180° - 130° = 50°$
also, $\angle R + \angle S = 180°$ (angles on the same side of transversal)
$\Rightarrow 90° + \angle S = 180°$
$\Rightarrow \angle S = 180° - 90° = 90°$
Thus, $\angle P = 50°$ and $\angle S = 90°$

Yes, there are more than one method to find m$\angle P$.
PQRS is a quadrilateral. Sum of measures of all angles is 360°.
Since, we know the measurement of $\angle Q$, $\angle R$ and $\angle S$.
$\angle Q = 130°$, $\angle R = 90°$ and $\angle S = 90°$
$\angle P + 130° + 90° + 90° = 360°$
$\Rightarrow \angle P + 310° = 360°$
$\Rightarrow \angle P = 360° - 310° = 50°$