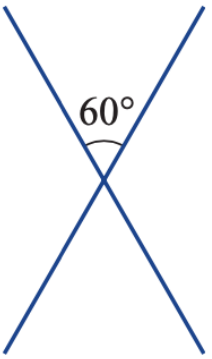
Angles at a point

WALT calculate angles at a point

Success Criteria I know angles at a point add to 360 degrees

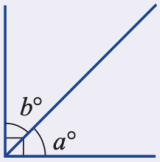
When two lines cross, different angles are formed, like in this example.

- Is there another 60° angle? Why?
- What is the size of one of the obtuse angles? How did you work this out?
- Are there any straight angles in the diagram?
- Are there any reflex angles in the diagram?
- What is a revolution angle?



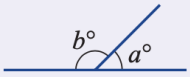
Things I need to know

- Special pairs of angles at a point include:
  - **Complementary** angles (sum to 90°)



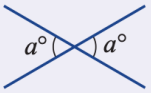
$a + b = 90$

  - **Supplementary** angles (sum to 180°)



$a + b = 180$

  - **Vertically opposite** angles (equal)



- Angles in a **revolution** sum to 360°.

1 Write the missing word.

a Angles that add to 90° are called _____ angles.

b Angles that add to 180° are called _____ angles.

c If two lines meet at right angles (90°), then they are said to be _____.

d Vertically opposite angles are _____.

2 What type of angle are the following?

a 27°

b 317°

c 180°

d 90°

e 360°

f 139°

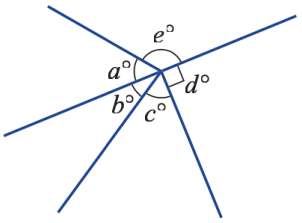
Choose from: acute, right, obtuse, straight, reflex or revolution.

3 Complete these sentences for this diagram.

a b and c are _____ angles.

b a and e are _____ angles.

c a, b, c, d and e form a _____.

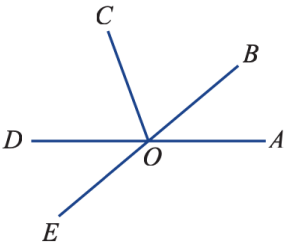


4 Estimate the size of these angles.

a $\angle AOB$

b $\angle AOC$

c Reflex $\angle AOE$



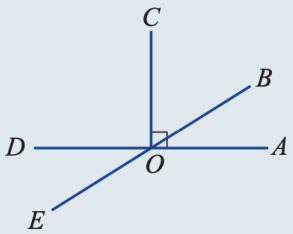
Example 1 Naming angles

Name the angle which is:

a vertically opposite to $\angle DOE$

b complementary to $\angle COB$

c supplementary to $\angle EOA$



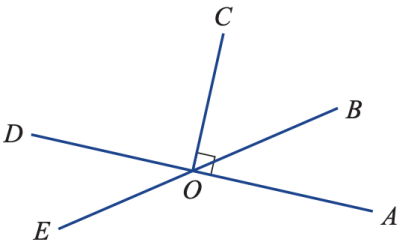
Solution	Explanation
a $\angle AOB$	$\angle DOE$ and $\angle AOB$ are equal and sit opposite each other.
b $\angle BOA$	$\angle COB$ and $\angle BOA$ add to 90°.
c $\angle DOE$ (or $\angle AOB$)	Pairs of angles on a straight line are supplementary (add to 180°).

5 Name an angle which is:

a vertically opposite to $\angle DOE$.

b complementary to $\angle COB$.

c supplementary to $\angle EOA$.

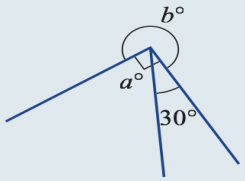


Vertically opposite angles are opposite and equal. Complementary angles add to 90°. Supplementary angles add to 180°.

Example 2 Finding angles at a point

Determine the value of the pronumerals in these diagrams.

a



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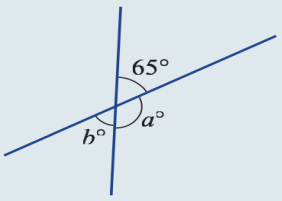
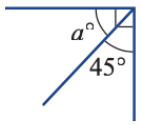


Solution	Explanation
a $a + 30 = 90$	a and 30° make a complementary pair of angles adding to 90°.
$a = 60$	
$b + 90 = 360$	Angles in a revolution add to 360°.
$b = 270$	
b $a + 65 = 180$	a and 65° make a supplementary pair of angles adding to 180°.
$a = 115$	
$b = 65$	b is vertically opposite the 65° angle.

6 State the value of the pronumeral (letter) in these diagrams.

a



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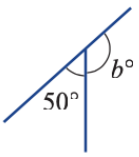

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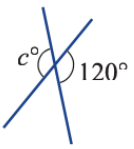

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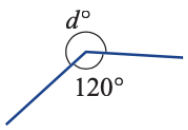
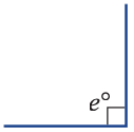


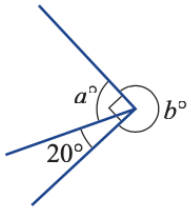
e



f

7 Determine the unknown angles marked in these diagrams.

a



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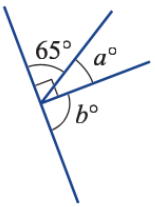

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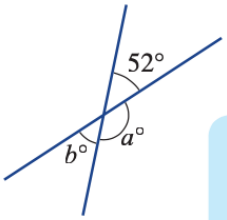

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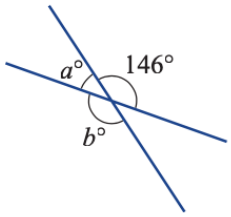

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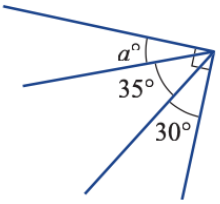

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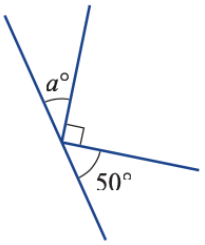

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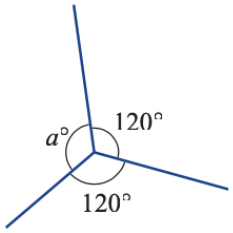

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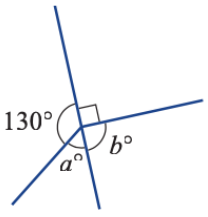

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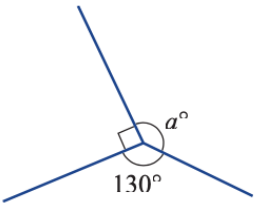

Angles in a right angle add to 90°. Angles on a straight line add to 180°. Angles in a revolution add to 360°.

Check your answers

1 **a** complementary **b** supplementary
c perpendicular **d** equal

2 **a** acute **b** reflex **c** straight
d right **e** revolution **f** obtuse

3 **a** complementary **b** supplementary
c revolution

4 **a** 40° **b** 110° **c** 220°

5 **a** $\angle AOB$ **b** $\angle BOA$ (or $\angle DOE$)
c $\angle AOB$ (or $\angle EOD$)

6 **a** 45 **b** 130 **c** 120
d 240 **e** 90 **f** 180

7 **a** $a = 70, b = 270$ **b** $a = 25, b = 90$
c $a = 128, b = 52$ **d** $a = 34, b = 146$
e $a = 25$ **f** $a = 40$
g $a = 120$ **h** $a = 50, b = 90$
i $a = 140$