Reasoning and Problem Solving
Step 5: Angles on a Straight Line

National Curriculum Objectives:

Mathematics Year 5: (5G4b) Identify angles at a point and one whole turn (total 360 degrees) and angles at a point on a straight line and half a turn (total 180 degrees).

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Explain whether a child is correct when measuring angles on a straight line. All angles are in increments of 5°.
Expected Explain whether a child is correct when measuring angles on a straight line. All angles are in increments of 1°.
Greater Depth Explain whether a child is correct when measuring angles on a straight line. All angles are in increments of 1°.

Questions 2, 5 and 8 (Problem solving)
Developing Work out what a missing digit should be using knowledge of angles on a straight line. All angles are in increments of 5° on a horizontal line with up to two angles labelled with degrees.
Expected Work out what a missing digit should be using knowledge of angles on a straight line. All angles are in increments of 1° on a horizontal line with up to two angles labelled with degrees.
Greater Depth Work out what two missing digits should be using knowledge of angles on a straight line. All angles are in increments of 1° on a horizontal line. One angle is fully labelled with degrees.

Questions 3, 6 and 9 (Reasoning)
Developing Decide if a statement is correct or incorrect using knowledge of angles on a straight line. All angles are in increments of 5° on a horizontal line with up to two angles labelled with degrees.
Expected Decide if a statement is correct or incorrect using knowledge of angles on a straight line. All angles are in increments of 1° on a horizontal line with up to two angles labelled with degrees.
Greater Depth Decide if a statement is correct or incorrect using knowledge of angles on a straight line. All angles are in increments of 1° on a horizontal line. One angle is labelled with degrees and clues are given to calculate the missing angles.

More Year 5 Properties of Shapes resources.

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Angles on a Straight Line

1a. James is measuring angles on a straight line.
He says:

There are two angles on the line. One is 110° and the other is 60°.

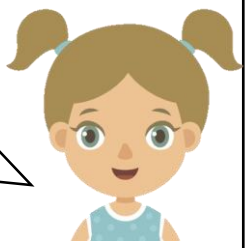
Could he be right? Explain how you know.

D R

Angles on a Straight Line

1b. Harper is measuring angles on a straight line.
She says:

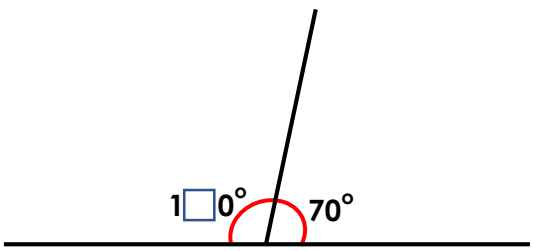
There are two angles on the line. One is 100 ° and the other is 80°.



Could she be right? Explain how you know.

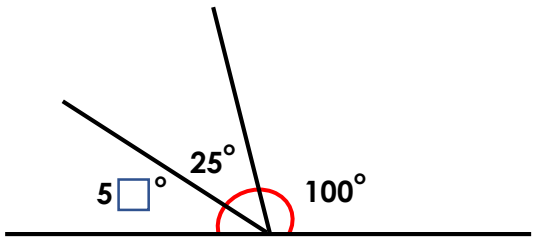
D R

2a. One of the angles below has lost a digit. What should the missing digit be?



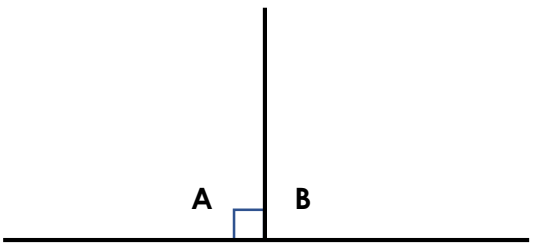
D *Angles not drawn to scale* PS

2b. One of the angles below has lost a digit. What should the missing digit be?



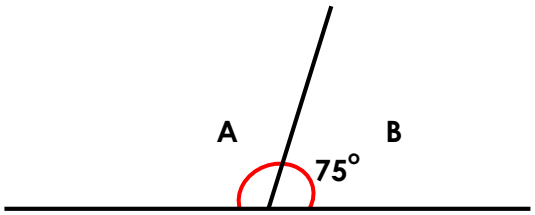
D *Angles not drawn to scale* PS

3a. John says angle B is the same as angle A. Do you agree? Explain your answer.



D *Angles not drawn to scale* R

3b. Theresa says that angle A is the same as angle B. Do you agree. Explain your answer.



D *Angles not drawn to scale* R

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Angles on a Straight Line

4a. Tyler is measuring angles on a straight line.
He says:

There are three angles on the line. One is 110°, one is 10° and the other is 60°.

Could he be right? Explain how you know.

E R

Angles on a Straight Line

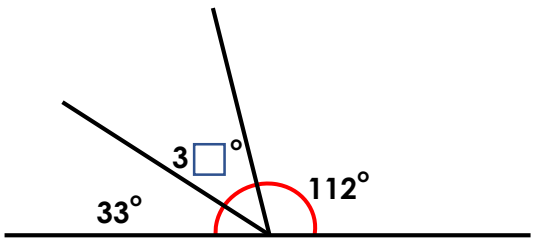
4b. Isabelle is measuring angles on a straight line.
She says:

There are three angles on the line. One is 100°, one is 30° and the other is 55°.

Could she be right? Explain how you know.

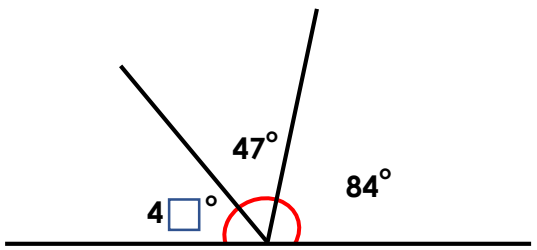
E R

5a. One of the angles below has lost a digit. What should the missing digit be?



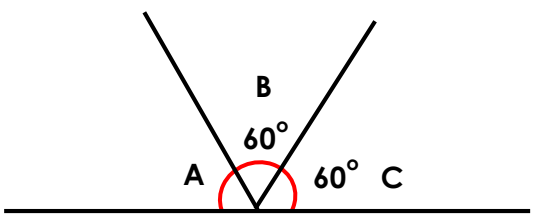
E *Angles not drawn to scale* PS

5b. One of the angles below has lost a digit. What should the missing digit be?



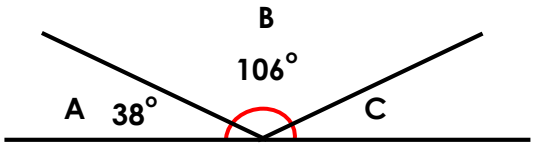
E *Angles not drawn to scale* PS

6a. Jim says that angle A is the same as angle B and C. Do you agree? Explain your answer.



E *Angles not drawn to scale* R

6b. Jen says that angle C is the same as angle A. Do you agree? Explain your answer.



E *Angles not drawn to scale* R

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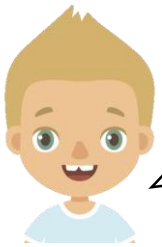
Angles on a Straight Line

7a. Eryk is measuring angles on a straight line.
He says:



There are three angles on a line. One is 19°, one is a right angle and the other is 61°.

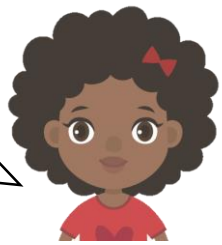
Could he be right? Explain how you know.

GD R

Angles on a Straight Line

7b. Kristi is measuring angles on a straight line.
She says:

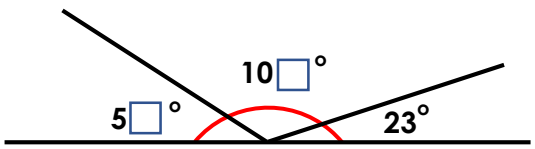
There are three angles on the line. One is 89° degrees, one is a right angle and the other is 1°.



Could she be right? Explain how you know.

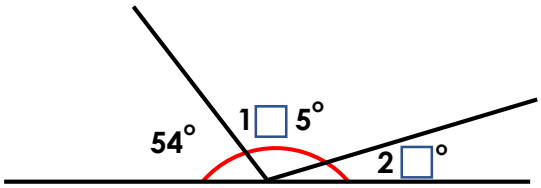
GD R

8a. Two of the angles below have lost a digit. What should the missing digits be?



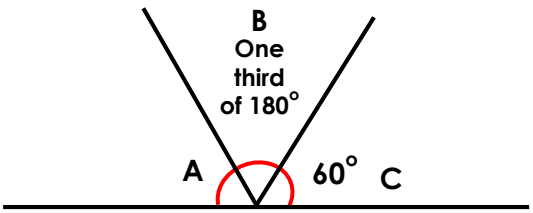
GD *Angles not drawn to scale* PS

8b. Two of the angles below have lost a digit. What should the missing digits be?



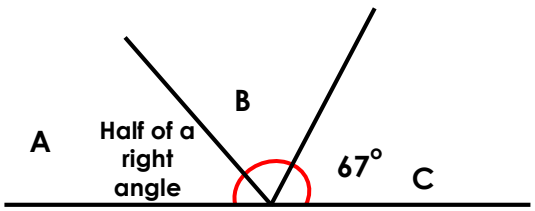
GD *Angles not drawn to scale* PS

9a. Pam says that angle A and B are the same as angle C if each angle is equal. Do you agree? Explain your answer.



GD *Angles not drawn to scale* R

9b. Tim says that angle B is the same as angle C. Do you agree? Explain your answer.



GD *Angles not drawn to scale* R

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Reasoning and Problem Solving
Angles on a Straight Line

Developing

1a. James cannot be right as his angles only total 170°.

2a. The missing digit is a 1.

3a. John is correct as both angles A and B are 90° angles. Two 90° angles makes 180°.

Expected

4a. Tyler could be right as his angles total 180°.

5a. The missing digit is a 5.

6a. Jim is correct as 60° + 60° = 120°. 180° – 120° = 60° which is the same as angle B and C.

Greater Depth

7a. Eryk cannot be right as his angles total 170°.

8a. The missing digits are a 4 and a 3.

9a. Pam is correct as one third of 180° = 60° so 60° + 60° = 120°. 180° – 120° = 60° which is the same as angle C at 60°.

Reasoning and Problem Solving
Angles on a Straight Line

Developing

1b. Harper could be right as her angles total 180°.

2b. The missing digit is a 5.

3b. Theresa is incorrect as 180° – 75° = 105° so angle A must be 105° which is different to angle B at 75°.

Expected

4b. Isabelle cannot be right as her angles total 185°.

5b. The missing digit is a 9.

6b. Jen is incorrect as 106° + 38 °= 144. 180° – 144° = 36° which is different to angle A at 38°.

Greater Depth

7b. Kristi could be right as her angles total 180°.

8b. The missing digits are a 0 and a 1.

9b. Tim is incorrect as half of a right angle is 45° so 45° + 67° = 112°. 180° – 112° = 68° which is different to angle C at 67°.

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Varied Fluency
Step 5: Angles on a Straight Line

National Curriculum Objectives:

Mathematics Year 5: (5G4b) Identify angles at a point and one whole turn (total 360 degrees) and angles at a point on a straight line and half a turn (total 180 degrees).

Differentiation:

Developing Questions to support calculating missing angles on straight lines. All angles are in increments of 5° and are on a horizontal line. Up to two angles with labelled degrees.
Expected Questions to support calculating missing angles on straight lines. All angles are in increments of 1° and are on a horizontal line. Up to two angles with labelled degrees.
Greater Depth Questions to support calculating missing angles on straight lines. All angles are in increments of 1° and are on a horizontal line. Only one angle may be labelled with degrees and clues given to calculate the missing angles.

More Year 5 Properties of Shapes resources.

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Angles on a Straight Line

1a. Match the facts.

Degrees on a straight line	90
Degrees in a right angle	180

D VF

Angles on a Straight Line

1b. Match the facts.

Degrees in 2 right angles	180
Right angles on a straight line	2

D VF

2a. True or false?

$$50^\circ + 140^\circ = 180^\circ$$

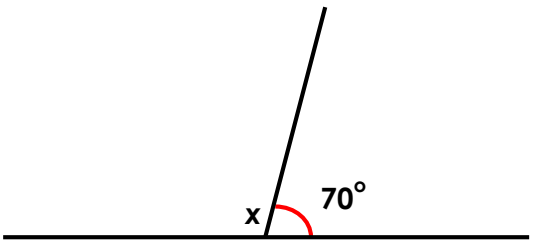
D VF

2b. True or false?

$$65^\circ + 115^\circ = 180^\circ$$

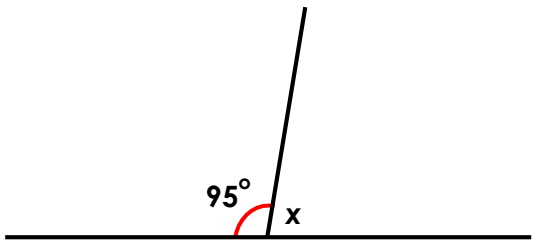
D VF

3a. Calculate the missing angle.



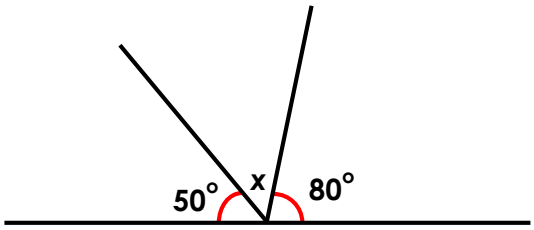
D *Angles not drawn to scale* VF

3b. Calculate the missing angle.



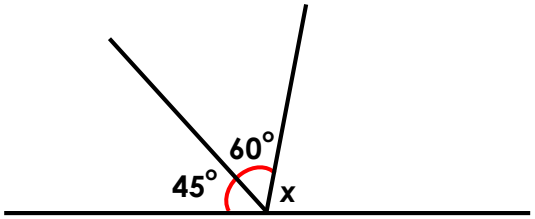
D *Angles not drawn to scale* VF

4a. Work out the missing angle from the given angle.



D *Angles not drawn to scale* VF

4b. Work out the missing angle from the given angle.



D *Angles not drawn to scale* VF

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Angles on a Straight Line

5a. Match the facts.

Degrees on a straight line	270
Degrees in a right angle	180
Degrees in 3 right angles	90

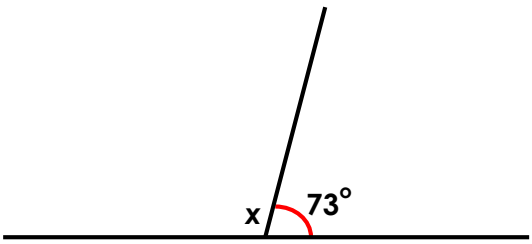
E VF

6a. True or false?

$93^\circ + 97^\circ = 180^\circ$

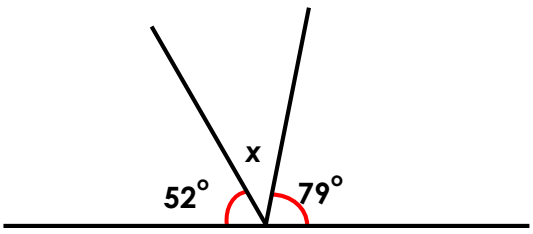
E VF

7a. Calculate the missing angle.



E *Angles not drawn to scale* VF

8a. Work out the missing angle from the two given angles.



E *Angles not drawn to scale* VF

Angles on a Straight Line

5b. Match the facts.

Degrees in half a right angle	360
Degrees in 2 right angles	180
Degrees on 2 straight lines	45

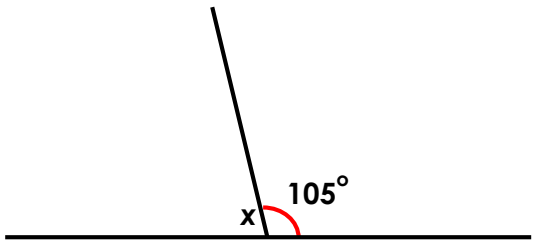
E VF

6b. True or false?

$31^\circ + 149^\circ = 180^\circ$

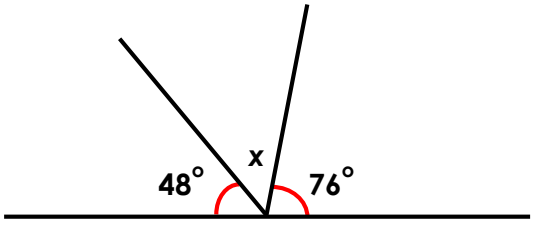
E VF

7b. Calculate the missing angle.



E *Angles not drawn to scale* VF

8b. Work out the missing angle from the two given angles.



E *Angles not drawn to scale* VF

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Angles on a Straight Line

9a. Match the facts.

Degrees on 3 straight lines	450
Degrees in 5 right angles	540
Right angles on one side of 60 straight lines	120

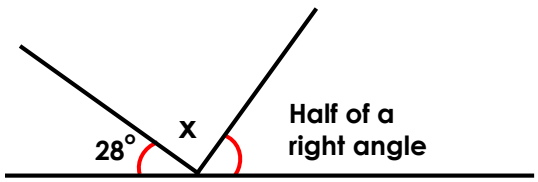
GD VF

10a. True or false?

$61^\circ + 119^\circ = 180^\circ$

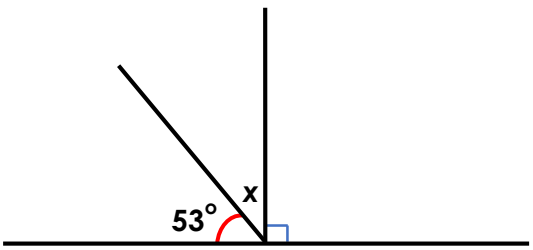
GD VF

11a. Calculate the missing angle.



GD *Angles not drawn to scale* VF

12a. Work out the missing angle from the two given angles.



GD *Angles not drawn to scale* VF

Angles on a Straight Line

9b. Match the facts.

Degrees on 2 straight lines	20
Degrees in 5 right angles	450
Right angles on one side of 10 straight lines	360

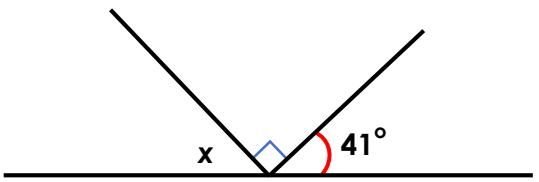
GD VF

10b. True or false?

$49^\circ + 132^\circ = 180^\circ$

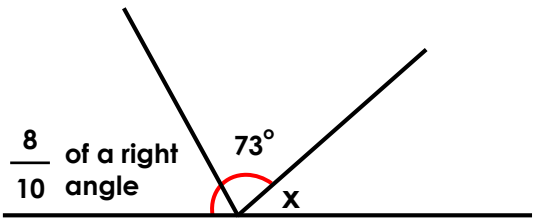
GD VF

11b. Calculate the missing angle.



GD *Angles not drawn to scale* VF

12b. Work out the missing angle from the two given angles.



GD *Angles not drawn to scale* VF

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Varied Fluency
Angles on a Straight Line

Developing

1a.

Degrees on a straight line	90
Degrees in a right angle	180

2a. False as $50^\circ + 140^\circ = 190^\circ$

3a. 110°

4a. 50°

Expected

5a.

Degrees on a straight line	270
Degrees in a right angle	180
Degrees in 3 right angles	90

6a. False as $93^\circ + 97^\circ = 190^\circ$

7a. 107°

8a. 49°

Greater Depth

9a.

Degrees on 3 straight lines	450
Degrees in 5 right angles	540
Right angles on one side of 60 straight lines	120

10a. True

11a. 107°

12a. 37°

Varied Fluency
Angles on a Straight Line

Developing

1b.

Degrees in 2 right angles	180
Right angles on a straight line	2

2b. True

3b. 85°

4b. 75°

Expected

5b.

Degrees in half a right angle	360
Degrees in 2 right angles	180
Degrees on 2 straight lines	45

6b. True

7b. 75°

8b. 56°

Greater Depth

9b.

Degrees on 2 straight lines	20
Degrees in 5 right angles	450
Right angles on one side of 10 straight lines	360

10b. False as $139^\circ + 132^\circ = 181^\circ$

11b. 49°

12b. 35°

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