GEOMETRY (Q 4, PAPER 2)

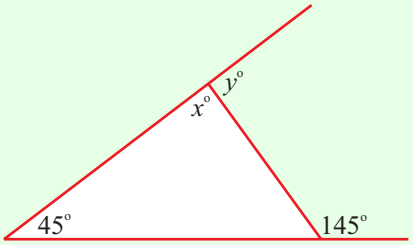
LESSON NO. 1: ANGLES AND TRIANGLES

2007

4 (a) In the diagram, two sides of the triangle are produced.

(i) Find x.

(ii) Find y.

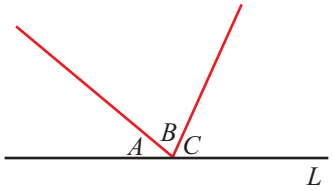


SOLUTION

4 (a) (i)

[A] **STRAIGHT ANGLES:** L is a straight line. The angles on L add up to 180°.

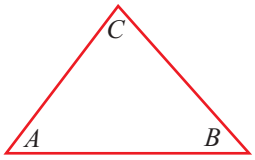
$\therefore A + B + C = 180^o$



[E] **ANGLES IN A TRIANGLE**

THEOREM 1: The sum of degree measure of the interior angles of a triangle is 180°.

Stated mathematically: $A + B + C = 180^o$



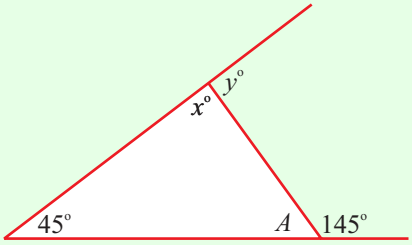
$A + 145^o = 180^o$ [Straight angle]

$\Rightarrow A = 180^o - 145^o = 35^o$

$45^o + 35^o + x^o = 180^o$ [Theorem 1]

$\Rightarrow 80^o + x^o = 180^o$

$\therefore x^o = 100^o$



4 (a) (ii)

$x^o + y^o = 180^o$ [Straight angle]

$\Rightarrow 100^o + y^o = 180^o$

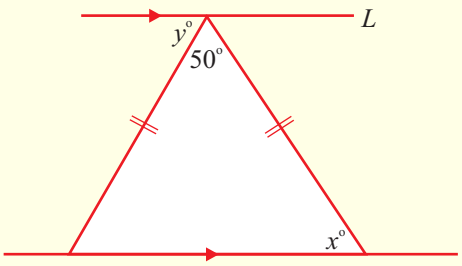
$\therefore y^o = 80^o$

2005

4 (a) In the diagram, the line L is parallel to the base of the isosceles triangle.

(i) Find x.

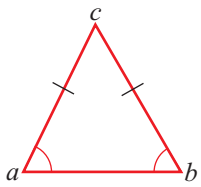
(ii) Find y.



SOLUTION

4 (a) (i)

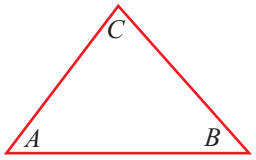
ISOSCELES TRIANGLE: This is a triangle with two equal sides. The angles opposite the equal sides are equal.



[E] **ANGLES IN A TRIANGLE**

THEOREM 1: The sum of degree measure of the interior angles of a triangle is 180°.

Stated mathematically: $A + B + C = 180^\circ$

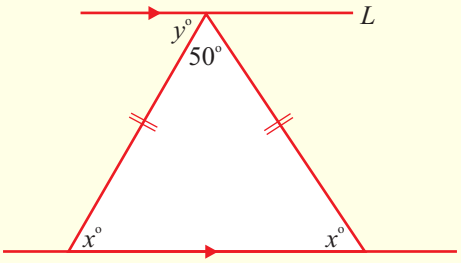


The angles opposite the equal sides are equal.
They are both x°.

$x^\circ + x^\circ + 50^\circ = 180^\circ$ [Theorem 1]

$\Rightarrow 2x^\circ = 130^\circ$

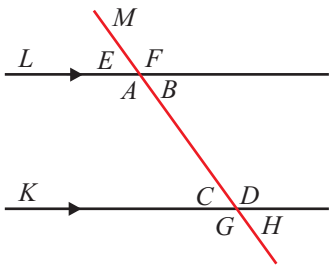
$\therefore x^\circ = 65^\circ$



4 (a) (ii)

[C] **ALTERNATE ANGLES**: K and L are two parallel lines, i.e. $K \parallel L$. A line M cutting these parallel lines is called a transversal. The inside opposite angles are equal and are called alternate angles. Therefore, $A = D$ and $B = C$.

[D] **CORRESPONDING ANGLES**: On the same diagram, $F = D$, $E = C$, $A = G$ and $B = H$. These are called corresponding angles.



$x^\circ = y^\circ$ [Alternate angles.]

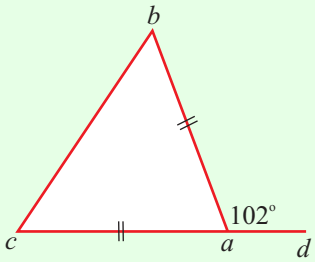
$\therefore y^\circ = 65^\circ$

2000

4 (a) In the diagram, $|ab| = |ac|$ and $|\angle bad| = 102^\circ$.

(i) Find $|\angle cab|$.

(ii) Find $|\angle abc|$.

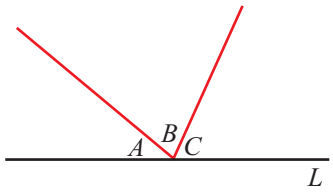


SOLUTION

4 (a) (i)

[A] **STRAIGHT ANGLES**: L is a straight line. The angles on L add up to 180°.

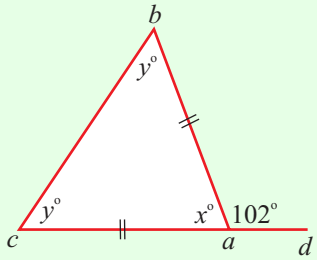
$\therefore A + B + C = 180^\circ$



$x^\circ + 102^\circ = 180^\circ$ [Straight angle.]

$\Rightarrow x^\circ = 180^\circ - 102^\circ$

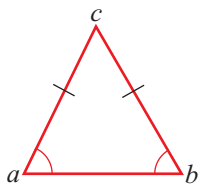
$\therefore x^\circ = |\angle cab| = 78^\circ$



4 (a) (ii)

$|\angle abc| = |\angle bca| = y^\circ$ [Isosceles triangle.]

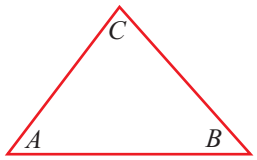
ISOSCELES TRIANGLE: This is a triangle with two equal sides. The angles opposite the equal sides are equal.



[E] **ANGLES IN A TRIANGLE**

THEOREM 1: The sum of degree measure of the interior angles of a triangle is 180°.

Stated mathematically: $A + B + C = 180^\circ$

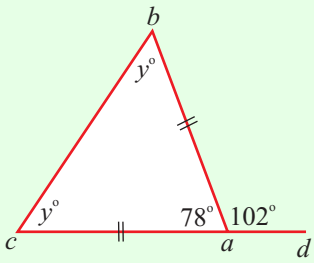


$78^\circ + y^\circ + y^\circ = 180^\circ$ [Theorem 1]

$\Rightarrow 2y^\circ = 180^\circ - 78^\circ$

$\Rightarrow 2y^\circ = 102^\circ$

$\therefore y^\circ = |\angle abc| = 51^\circ$

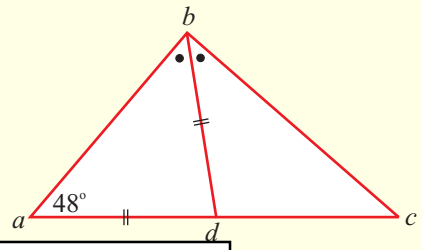


1998

4 (a) In the triangle abc, $|ad| = |bd|$,

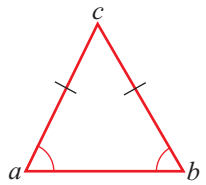
$|\angle abd| = |\angle dbc|$ and $|\angle dab| = 48^\circ$.

Find $|\angle dcb|$.



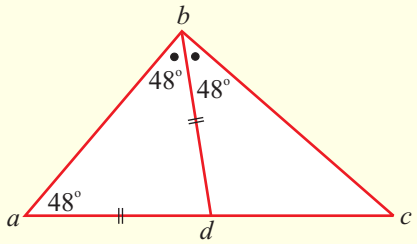
SOLUTION

ISOSCELES TRIANGLE: This is a triangle with two equal sides. The angles opposite the equal sides are equal.



$|\angle dab| = |\angle dba| = 48^\circ$ [Isosceles triangle]

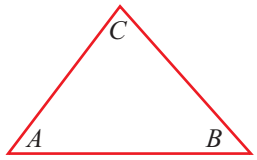
$|\angle dba| = |\angle dbc| = 48^\circ$ [Given]



[E] **ANGLES IN A TRIANGLE**

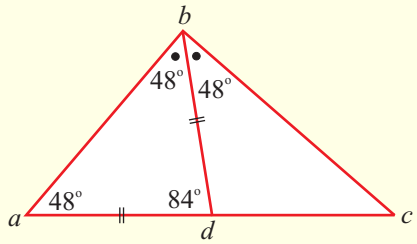
THEOREM 1: The sum of degree measure of the interior angles of a triangle is 180°.

Stated mathematically: $A + B + C = 180^\circ$



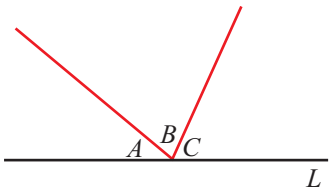
$|\angle adb| + 48^\circ + 48^\circ = 180^\circ$ [Theorem 1]

$\therefore |\angle adb| = 180^\circ - 96^\circ = 84^\circ$



[A] **STRAIGHT ANGLES**: L is a straight line. The angles on L add up to 180°.

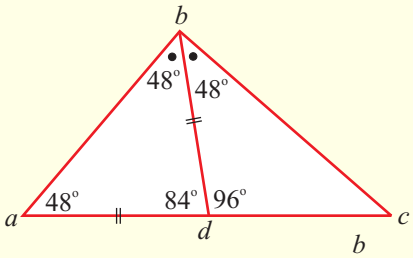
$\therefore A + B + C = 180^\circ$



$|\angle cdb| + 84^\circ = 180^\circ$ [Straight angle]

$\Rightarrow |\angle cdb| = 180^\circ - 84^\circ$

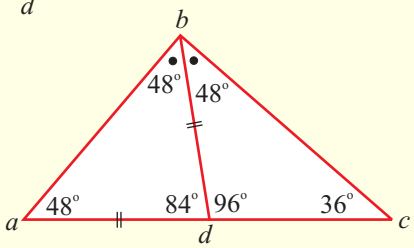
$\therefore |\angle cdb| = 96^\circ$



$48^\circ + 96^\circ + |\angle dcb| = 180^\circ$ [Theorem 1]

$\Rightarrow |\angle dcb| = 180^\circ - 48^\circ - 96^\circ$

$\therefore |\angle dcb| = 36^\circ$



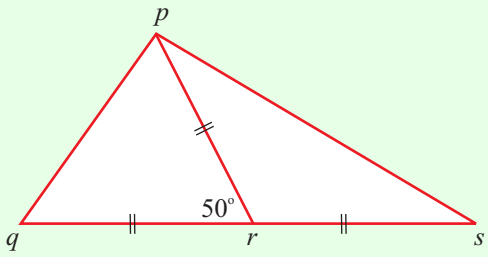
1996

4 (a) $|pr| = |qr| = |rs|$ and $|\angle prq| = 50^\circ$.

Find

(i) $|\angle pqr|$

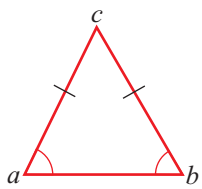
(ii) $|\angle psr|$.

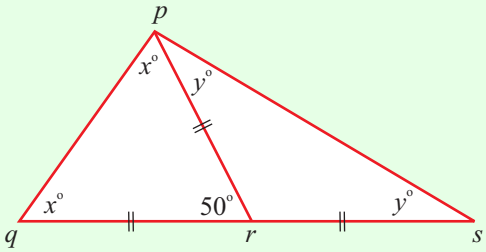


SOLUTION

4 (a) (i)

ISOSCELES TRIANGLE: This is a triangle with two equal sides. The angles opposite the equal sides are equal.





[E] **ANGLES IN A TRIANGLE**

THEOREM 1: The sum of degree measure of the interior angles of a triangle is 180°.

Stated mathematically: $A + B + C = 180^\circ$

$|\angle pqr| = |\angle qpr| = x^\circ$ [Isosceles triangle]

$x^\circ + x^\circ + 50^\circ = 180^\circ$ [Theorem 1]

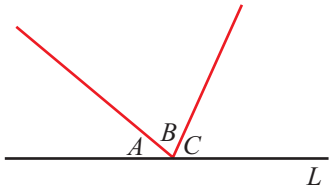
$\Rightarrow 2x^\circ = 130^\circ$

$\therefore x^\circ = |\angle pqr| = 65^\circ$

4 (a) (ii)

[A] **STRAIGHT ANGLES**: L is a straight line. The angles on L add up to 180°.

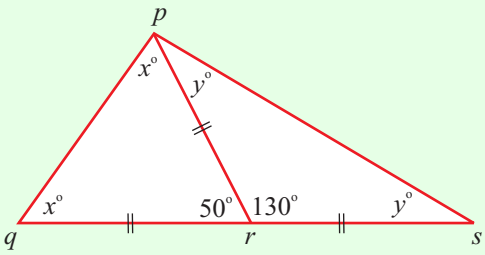
$\therefore A + B + C = 180^\circ$



$50^\circ + |\angle prs| = 180^\circ$ [Straight angle]

$\Rightarrow |\angle prs| = 180^\circ - 50^\circ$

$\therefore |\angle prs| = 130^\circ$



$|\angle psr| = |\angle rps| = y^\circ$ [Isosceles triangle]

$y^\circ + y^\circ + 130^\circ = 180^\circ$ [Theorem 1]

$\Rightarrow 2y^\circ = 50^\circ$

$\therefore y^\circ = |\angle psr| = 25^\circ$