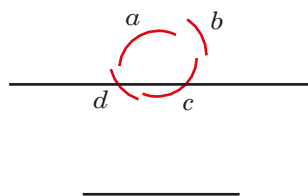


Vertically opposite angles

- 1 The diagram shows four angles formed by two straight lines.



- a) Measure the sizes of the angles.

$$a = 130^\circ \quad b = 50^\circ \quad c = 130^\circ \quad d = 50^\circ$$

- b) What is the total of angles a and b ?

$$180^\circ$$

Explain why.

Adjacent angles on a straight line sum to 180°

Do any other pairs of angles have this same total?

- c) Angles a and c are vertically opposite angles.

What do you notice about the sizes of angles a and c ?

They are equal.

- d) Angles b and d are also vertically opposite angles.

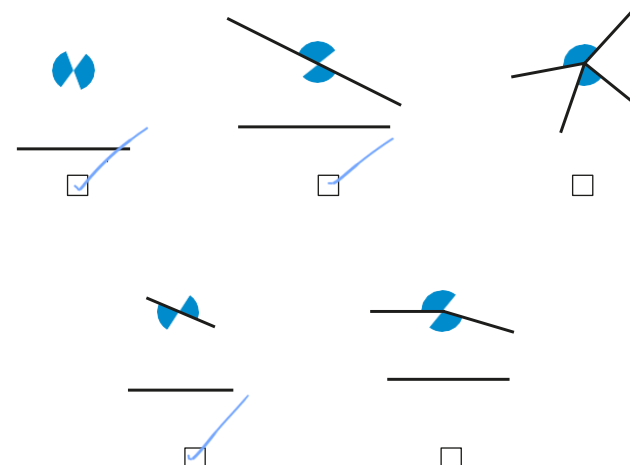
What do you notice about the sizes of angles b and d ?

They are equal.

- e) Complete the sentence.

Vertically opposite angles are equal.

- 2 Tick the pairs of angles that are vertically opposite.



Compare answers with a partner.

- 3 Work out the sizes of the unknown angles.

Give reasons for your answers.

- a)

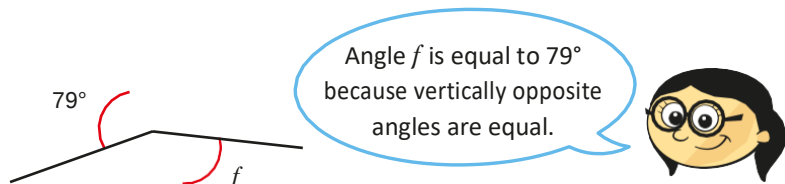
$$y = 29^\circ \text{ because vertically opposite angles are equal.}$$

- b)

$$z = 132^\circ \text{ because vertically opposite angles are equal.}$$

4

Annie is working out the size of angle f .



Do you agree with Annie? No

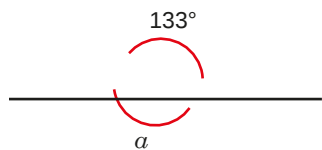
Explain your answer.

The diagram doesn't show two straight lines crossing so the angles are not vertically opposite.

5

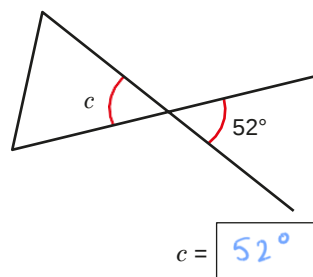
Work out the unknown angles.

a)



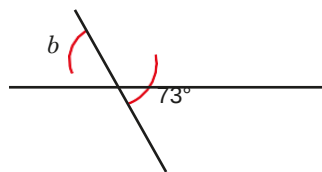
$$a = \boxed{133^\circ}$$

c)



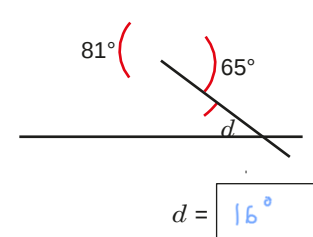
$$c = \boxed{52^\circ}$$

b)



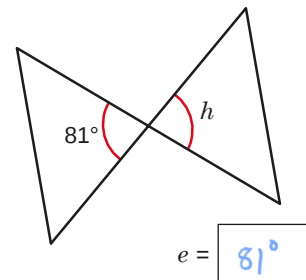
$$b = \boxed{73^\circ}$$

d)



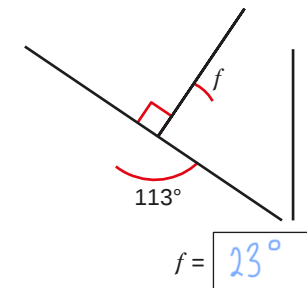
$$d = \boxed{16^\circ}$$

e)



$$e = \boxed{81^\circ}$$

f)

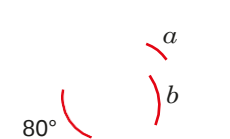


$$f = \boxed{23^\circ}$$

Talk about your reasons with a partner.

6

Angle b is three times the size of angle a .



Work out the sizes of angles a and b .

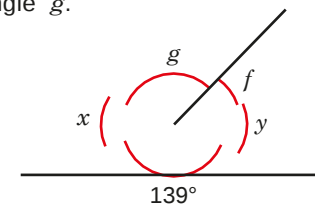
$$a = \boxed{20^\circ}$$

$$b = \boxed{60^\circ}$$

7

Angle f is one quarter of the size of angle g .

Angle f is 28° .



Are angles x and y vertically opposite? No

Explain your answer.

$$28 \times 4 = 112 \quad \text{so } g = 112^\circ$$

$$112 + 28 = 140$$

$139 \neq 140$ therefore the diagram does not show vertically opposite angles.