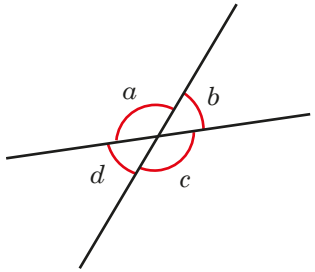
Vertically opposite angles

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



a) Measure the sizes of the angles.

$a =$ 130° $b =$ 50° $c =$ 130° $d =$ 50°

b) What is the total of angles a and b? 180°

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.

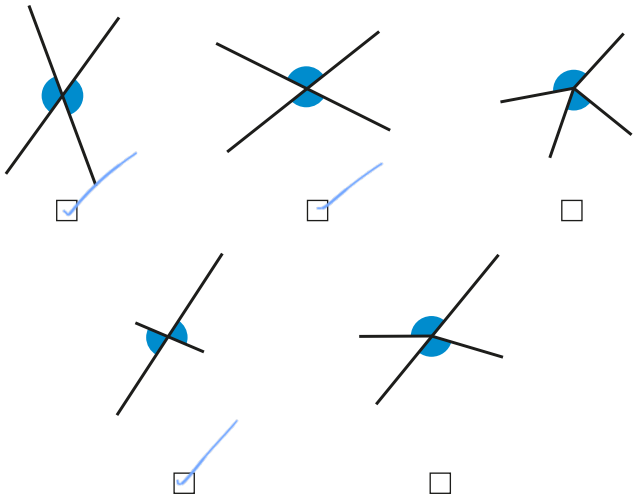
What do you notice about the sizes of angles b and d?

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.

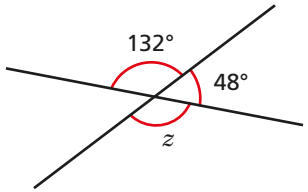
3 Work out the sizes of the unknown angles.

Give reasons for your answers.

a)

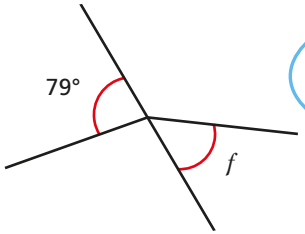
$y =$ 29° because vertically opposite angles are equal.

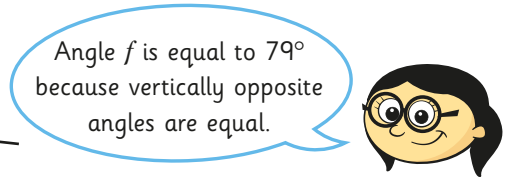
b)



$z =$ 132° because vertically opposite angles are equal.

4 Annie is working out the size of angle f.





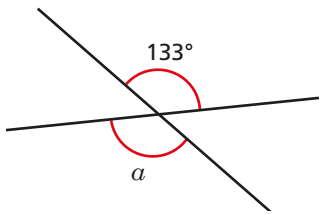
Do you agree with Annie? No

Explain your answer.

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

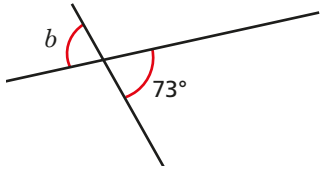
5 Work out the unknown angles.

a)



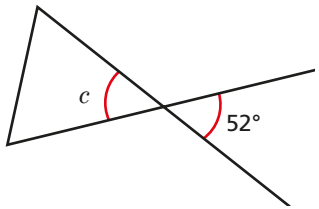
$a =$ 133°

b)



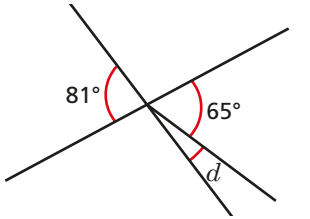
$b =$ 73°

c)



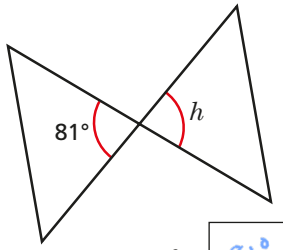
$c =$ 52°

d)



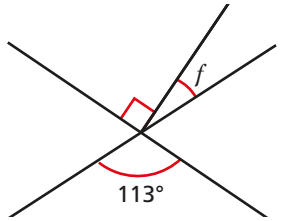
$d =$ 16°

e)



$e =$ 81°

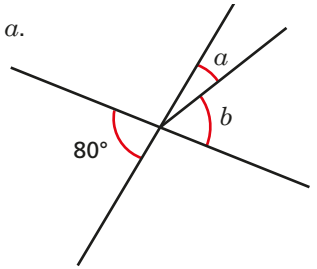
f)



$f =$ 23°

Talk about your reasons with a partner.

6 Angle b is three times the size of angle a.

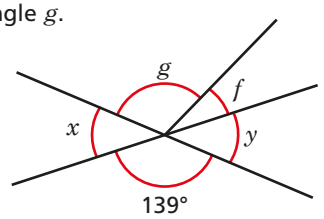


Work out the sizes of angles a and b.

$a =$ 20° $\quad b =$ 60°

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.

28×4 = 112 so g = 112°
112 + 28 = 140

139 ≠ 140 therefore the diagram does not show vertically opposite angles.