

Reasoning and Problem Solving

Step 7: Angles in a Triangle – Missing Angles

National Curriculum Objectives:

Mathematics Year 6: (6G4b) [Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Explain how it's possible to find missing angles using knowledge of angles in a triangle and angles on a straight line. Includes angles measured to the nearest ten degrees.

Expected Explain how it's possible to find missing angles using knowledge of angles in a triangle, angles on a straight line and angles around a complete rotation. Includes angles measured to the nearest 5 degrees.

Greater Depth Explain how it's possible to find missing angles using knowledge of angles in a triangle, angles on a straight line, vertically opposite angles and angles around a complete rotation. Includes angles measured to the nearest whole degree.

Questions 2, 5 and 8 (Reasoning)

Developing Explain who has calculated the missing angle correctly using knowledge of angles in a triangle and angles on a straight line. Includes angles measured to the nearest ten degrees.

Expected Explain who has calculated the missing angle correctly using knowledge of angles in a triangle, angles on a straight line and vertically opposite angles. Includes angles measured to the nearest five degrees.

Greater Depth Explain who has calculated the missing angle correctly using knowledge of angles in a triangle, angles on a straight line, vertically opposite angles and angles around a complete rotation. Includes angles measured to the nearest whole degree.

Questions 3, 6 and 9 (Problem Solving)

Developing Find 1 incorrect angle and fix the mistake. Includes angles measured to the nearest ten degrees.

Expected Find 1 incorrect angle and fix the mistake. Includes angles measured to the nearest five degrees.

Greater Depth Find 2 incorrect angles and fix the mistakes. Includes angles measured to the nearest whole degree.

More [Year 6 Properties of Shapes](#) resources.

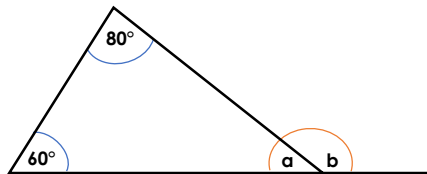
Did you like this resource? Don't forget to [review](#) it on our website.

Angles in a Triangle – Missing Angles

Angles in a Triangle – Missing Angles

1a. Kelly says:

It is impossible for me to calculate all of the missing angles.



Is Kelly correct? Explain why.

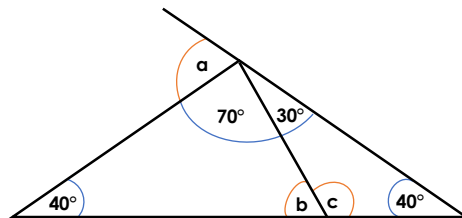


Angles not drawn to scale

R

1b. Matt says:

It is possible for me to calculate all of the missing angles.



Is Matt correct? Explain why.

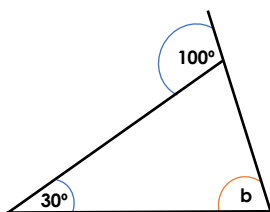


Angles not drawn to scale

R

2a. Saskia thinks that angle b measures 60° . Oscar thinks that angle b measures 70° .

Who is correct? Explain why.

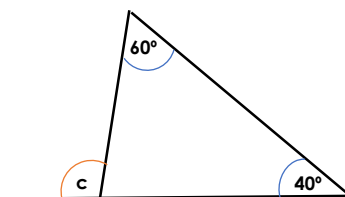


Angles not drawn to scale

R

2b. Troy thinks that angle c measures 80° . Ellie thinks that angle c measures 100° .

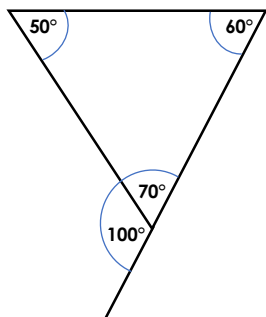
Who is correct? Explain why.



Angles not drawn to scale

R

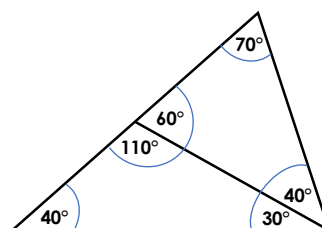
3a. One of these angles is wrong. Find and fix the mistake.



Angles not drawn to scale

PS

3b. One of these angles is wrong. Find and fix the mistake.



Angles not drawn to scale

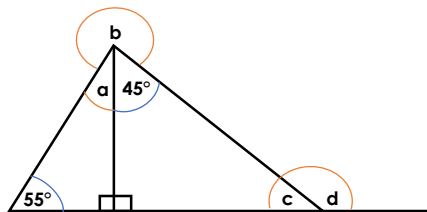
PS

Angles in a Triangle – Missing Angles

Angles in a Triangle – Missing Angles

4a. Rosie says:

It's impossible for me to calculate all of the missing angles.



Is Rosie correct? Explain why.

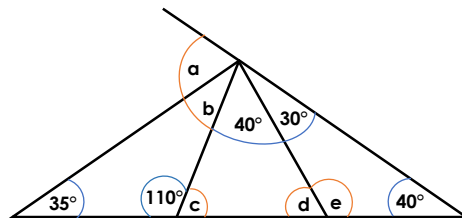


Angles not drawn to scale

R

4b. Stan says:

It is possible for me to calculate all of the missing angles.



Is Stan correct? Explain why.

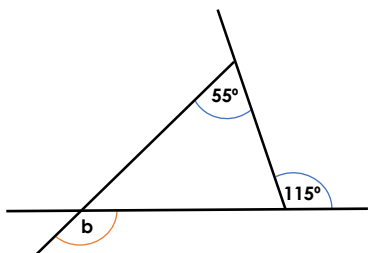


Angles not drawn to scale

R

5a. Charles thinks that angle b measures 65° . Chrissy thinks that angle b measures 120° .

Who is correct? Explain why.

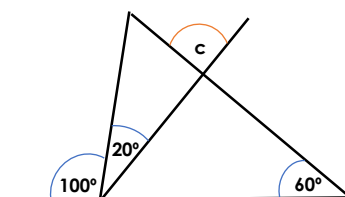


Angles not drawn to scale

R

5b. Mary thinks that angle c measures 60° . Hassan thinks that angle c measures 120° .

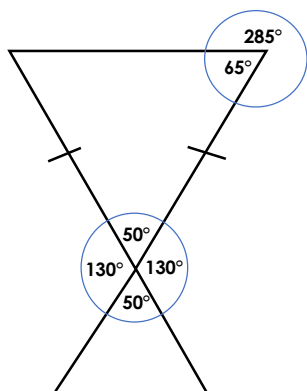
Who is correct? Explain why.



Angles not drawn to scale

R

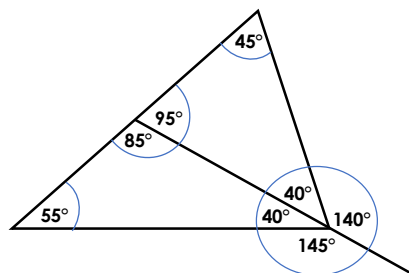
6a. One of these angles is wrong. Find and fix the mistake.



Angles not drawn to scale

PS

6b. One of these angles is wrong. Find and fix the mistake.



Angles not drawn to scale

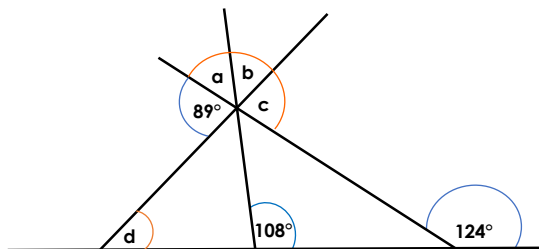
PS

Angles in a Triangle – Missing Angles

Angles in a Triangle – Missing Angles

7a. Rob says:

It's impossible for me to calculate all of the missing angles.



Is Rob correct? Explain why.

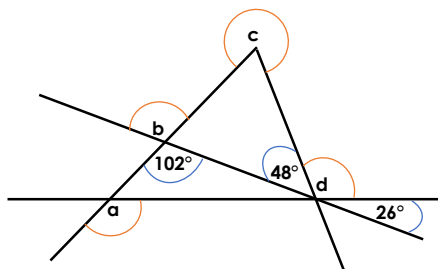


Angles not drawn to scale

R

7b. Balvinder says:

It is possible for me to calculate all of the missing angles.



Is Balvinder correct? Explain why.

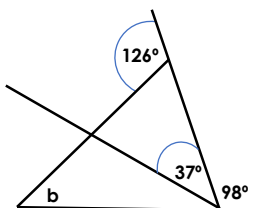


Angles not drawn to scale

R

8a. Alex thinks that angle b measures 44° .
George thinks that angle b measures 91° .

Who is correct? Explain why.

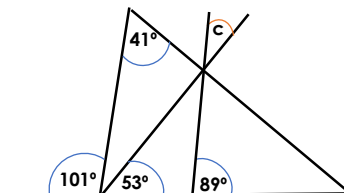


Angles not drawn to scale

R

8b. Sid thinks that angle c measures 36° .
Hazel thinks that angle c measures 26° .

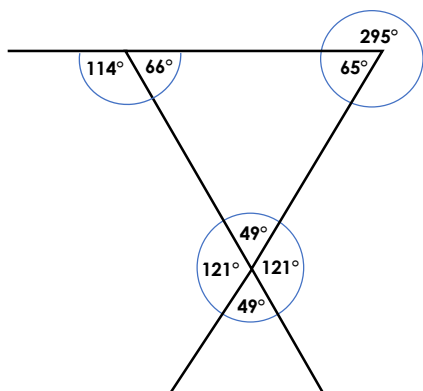
Who is correct? Explain why.



Angles not drawn to scale

R

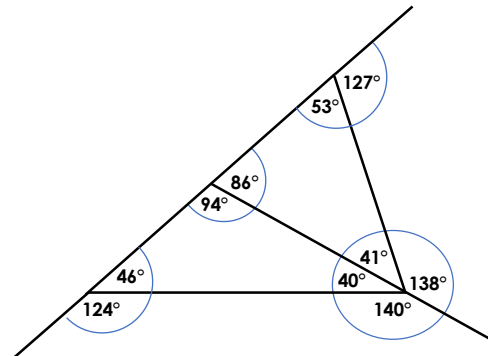
9a. Some of these angles are wrong. Find and fix the mistake.



Angles not drawn to scale

PS

9b. Some of these angles are wrong. Find and fix the mistakes.



Angles not drawn to scale

PS

Reasoning and Problem Solving Angles in a Triangle – Missing Angles

Developing

- 1a. Kelly is wrong as $a = 40^\circ$ and $b = 140^\circ$. Angle a is calculated by knowing that angles in a triangle total 180° . Angle b is calculated by knowing that angles on a straight line total 180° . ($180^\circ - 40^\circ = 140^\circ$).
- 2a. Oscar is correct. If he calculated the angle of the straight line first ($180^\circ - 100^\circ = 80^\circ$) he can then add the two angles in the triangle ($30^\circ + 80^\circ = 110^\circ$) and subtract that answer from 180° to give him 70° .
- 3a. 100° should be 110° .

Expected

- 4a. Rosie is wrong as $a = 35^\circ$, $b = 280^\circ$, $c = 45^\circ$ and $d = 135^\circ$. Angles a and c can be calculated using knowledge that angles in a triangle total 180° . Angle b can be calculated once angle a is known and using knowledge that the angle of a complete circle is 360° . Angle d can be calculated using knowledge that the angle of a straight line is 180° .
- 5a. Chrissy is correct. Using knowledge that the angle of a straight line is 180° , it is possible to calculate all of the angles in the triangle. Then, it is possible to calculate $180^\circ - 60^\circ = 120^\circ$.
- 6a. 285° should be 295° .

Greater Depth

- 7a. Rob is wrong as $a = 16^\circ$, $b = 75^\circ$, $c = 89^\circ$ and $d = 33^\circ$. The angles can be calculated using knowledge of the angle of a straight line, angles in a triangle and vertically opposite angles.
- 8a. Alex is correct. He needed to calculate the angles of a straight line first ($98^\circ + 73^\circ = 135^\circ$, $180^\circ - 135^\circ = 45^\circ$ and $180^\circ - 126^\circ = 54^\circ$). He can then calculate the missing angle in the triangle as 89° . $180^\circ - 89^\circ = 91^\circ$. $91^\circ + 45^\circ = 136^\circ$. $180^\circ - 136^\circ = 44^\circ$.
- 9a. Both 121° should be 131° .

Reasoning and Problem Solving Angles in a Triangle – Missing Angles

Developing

- 1b. Matt is correct as $a = 80^\circ$, $b = 70^\circ$ and $c = 110^\circ$. Angles b and c can be calculated by understanding that angles in a triangle total 180° . Angle a can be calculated by working out $70^\circ + 30^\circ = 100^\circ$, then $180^\circ - 100^\circ = 80^\circ$.
- 2b. Ellie is correct. The missing angle inside the triangle is 80° ($60^\circ + 40^\circ + 80^\circ = 180^\circ$). The angle of a straight line is 180° , so $180^\circ - 80^\circ = 100^\circ$.
- 3b. 60° should be 70° .

Expected

- 4b. Stan is correct as $a = 75^\circ$, $b = 35^\circ$, $c = 70^\circ$, $d = 70^\circ$ and $e = 110^\circ$. Angles b and e can be calculated using knowledge that angles in a triangle total 180° . Angles a and c can be calculated using knowledge that the angle of a straight line is 180° .
- 5b. Mary is correct. She has used her knowledge of vertically opposite angles.
- 6b. 145° should be 140° .

Greater Depth

- 7b. Balvinder is correct as $a = 128^\circ$, $b = 102^\circ$, $c = 306^\circ$ and $d = 106^\circ$. The angles can be calculated using knowledge of the angles on a straight line, angles in a triangle, angles around a complete rotation and vertically opposite angles.
- 8b. Sid is correct. He needed to calculate $180^\circ - 89^\circ = 91^\circ + 53^\circ = 144^\circ$. then $180^\circ - 144^\circ = 36^\circ$. Angle c can then be calculated as 36° using knowledge of vertically opposite angles.
- 9b. 138° should be 139° and 124° should be 134° .