

Finding angles

Starter

1. (Review of last lesson)

Make x the subject: (a) $a(x + c) = x - 7$

(b) $y = \frac{x(4 + p)}{a + x}$

Working: (a)

Expand:

Collect x -terms on one side:

Factorise:

Divide by $1 - a$:

Put new subject on LHS:

$$\begin{aligned} a(x + c) &= x - 7 \\ ax + ac &= x - 7 \\ ac + 7 &= x - ax \\ ac + 7 &= x(1 - a) \\ \frac{ca + 7}{1 - a} &= x \\ x &= \frac{ca + 7}{1 - a} \end{aligned}$$

(b)

Cross multiply:

Expand both brackets:

Collect x -terms on one side:

Factorise:

Divide by $4 + p - a$:

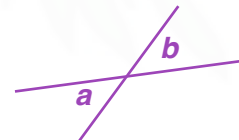
Put new subject on LHS:

$$\begin{aligned} y &= \frac{x(4 + p)}{a + x} \\ y(a + x) &= x(4 + p) \\ ay + ax &= 4x + px \\ ay &= 4x + px - ax \\ ay &= x(4 + p - a) \\ \frac{ay}{4 + p - a} &= x \\ x &= \frac{ay}{4 + p - a} \end{aligned}$$

2. (Review of previous material) Add a short phrase to complete each angle fact.

- Angles on a straight line _____.
- Angles at a point _____.
- Vertically opposite angles _____.
- Angles in a triangle _____.
- Equilateral triangles _____.
- Isosceles triangle _____.
- Angles in a quadrilateral _____.

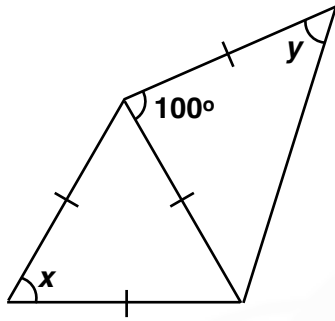
Vertically opposite angles



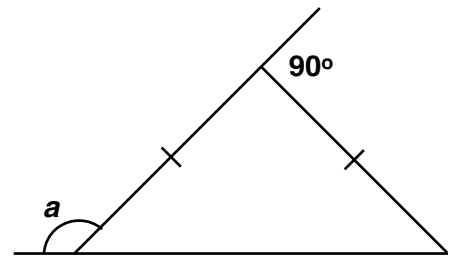
- Working:**
- Angles on a straight line...add up to 180° .
 - Angles at a point...add up to 360° .
 - Vertically opposite angles...are equal.
 - Angles in a triangle...add up to 180° .
 - Equilateral triangles...have three equal angles of 60° .
 - Isosceles triangle...one pair of equal angles.
 - Angles in a quadrilateral...add up to 180° .

E.g. 1 Calculate the values of the marked angles:

(a)



(b)



Working:

(a) Angle x is an equilateral triangle so $x = 60^\circ$
 Angle y is in an isosceles triangle so $y = \frac{180^\circ - 100^\circ}{2} = 40^\circ$

(b) The angle at the top of the isosceles triangle is 90° .
 The identical angles in the isosceles triangle are $\frac{180^\circ - 90^\circ}{2} = 45^\circ$
 $a = 180^\circ - 45^\circ - 135^\circ$

Some questions may required you to set up and solve a linear equation.

E.g. 2 Calculate the values of p and q .

Working:

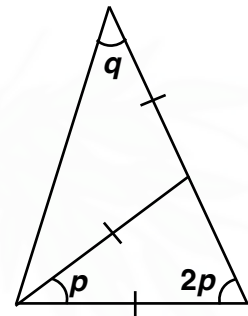
Since the triangle including angle p is isosceles the angles are $p, 2p$ and $2p$.

$$\begin{aligned} \therefore p + 2p + 2p &= 180^\circ \\ 5p &= 180^\circ \\ p &= 36^\circ \end{aligned}$$

The triangle including q is also isosceles.

The angles are q, q and $180^\circ - 2p = 108^\circ$

$$\begin{aligned} \therefore q + q + 108^\circ &= 180^\circ \\ 2q &= 72^\circ \\ q &= 36^\circ \end{aligned}$$



Video:

[Angles in a triangle](#)

[Solutions to Starter and E.g.s](#)

Exercise

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|----------------------|---|
| 9-1 class textbook: | p62 M3.1 Qu 1-24 odd Draw all diagrams |
| A*-G class textbook: | p55 M3.1 Qu 1-24 odd Draw all diagrams. |
| 9-1 homework book: | p19 M3.1 Qu 1-10 Draw all diagrams |
| A*-G homework book: | p14 M3.1 Qu 1-10 Draw all diagrams |