Reasoning and Problem Solving
Step 4: Vertically Opposite 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 (Problem Solving)
Developing Calculate a missing angle using knowledge that vertically opposite angles are equal. Includes 4 angles measured to the nearest 10 degrees.
Expected Calculate a missing angle using knowledge that vertically opposite angles are equal. Includes 4 angles measured to the nearest whole degree; up to 2 angles given per question.
Greater Depth Calculate a missing angle using knowledge that vertically opposite angles are equal. Includes up to 6 angles measured to the nearest whole degree; up to 2 angles given per question.

Questions 2, 5 and 8 (Reasoning)
Developing Identify and explain errors when calculating missing angles using knowledge of vertically opposite angles. Includes 4 angles measured to the nearest 10 degrees.
Expected Identify and explain errors when calculating missing angles using knowledge that vertically opposite angles are equal. Includes 4 angles measured to the nearest whole degree; up to 2 angles given per question.
Greater Depth Identify and explain errors when calculating missing angles using knowledge that vertically opposite angles are equal. Includes up to 6 angles measured to the nearest whole degree; up to 2 angles given per question.
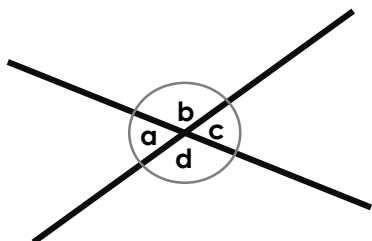
Questions 3, 6 and 9 (Problem Solving)
Developing Investigate 3 true or false statements about vertically opposite angles. 4 angles measured to the nearest 10 degrees.
Expected Investigate 4 true or false statements about vertically opposite angles using knowledge that vertically opposite angles are equal. Includes 4 angles measured to the nearest whole degree; up to 2 angles given per question.
Greater Depth Investigate 4 true or false statements about vertically opposite angles using knowledge that vertically opposite angles are equal. Includes up to 6 angles measured to the nearest whole degree; up to 2 angles given per question.

More Year 6 Properties of Shapes resources.

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

classroomsecrets.co.uk
Problem Solving and Reasoning – Vertically Opposite Angles – Teaching Information
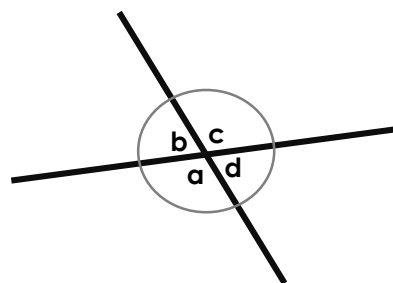
Vertically Opposite Angles

1a. If angle a measures 50°, what is the size of angle b?

Not to scale   PS

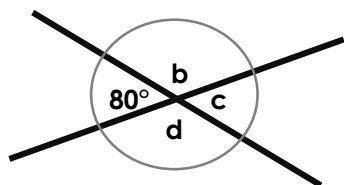**1b.** If angle b measures 70°, what is the size of angle c?

Not to scale   PS

2a. Oscar says:

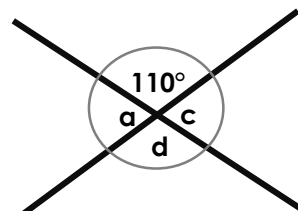> I think that angle b measures 80°.

Is Oscar correct? Explain why.

Not to scale   R
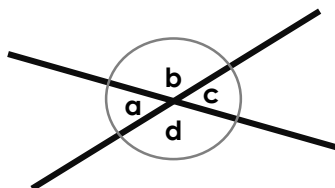
2b. Anna says:

> I think that angle c measures 140°.

Is Anna correct? Explain why.

Not to scale   R

3a. Knowing that a measures 40°, identify whether these statements are true or false:

a. Angle c measures 80°.
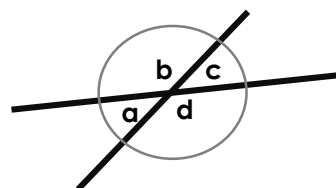
b. Angles a and c total 80°.

c. Angle b measures 140°.

Not to scale   PS

3b. Knowing that b measures 120°, identify whether these statements are true or false:

a. Angles b and d total 240°.
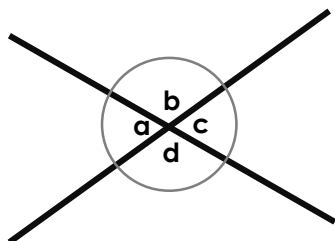
b. Angle a measures 50°.

c. Angles c and d total 180°.

Not to scale   PS

classroomsecrets.co.uk

Reasoning and Problem Solving – Vertically Opposite Angles – Year 6 Developing

Vertically Opposite Angles

Vertically Opposite Angles

4a. If angle a measures 86°, what is the size of angle b?

Not to scale

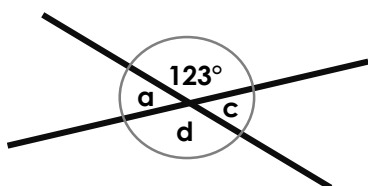**4b.** If angle c measures 47°, what is the size of angle d?
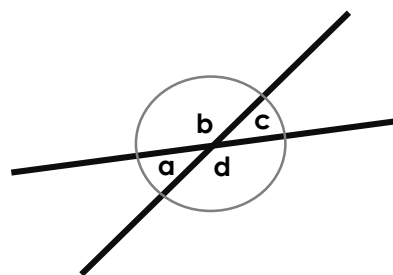
Not to scale

5a. Sandy says:

> I think that angle c measures 114°.
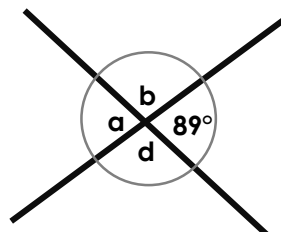
Is Sandy correct? Explain why.

Not to scale

5b. Jack says:

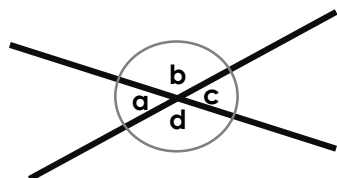> I think that angle d measures 90°.

Is Jack correct? Explain why.

Not to scale

6a. Knowing that d measures 131°, identify whether these statements are true or false:

- a. Angle c measures 49°.
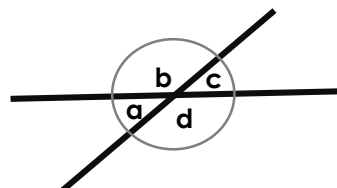- b. Angles b and d total 180°.
- c. Angles a, b and c total 229°.
- d. Angles a and c total 100°.

Not to scale

6b. Knowing that c measures 74°, identify whether these statements are true or false:

- a. Angles a and c total 146°.
- b. Angle b measures 106°.
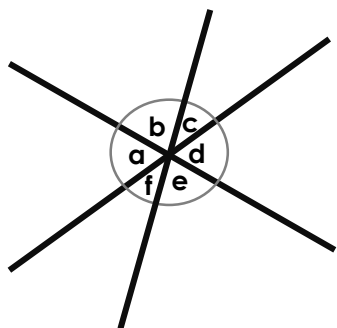- c. Angles b and d total 212°.
- d. Angles a, b, c and d total 180°.

Not to scale

Vertically Opposite Angles
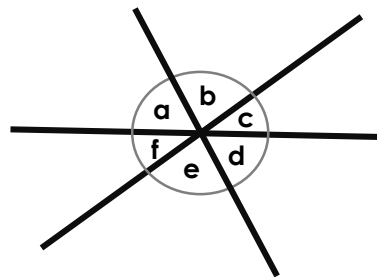
Vertically Opposite Angles

7a. If angle b measures 79° and angle c measures 48°, what is the size of angle d?

Not to scale   PS

7b. If angle a measures 81° and angle b measures 84°, what is the size of angle c?
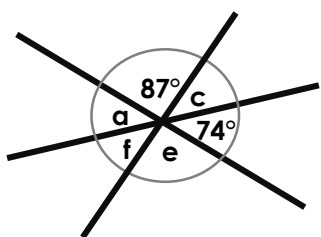

Not to scale   PS

8a. Barney says:

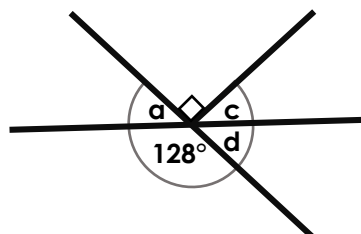> I think that angle c measures 29°.

Is Barney correct? Explain why.

Not to scale   R

8b. Shona says:

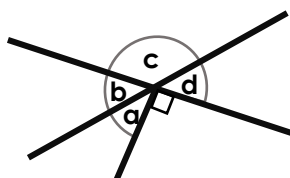> I think that angle c measures 48°.

Is Shona correct? Explain why.

Not to scale   R

9a. Knowing that d measures 75°, identify whether these statements are true or false:

- a. Angles c and d total 180°.
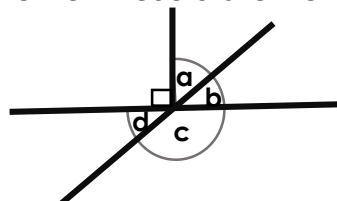- b. Angles b and d total 150°.
- c. Angles a, b, c and d total 340°.
- d. Angle a measures 25°.

Not to scale   PS

9b. Knowing that c measures 137°, identify whether these statements are true or false:

- a. Angles b and d total 88°.
- b. Angle a measures 47°.
- c. Angles a and b total 90°.
- d. Angles b, c and d total 220°.

Not to scale   PS

© Classroom Secrets Limited 2019

classroomsecrets.co.uk

Reasoning and Problem Solving – Vertically Opposite Angles – Year 6 Greater Depth

Reasoning and Problem Solving
Vertically Opposite Angles

Developing

1a. Angle b = 130°

2a. Oscar is not correct as angle b is not vertically opposite. Angle b measures 100°.

3a. a = false, it measures 40°; b = true and c = true.

Expected

4a. Angle b = 94°.

5a. Sandy is not correct as she has calculated the size of angle a and angle c together. She needs to divide the answer by 2 to give her 57°.

6a. a = true; b = false, they total 262°; c = true and d = false, they total 98 °.

Greater Depth

7a. Angle d = 53°.

8a. Barney is not correct because 87° and 74° total 161°. This means that angle c must measure 19°.

9a. a = true; b = true; c = false, they total 270 ° and d = false, it measures 15 °.

Developing

1b. Angle c = 110°.

2b. Anna is not correct as angle a and c both total 140°. Angle c on its own measures 70°.

3b. a = true, b = false, it measures 60° and c = true.

Expected

4b. Angle d = 133°.

5b. Jack is not correct as an angle of 90° will mean that all 4 angles total of 358° instead of 360°. Angle d must be 91°.

6b. a = false, they total 148 °; b = true; c = true and d = false, they total 360°.

Greater Depth

7b. Angle c = 15°.

8b. Shona is not correct. Angles on a straight line equal 180 ° so angle d must be 52°. Angle a must also be 52°. 52° + 90° = 142°. 180° - 142° = 38°. Angle c is 38°.

9b. a = false, they total 86 °; b = true; c = true and d = false, they total 223 °.