12

Properties of Parallelogram, Rhombus and Trapezium

SINGAPORE
STUDENT LEARNING SPACE

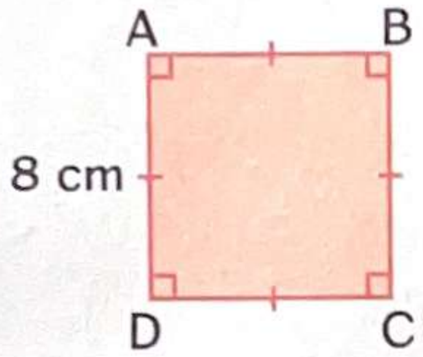
Do you know what a parallelogram, rhombus and trapezium are?

Learn more at *go.gov.sg/pm520*

Properties of Parallelogram

Recall

1 ABCD is a **square**.



A square has

(a) ☐ right angles.

(b) ☐ equal sides.

(c) ☐ pairs of opposite sides that are parallel.

In Square ABCD, the length of DC is ☐ cm.

2 EFGH is a **rectangle**.

A rectangle has

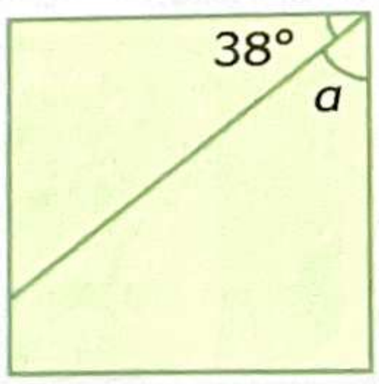
(a) ☐ right angles.

(b) ☐ pairs of opposite sides that are parc

In Rectangle EFGH, its length HG is ☐ cm and its breadth FG i
☐ cm.

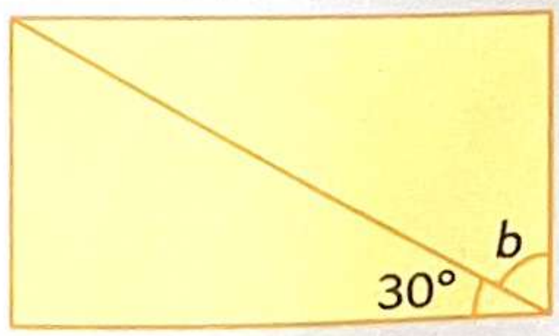
3 Find the unknown angles in the rectangle and square.

(a)



$\angle a =$ ☐

(b)



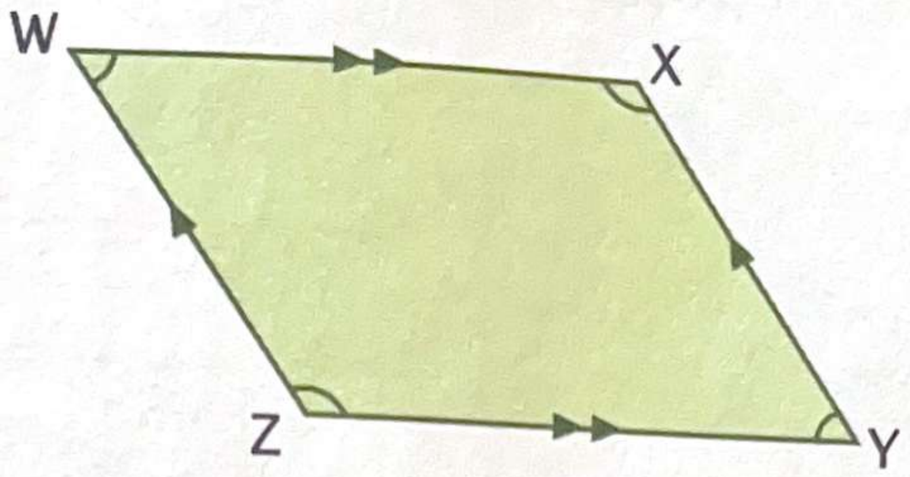
$\angle b =$ ☐

Go to PB 5B Practice 1

Let's Try! 1

WXYZ is a parallelogram.

Identify the sides and angles of the parallelogram.



(a) WX = ____

(b) WZ = ____

(c) WX // ____

(d) WZ // ____

(e) ∠ZWX = ∠____

(f) ∠WXY = ∠____

(g) ∠ZWX + ∠____ = 180°

(h) ∠ZWX + ∠____ = 180°

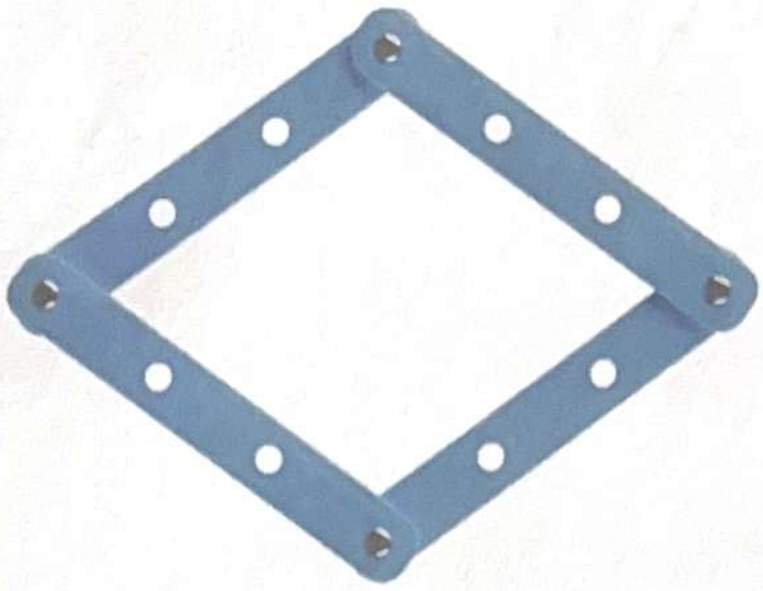
(i) ∠XYZ + ∠____ = 180°

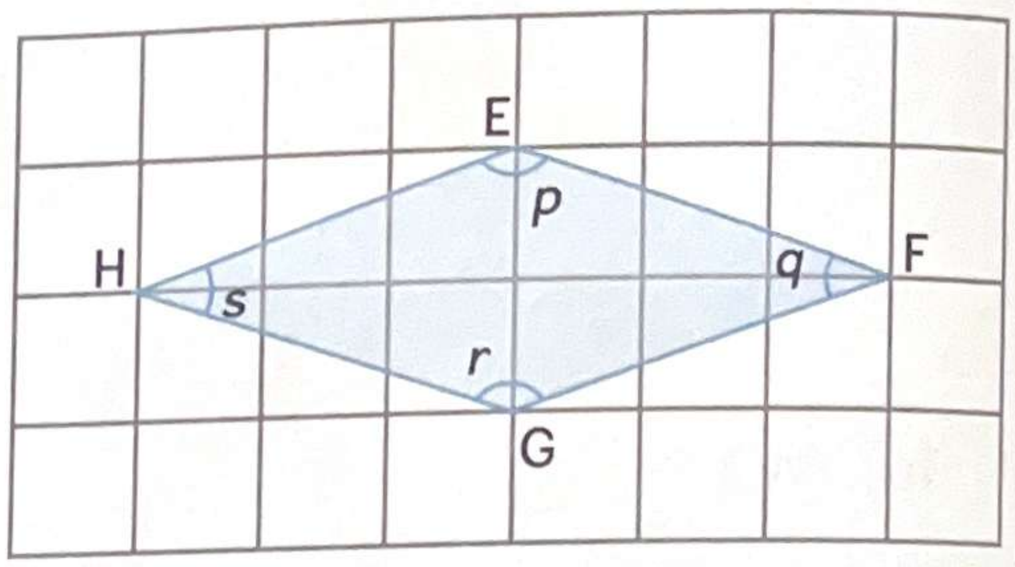
(j) ∠WZY + ∠____ = 180°

Go to PB 5B

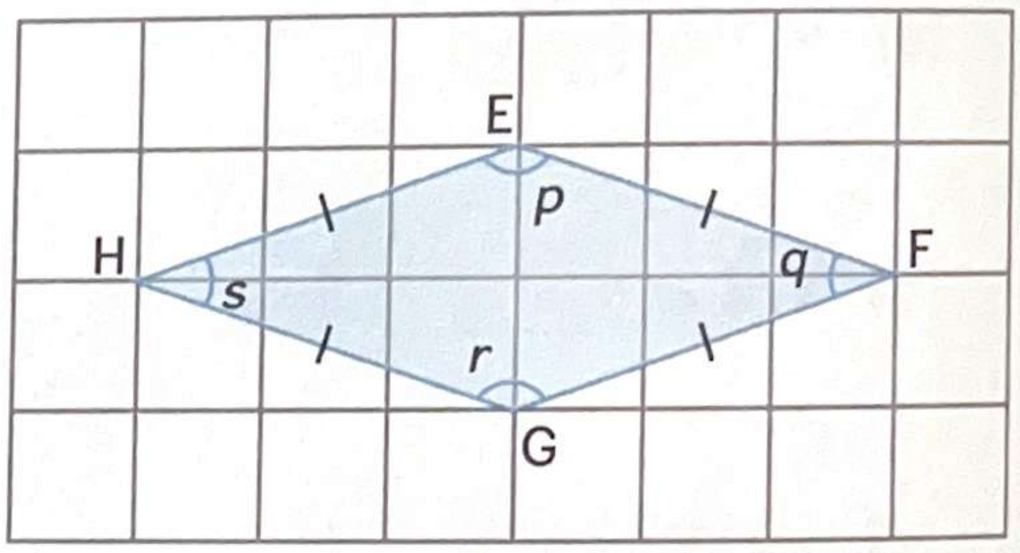
Properties of Rhombus

A **rhombus** is a parallelogram with four equal sides, two pairs of opposite sides that are parallel and opposite angles that are equal.





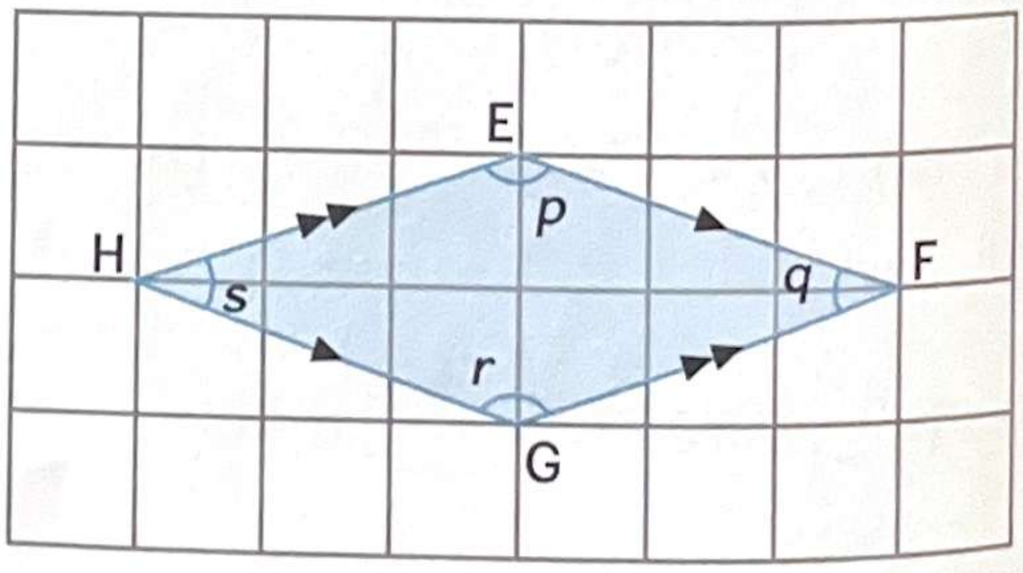
EF = FG = GH = EH



A rhombus has 4 equal sides.

EF // HG

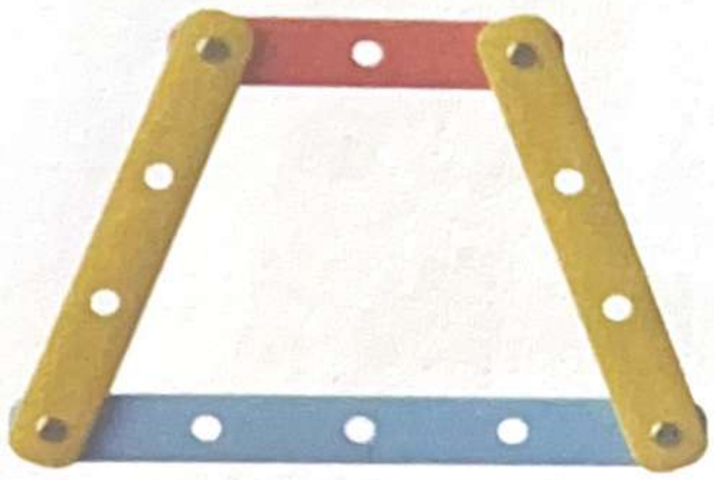
HE // GF

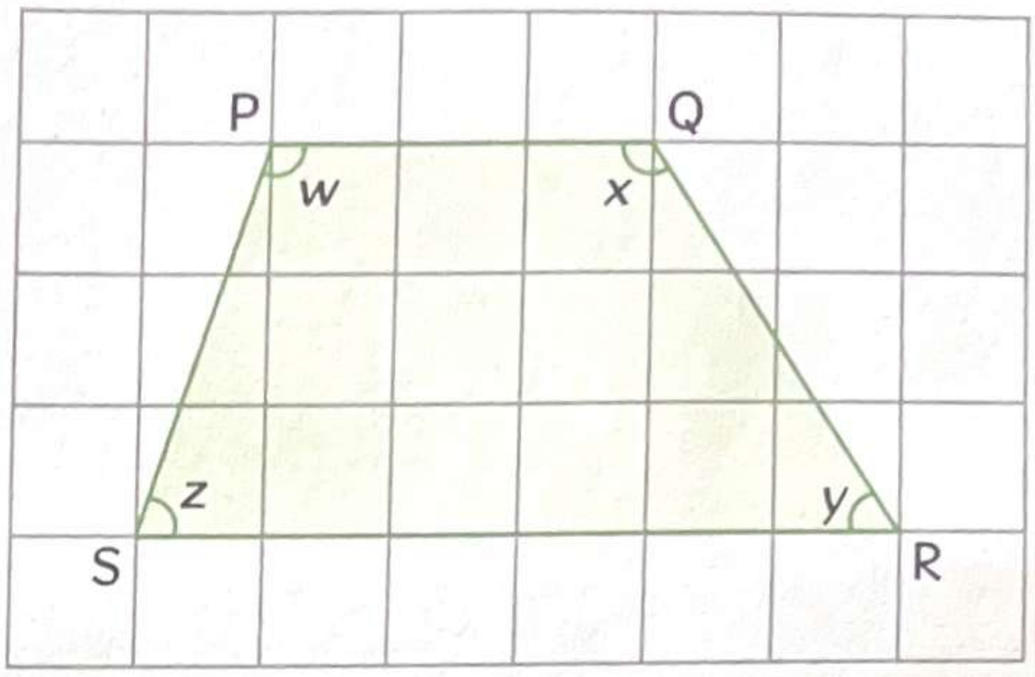


The 2 pairs of opposite sides of a rhombus are parallel.

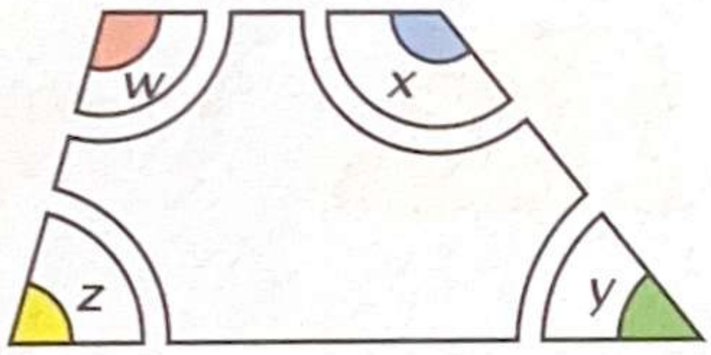
Properties of Trapezium

A **trapezium** is a quadrilateral with one pair of parallel sides.

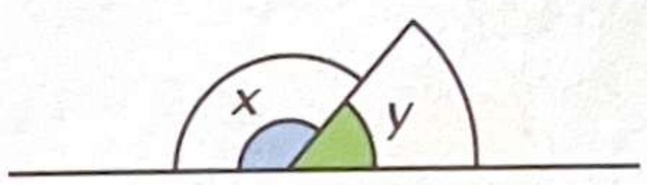




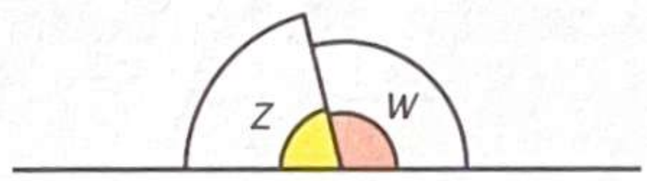
Cut the angles from a trapezium cutout at $\angle w$, $\angle x$, $\angle y$ and $\angle z$.



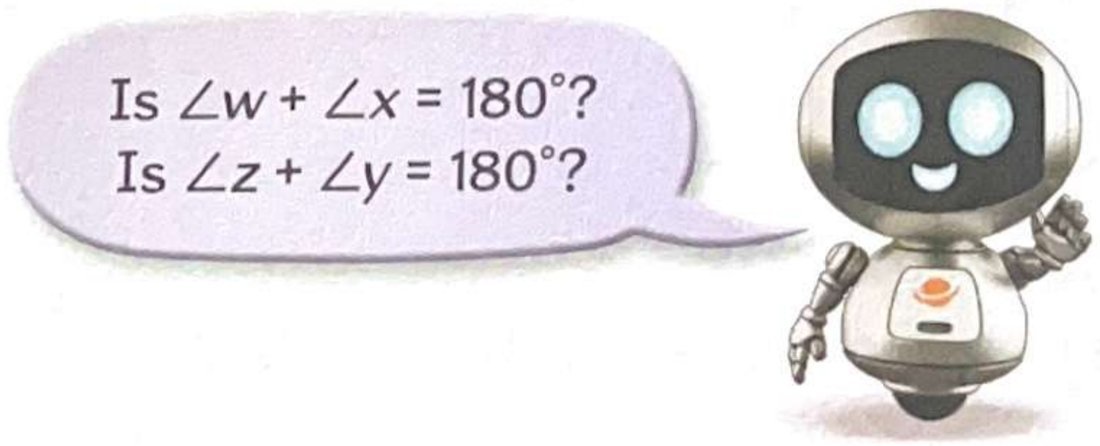
Arrange $\angle x$ and $\angle y$ on a straight line. Do the same for $\angle z$ and $\angle w$.



$\angle x + \angle y = 180°$



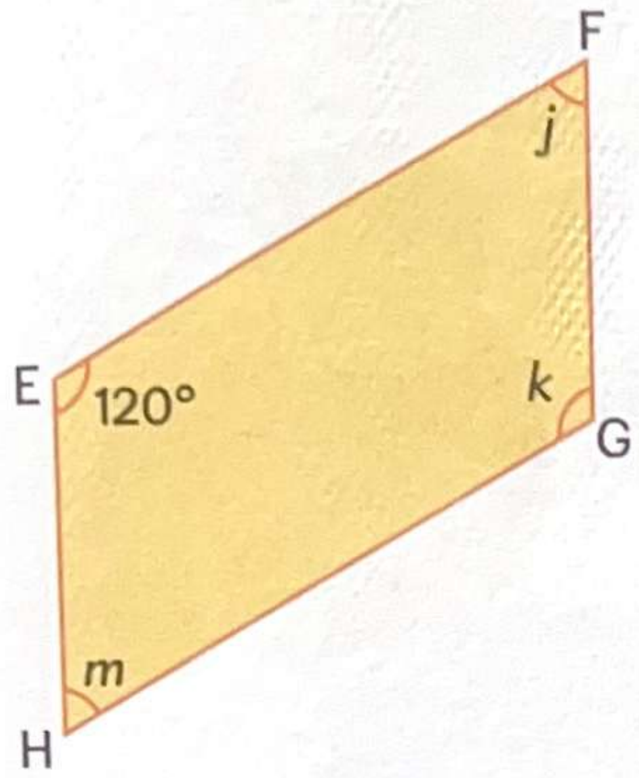
$\angle z + \angle w = 180°$

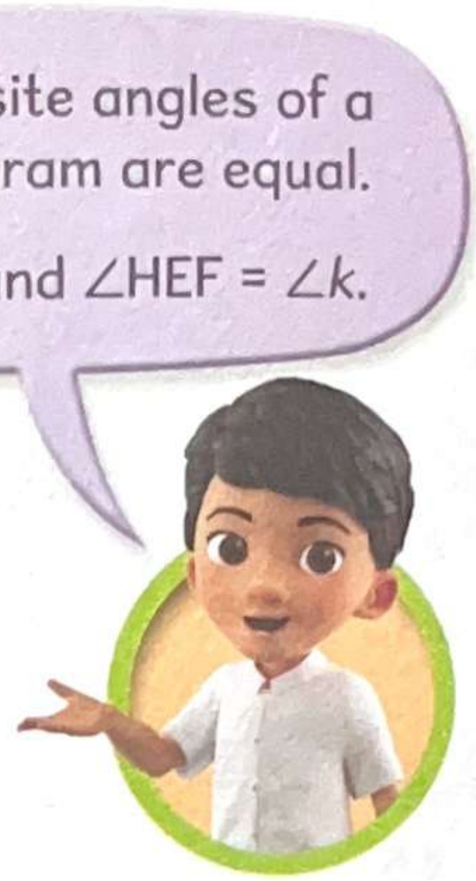


The sum of angles between the pair of parallel sides of a trapezium is 180°.

Finding Unknown Angles

EFGH is a parallelogram. $\angle HEF = 120°$.
Find $\angle j$, $\angle k$ and $\angle m$.



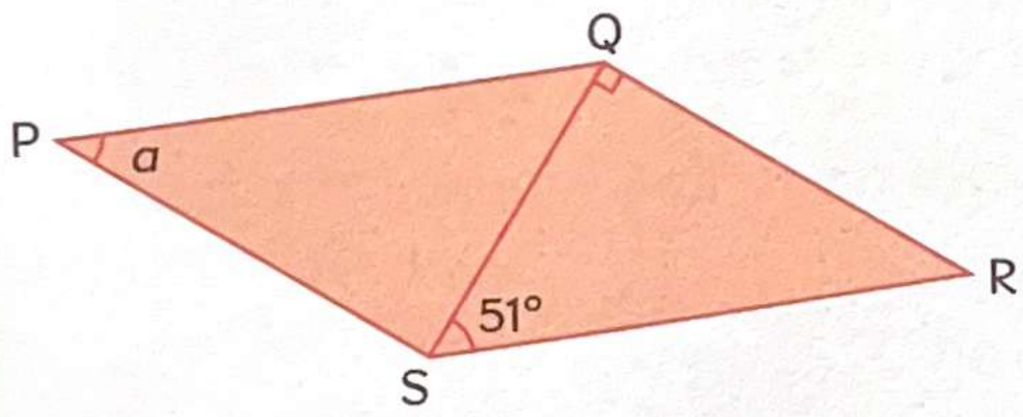


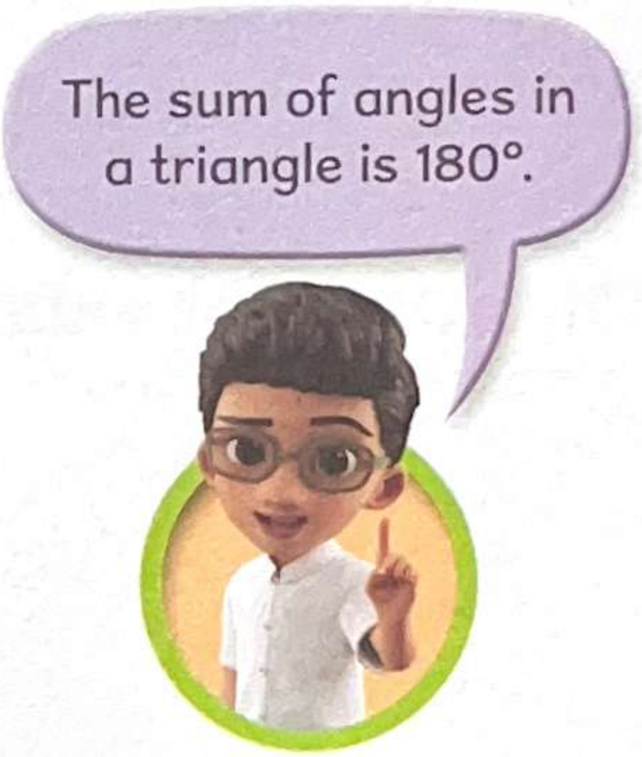
$\angle k = \mathbf{120°}$

$\angle m = 180° - 120°$
$= \mathbf{60°}$

$\angle j = \angle m$
$= \mathbf{60°}$

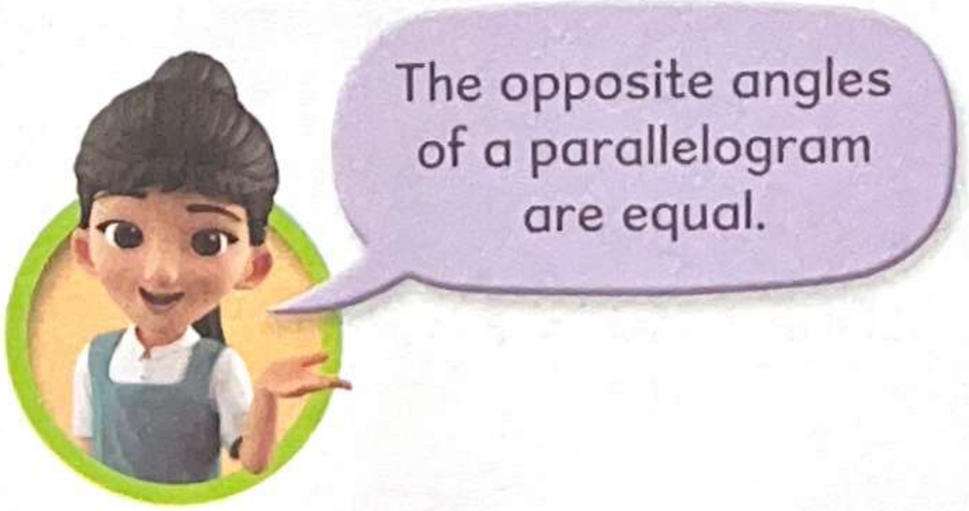
PQRS is a parallelogram. $\angle QSR = 51°$. Find $\angle a$.



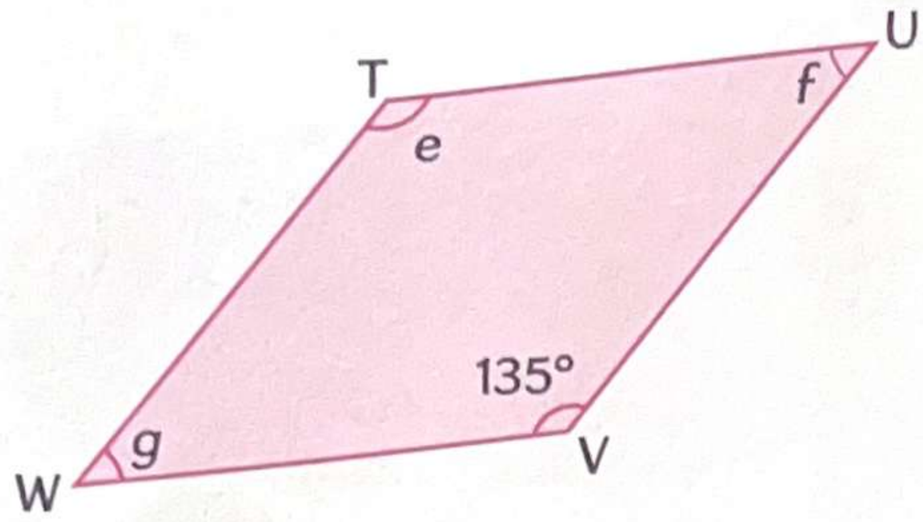


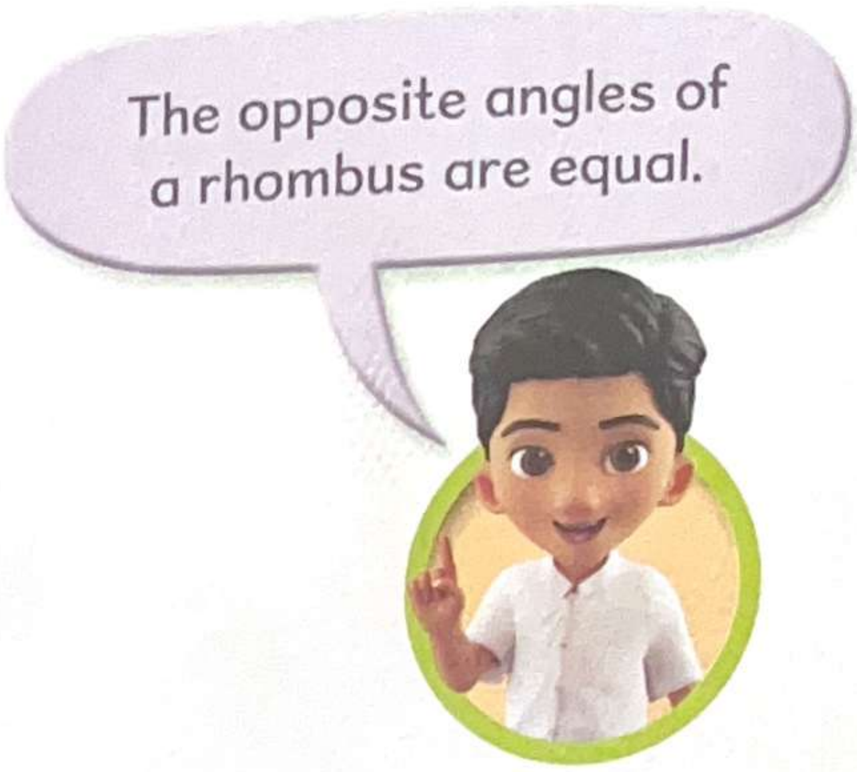
$\angle QRS = 180° - 90° - 51°$
$= 39°$

$\angle a = \angle QRS$
$= \mathbf{39°}$



TUVW is a rhombus. $\angle UVW = 135°$. Find $\angle e$, $\angle f$ and $\angle g$.



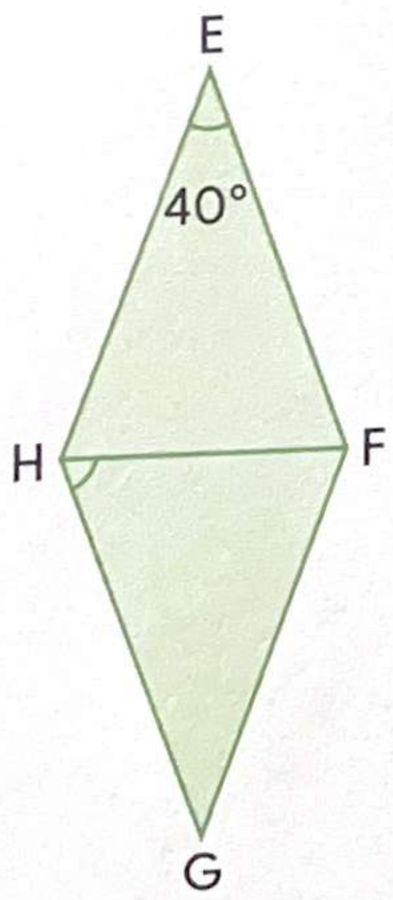


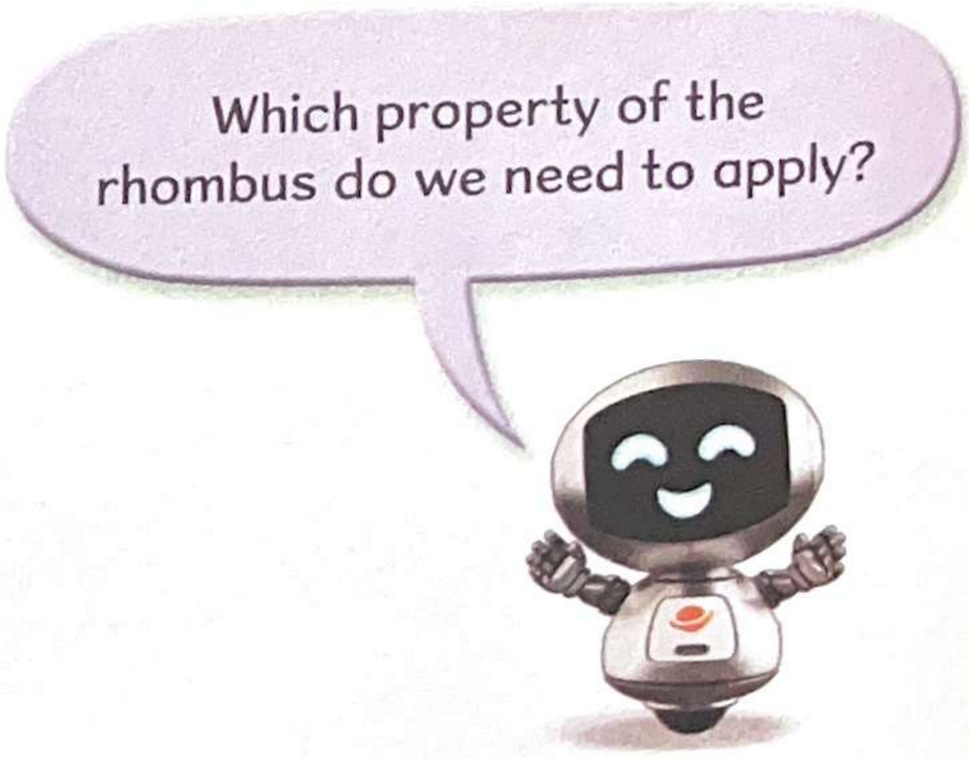
$\angle e = \angle UVW$
$= \mathbf{135°}$

$\angle f = 180° - 135°$
$= \mathbf{45°}$

$\angle g = \angle f$
$= \mathbf{45°}$

EFGH is a rhombus. $\angle HEF = 40°$. Find $\angle GHF$.

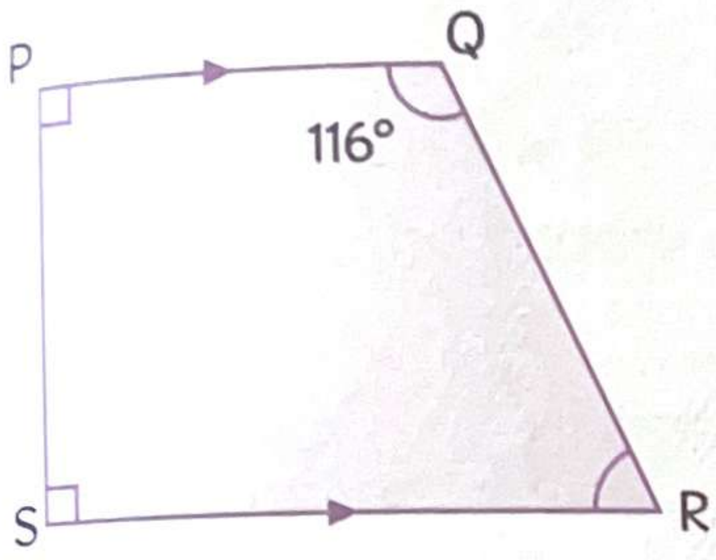




$\angle FGH = \angle HEF$
$= 40°$

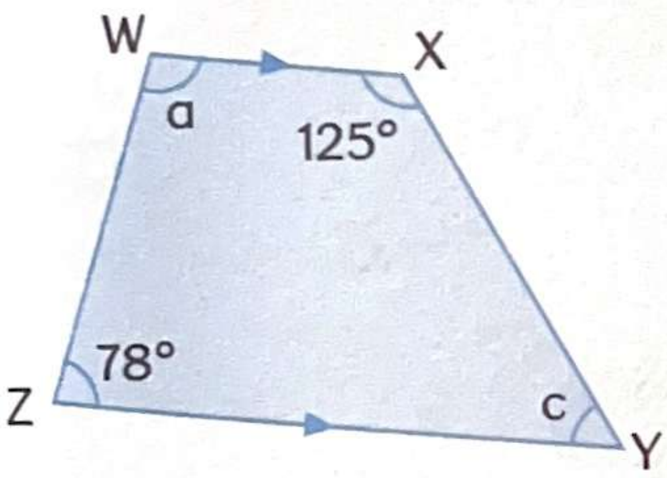
$180° - 40° = 140°$
$\angle GHF = 140° \div 2$
$= \mathbf{70°}$

PQRS is a trapezium. PQ // RS. Find ∠QRS.



$\angle QRS = 180° - 116°$
$= \mathbf{64°}$

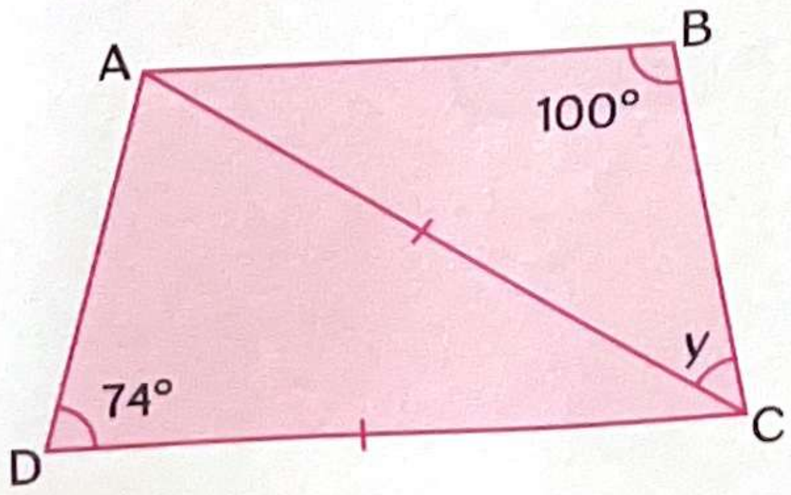
WXYZ is a trapezium. Find ∠*a* and ∠*c*.



$\angle a = 180° - 78°$
$= \mathbf{102°}$

$\angle c = 180° - 125°$
$= \mathbf{55°}$

ABCD is a trapezium. ACD is an isosceles triangle. ∠CDA = 74°. ∠ABC = 100°. AB // DC. Find ∠*y*.

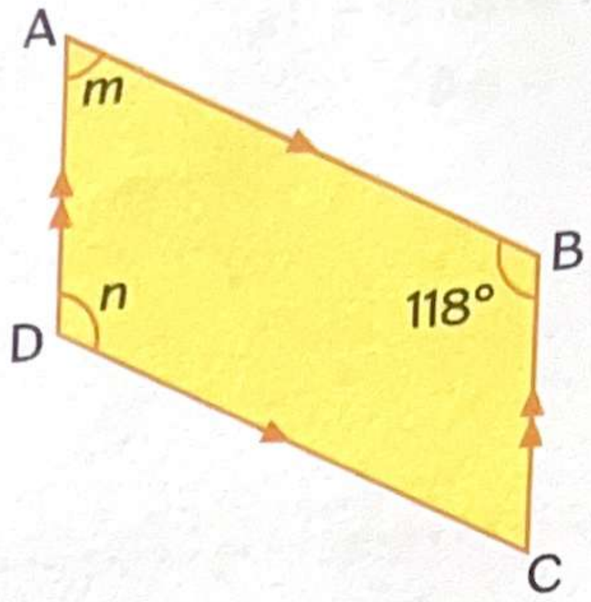


$\angle ACD = 180° - 74° - 74°$
$= 32°$

$\angle y = 180° - 100° - 32°$
$= \mathbf{48°}$

Let's Try! 4

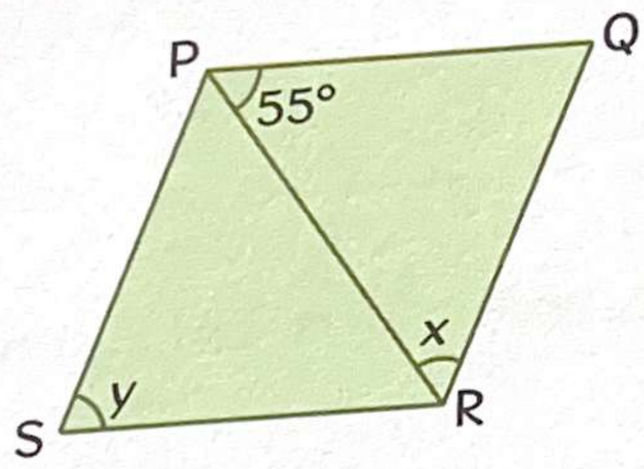
(a) ABCD is a parallelogram. $\angle ABC = 118°$.
Find $\angle m$ and $\angle n$.



$\angle m =$ ____

$\angle n =$ ____

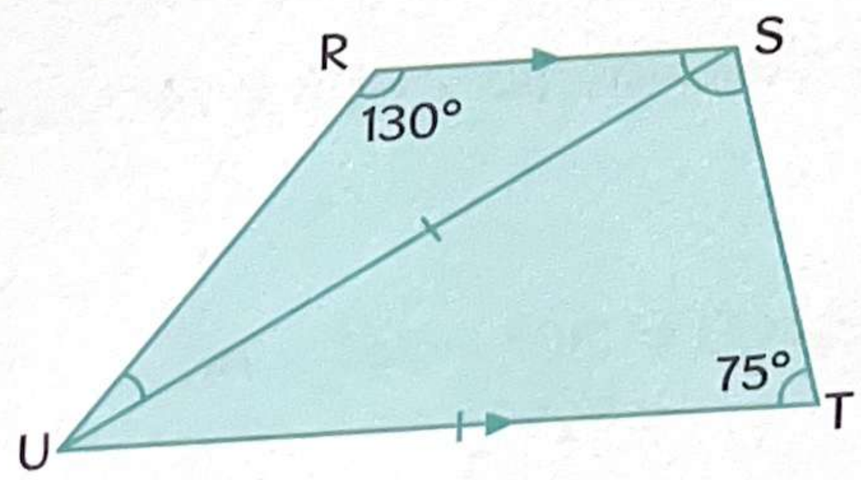
(b) PQRS is a rhombus. $\angle RPQ = 55°$.
Find $\angle x$ and $\angle y$.



$\angle x =$ ____

$\angle y =$ ____

(c) RSTU is a trapezium. SUT is an isosceles triangle.
Find $\angle RST$ and $\angle SUR$.



$\angle RST =$ ____

$\angle SUR =$ ____

Go to PB 5B Practice 5