Reasoning and Problem Solving
Step 6: Calculating Angles around a Point

National Curriculum Objectives:

Mathematics Year 5: (5G4b) Identify angles at a point and one whole turn (total 360)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Use the digit cards to fill in the missing angles around a point. 3 missing numbers and 3 digit cards. Using 3 angles and increments of 5°.
Expected Use the digit cards to fill in the missing angles around a point. 4 missing numbers and 5 digit cards. Using up to 5 angles and increments of 1°.
Greater Depth Use the digit cards to fill in the missing angles around a point. 5 missing numbers and 6 digit cards. Using up to 5 angles and increments of 1°.

Questions 2, 5 and 8 (Reasoning)
Developing Read the word problem and explain if the statement is correct. 2 or 3 steps. Using increments of 5°.
Expected Read the word problem and explain if the statement is correct. 3 or 4 steps. Using increments of 1°.
Greater Depth Read the word problem and explain if the statement is correct. More than 5 steps. Using increments of 1°.

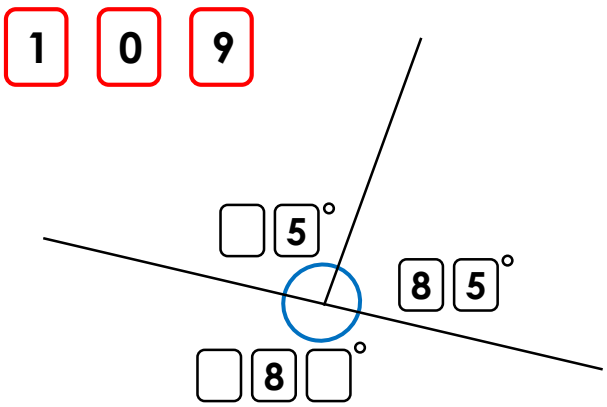
Questions 3, 6 and 9 (Problem Solving)
Developing Use the hints to work out what the 3 angles around a point are. Using increments of 5°.
Expected Use the hints to work out what the 4 angles around a point are. Using increments of 1°.
Greater Depth Use the hints to work out what the 5 angles around a point are. Using increments of 1°.

More Year 5 Properties of Shapes resources.

Did you like this resource? Don't forget to review it on our website.

Calculating Angles around a Point

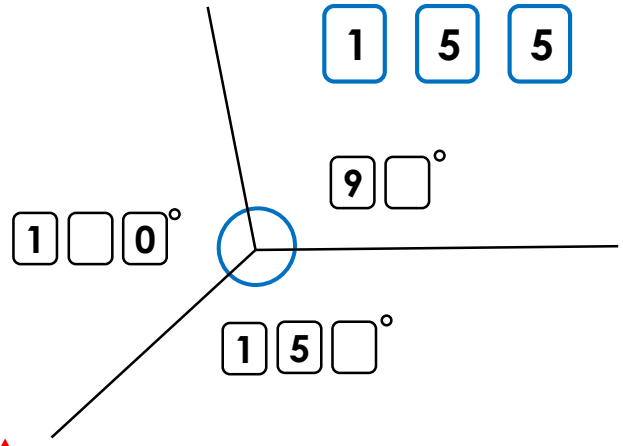
1a. Use the digit cards to fill in the missing numbers.



D PS

Calculating Angles around a Point

1b. Use the digit cards to fill in the missing numbers.



D PS

2a. Asa is cutting a jam tart.
First, she cuts the tart into 2 equal halves.
Then, she cuts one half into 2 equal pieces and the other half into 2 unequal pieces. She says that one of the equal pieces is smaller than the larger unequal piece.

How is this possible? Explain your answer.

You could draw a diagram to help you.

D R

2b. Cohen is cutting up his birthday cake.
First, he cuts it into 3 equal pieces.
He says that 2 of the equal pieces is bigger than half of the cake.

How is this possible? Explain your answer.

You could draw a diagram to help you.

D R

3a. Use the hints to work out the angles.
Three angles make up a full turn.

Angle A is a right angle.
Angle B is an obtuse angle and is 30° more than angle A.
Angle C is 30° less than a straight line.

What are the 3 angles?

D PS

3b. Use the hints to work out the angles.
Three angles make up a full turn.

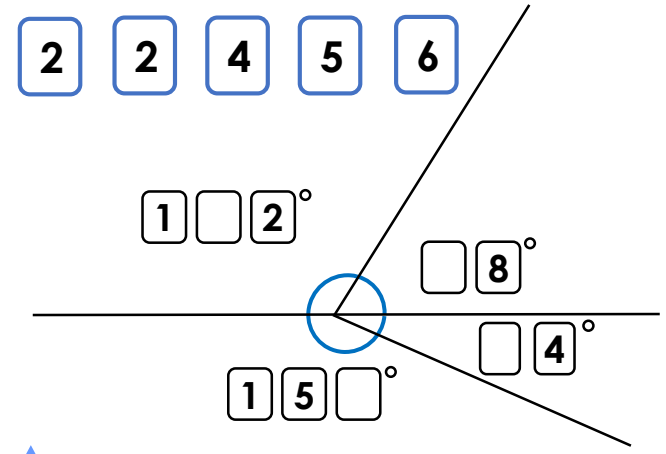
Angle A is half of a right angle.
Angle B is three times bigger than angle A.
Angle C is double a right angle.

What are the 3 angles?

D PS

Calculating Angles around a Point

4a. Use the digit cards to fill in the missing numbers.



E PS

5a. Alfie is cutting a cake. First, he cuts the cake into 2 equal halves.
Then, he cuts one half of the cake into 3 equal pieces.
He cuts the other half of the cake into 2 unequal pieces. One of these pieces makes an obtuse angle.
Alfie says that one of the three equal pieces of cake is bigger than the smaller unequal piece.
How is this possible? Explain your answer.

You could draw a diagram to help you.

E R

6a. Use the hints to work out the angles.
Four angles make up a full turn.

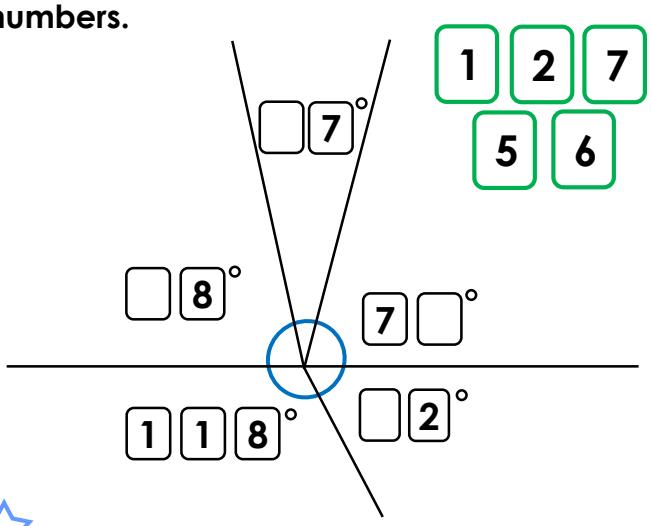
Angle A is half of a right angle.
Angle B is double angle A.
Angle C is a third more than Angle B.
Angle D is an obtuse angle and a multiple of 5.

What are the 4 angles?

E PS

Calculating Angles around a Point

4b. Use the digit cards to fill in the missing numbers.



E PS

5b. Evie is cutting a meat pie. First, she cuts the cake into 2 equal halves.
Then, she cuts one of the halves into 4 equal pieces and the other half she cuts into 3 unequal pieces. One of the unequal pieces is a right angle. Evie says that one of the other unequal pieces is smaller than one of the 4 equal pieces.

How is this possible? Explain your answer.

You could draw a diagram to help you.

E R

6b. Use the hints to work out the angles.
Four angles make up a full turn.

Angle A is a multiple of 5 and 7.
Angle B is triple angle A.
Angle C is an obtuse angle.
Angle D is a third of angle C.

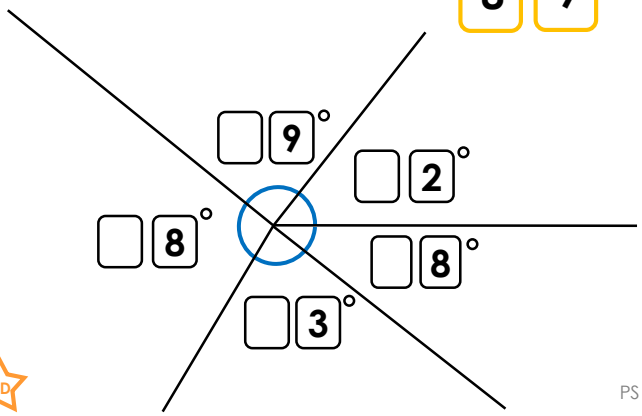
What are the 4 angles?

E PS

Calculating Angles around a Point

7a. Use the digit cards to fill in the missing numbers.

3 4 5 8 8 9

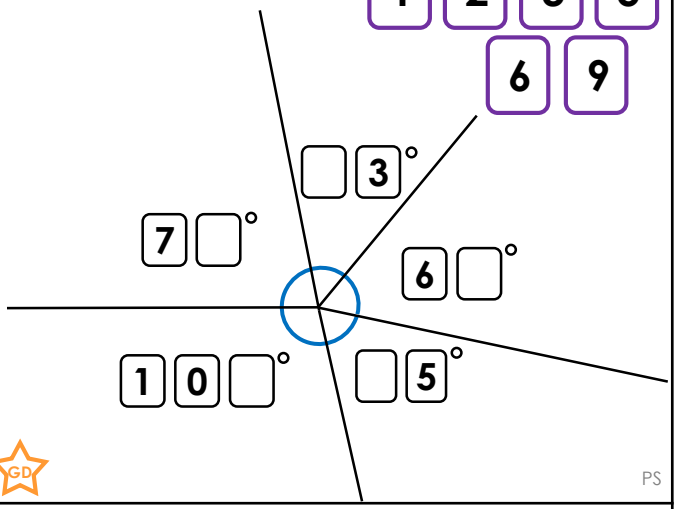


GD PS

Calculating Angles around a Point

7b. Use the digit cards to fill in the missing numbers.

1 2 3 5 6 9



GD PS

8a. Lacey is cutting up a pizza. First, she cuts the pizza into 4 equal pieces. Then, she cuts 1 of the 4 equal pieces into 3 equal pieces. She cuts another one of the 4 equal pieces into 2 equal pieces.
She says that 2 of the 3 equal pieces added together are larger than one of the 2 equal pieces.

How is this possible? Explain your answer.

You could draw a diagram to help you.

GD R

8b. Josef is cutting up a custard tart. First, he cuts it into 5 equal pieces.
He cuts 2 of the pieces into 2 equal pieces and 3 of the pieces into 3 equal parts.
He says that 4 of the 3 equal parts is bigger than 2 of the 2 equal parts.

How is this possible? Explain your answer.

You could draw a diagram to help you.

GD R

9a. Use the hints to work out the angles.
Five angles make up a full turn.

Angle A is a sixth of a straight line.
Angle B is a multiple of 12 and 9; less than a right angle but more than 45°.
Angle C is double angle B.
Angle D and angle E are opposite angles.

What are the 5 angles?

GD PS

9b. Use the hints to work out the angles.
Five angles make up a full turn.

Angle A is an eighth of a full turn.
Angle B is three times bigger than angle A.
Angle C is a third of a straight line.
Angle D is double angle E.

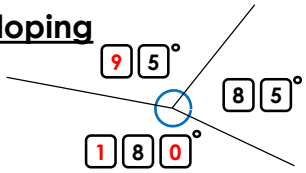
What are the 5 angles?

GD PS

Reasoning and Problem Solving
Calculating Angles around a Point

Developing

1a.

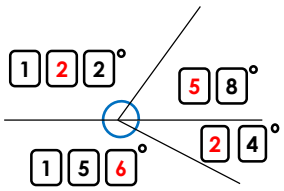


2a. The two equal pieces are both 90°. The two unequal pieces must add up to 180°. This is possible if the smaller unequal piece is less than a right angle (90°)

3a. A = 90° B = 120° C = 150°

Expected

4a.

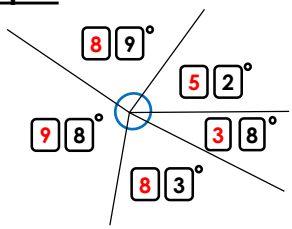


5a. The three equal pieces are all 60°. The two unequal pieces must add up to 180°. An obtuse angle is bigger than 90° (but smaller than 180°) so the bigger piece has to be between 90° – 180°. So this can be possible if the smaller piece is less than 60° as the bigger piece will still be an obtuse angle.

6a. A = 45° B = 90° C = 120° D = 105°

Greater Depth

7a.



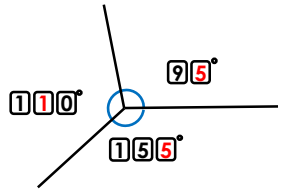
8a. The four equal pieces are 90°. One piece cut into three equal pieces, the pieces will all be 30°. One piece cut into 2 equal halves, the pieces will be 45°. So this is possible because 2 x 30° = 60° which is more than 45°

9a. A = 30° B = 72° C = 144° D = 57° E = 57°

Reasoning and Problem Solving
Calculating Angles around a Point

Developing

1b.

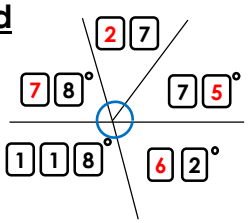


2b. The three equal pieces are all 120°. Half the cake is 180°. So this is possible as 2 x 120° = 240° which is bigger than 180°.

3b. A = 45° B = 135° C = 180°

Expected

4b.

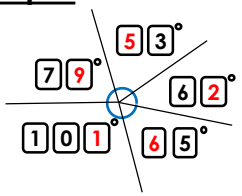


5b. The four equal pieces are all 45°. A right angle is 90°. The 2 unequal pieces add up to 90°. So this can be possible if one of the other unequal pieces is smaller than 45°.

6b. A = 35° B = 105° C = 165° D = 55°

Greater Depth

7b.



8b. The five equal pieces are 72°. The two pieces cut into 2 equal pieces are 36° each and the three equal parts cut into 3 equal pieces are 24° each. It is because, 4 x 24° = 96° which is bigger than 2 x 36° = 72°.

9b. A = 45° B = 135° C = 60° D = 80° E = 40°

Varied Fluency
Step 6: Calculating Angles around a Point

National Curriculum Objectives:

Mathematics Year 5: (5G4b) Identify angles at a point and one whole turn (total 360)

Differentiation:

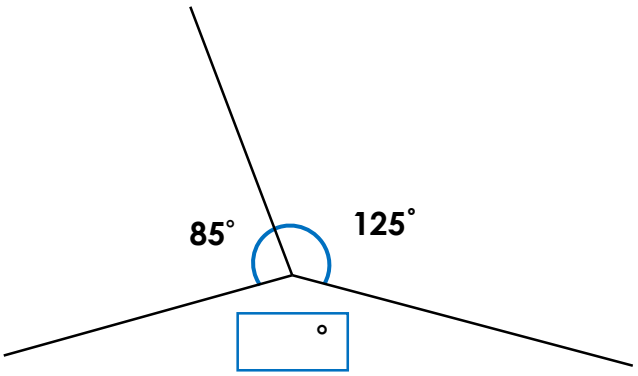
Developing Questions to support calculating a missing angle around a point. Using 3 angles and increments of 5°.
Expected Questions to support calculating a missing angle around a point. Using up to 5 angles and increments of 1°.
Greater Depth Questions to support calculating 2 missing angles around a point. Using up to 5 angles and increments of 1°. Some angles are labelled with degrees and clues given to calculate missing angles.

More Year 5 Properties of Shapes resources.

Did you like this resource? Don't forget to review it on our website.

Calculating Angles around a Point

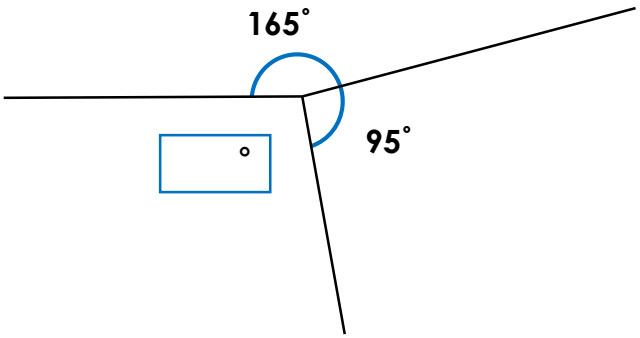
1a. What is the missing angle?



D VF

Calculating Angles around a Point

1b. What is the missing angle?



D VF

2a. Three angles make up a full turn.
These are 2 of the angles:

75°
155°

What is the value of the third angle?

D VF

2b. Three angles make up a full turn.
These are 2 of the angles:

80°
165°

What is the value of the third angle?

D VF

3a. Circle 3 angles that will add up to make a full turn.

125° 175° 60° 75°

D VF

3b. Circle 3 angles that will add up to make a full turn.

115° 55° 85° 160°

D VF

4a.

A third of a full turn is 120°

True or false?

D VF

4b.

A quarter of a full turn is 45°

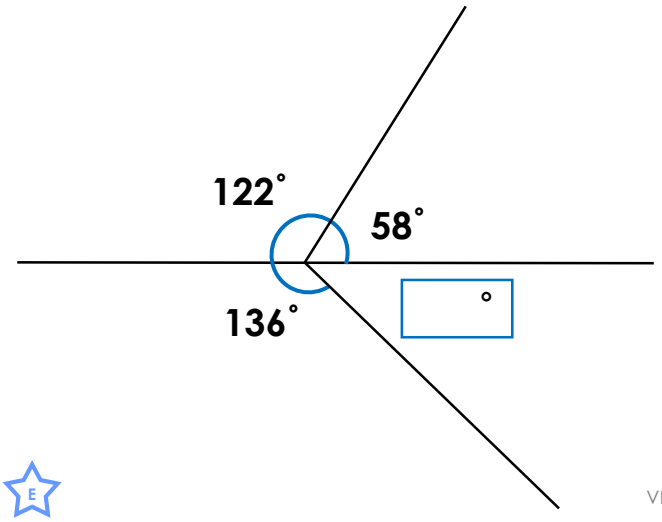
True or false?

D VF

Calculating Angles around a Point

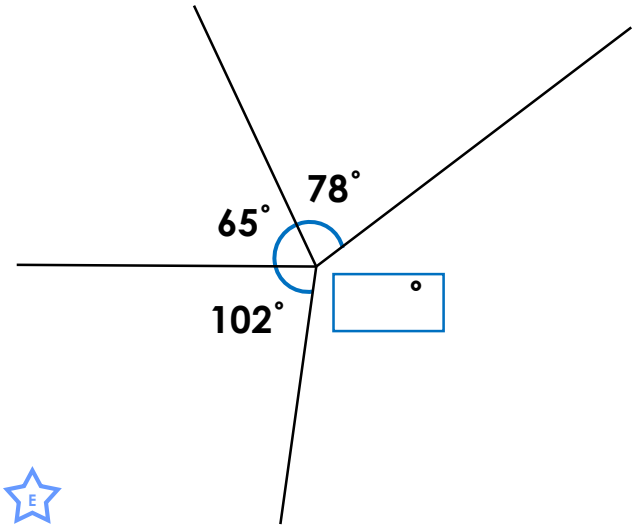
Calculating Angles around a Point

5a. What is the missing angle?



VF

5b. What is the missing angle?



VF

6a. Four angles make up a full turn. These are 3 of the angles:

28°
143°
92°

What is the value of the fourth angle?

VF

6b. Four angles make up a full turn. These are 3 of the angles:

36°
178°
67°

What is the value of the fourth angle?

VF

7a. Circle 4 angles that will add up to make a full turn.

32°	69°	112°
53°	101°	78°

VF

7b. Circle 4 angles that will add up to make a full turn.

81°	59°	136°
22°	84°	78°

VF

8a.

A sixth of a full turn is 66°

True or false?

VF

8b.

An eighth of a full turn is 45°

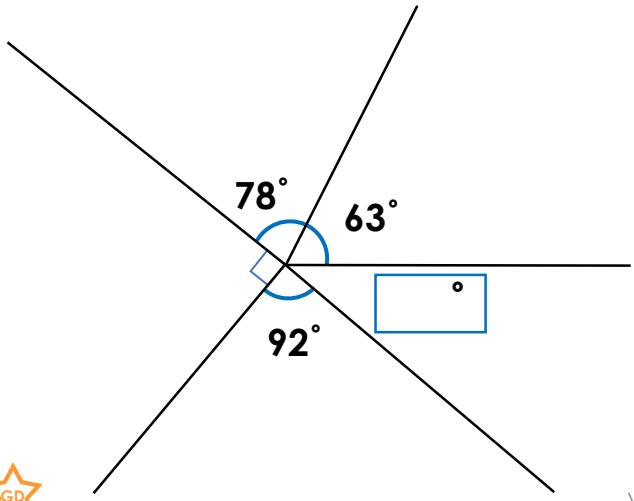
True or false?

VF

Calculating Angles around a Point

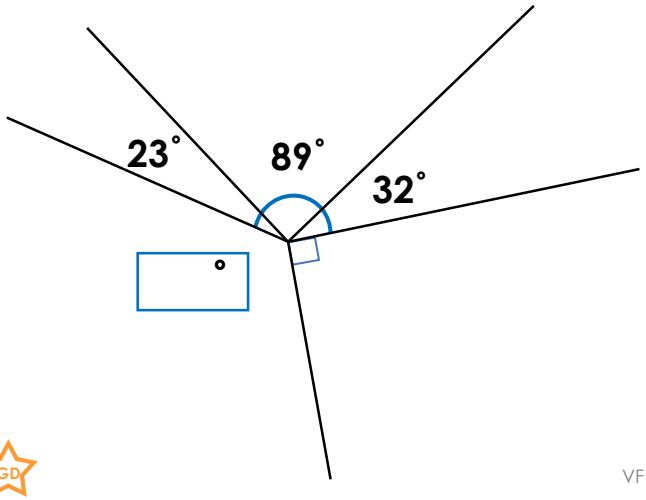
Calculating Angles around a Point

9a. What is the missing angle?



GD VF

9b. What is the missing angle?



GD VF

10a. Five angles make up a full turn. These are 4 of the angles:

54°
13°
93°
64°

What is the value of the fifth angle?

GD VF

10b. Five angles make up a full turn. These are 4 of the angles:

54°
66°
124°
71°

What is the value of the fifth angle?

GD VF

11a. Circle 5 angles that will add up to make a full turn.

42°	36°	89°
32°	98°	95°

GD VF

11b. Circle 5 angles that will add up to make a full turn.

104°	19°	83°
98°	22°	56°

GD VF

12a.

Three-ninths of a full turn is 120°

True or false?

GD VF

12b.

Five-eighths of a full turn is 200°

True or false?

GD VF

Varied Fluency
Calculating Angles around a Point

Developing
1a. 150°
2a. 130°
3a. 60° 125° 175°
4a. True

Expected
5a. 44°
6a. 97°
7a. 69° 78° 101° 112°
8a. False, it is 60°.

Greater Depth
9a. 37°
10a. 136°
11a. 36° 42° 89° 95° 98°
12a. True

Varied Fluency
Calculating Angles around a Point

Developing
1b. 100°
2b. 115°
3b. 85° 115° 160°
4b. False, it is 90°.

Expected
5b. 115°
6b. 79°
7b. 59° 81° 84° 136°
8b. True

Greater Depth
9b. 126°
10b. 45°
11b. 19° 56° 83° 98° 104°
12b. False, it is 225°