Year 3 maths: Four-sided shapes and their properties (Hard)

Maths · Shapes and space
Level: Hard

Student: _____ Date: _____

Instructions
- There are 10 questions. Read each one carefully.
- Write your answers on this paper. Use the space under a question to work it out.
- A grown-up can read a question aloud — that's fine.
- The answers are at the end. Check them together when you have finished.

Questions

1. A shape has 4 sides all the same length, and one of its corners is a right angle. What must it be?

Circle one answer.

○ **A** rectangle ○ **B** rhombus ○ **C** square ○ **D** trapezium ○ **E** kite

2. Count all the right angles in a square, a rectangle and a triangle with one square corner.

Answer: ☐ right angles

Working:

3. Sam draws 2 quadrilaterals and 3 triangles. How many corners has he drawn altogether?

Answer: ☐ corners

Working:

4. A square is turned so it stands on one corner. Which is true?

Circle one answer.

○ **A** It becomes a kite.

○ **B** It is no longer a quadrilateral.

○ **C** It becomes a rhombus with no right angles.

○ **D** It has only 2 right angles now.

○ **E** It is still a square: 4 equal sides and 4 right angles.

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5. Three of these letters are chosen. What is the highest possible total number of right angles in the three chosen letters?

Circle one answer.



○ **A** 9 ○ **B** 7 ○ **C** 4 ○ **D** 10 ○ **E** 5

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6. Lena has a square piece of card. She cuts it into two equal shapes with one straight cut. She makes three statements. 1: The shapes are both triangles. 2: The shapes are both trapeziums. 3: The shapes are both squares. Which of the statements can be true?

Circle one answer.

○ **A** statement 1 only

○ **B** statements 1 and 2 only

○ **C** statements 1 and 3 only

○ **D** statements 2 and 3 only

○ **E** statements 1, 2 and 3

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7. Ravi has a rectangle of paper twice as long as it is wide. He cuts it into two equal shapes with one straight cut. He makes three statements. 1: The shapes are both triangles. 2: The shapes are both squares. 3: The shapes are both rectangles. Which of the statements can be true?

Circle one answer.

○ **A** statement 1 only

○ **B** statements 1 and 2 only

○ **C** statements 1 and 3 only

○ **D** statements 2 and 3 only

○ **E** statements 1, 2 and 3

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8. Freya has a rectangle that is not a square. She makes one straight cut to divide it into two shapes. 1: a triangle and a rectangle. 2: two rectangles. 3: two triangles. Which of these can she make with the one cut?

Circle one answer.

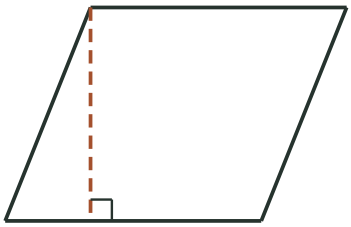
○ **A** 2 only ○ **B** 3 only ○ **C** 1 and 3 only

○ **D** 2 and 3 only ○ **E** 1, 2 and 3

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9. Mila cuts this parallelogram along the dashed line. Which two shapes does she get?

Circle one answer.



○ **A** two trapeziums

○ **B** a triangle and a rectangle

○ **C** a triangle and a parallelogram

○ **D** two triangles

○ **E** a triangle and a trapezium

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10. Lily has a regular hexagon of card. She makes one straight cut to divide it into two shapes. 1: a triangle and a quadrilateral. 2: two quadrilaterals. 3: a quadrilateral and a pentagon. Which of these can she make with the one cut?

Circle one answer.



○ **A** 1 only ○ **B** 2 only

○ **C** 1 and 2 only ○ **D** 2 and 3 only

○ **E** 1, 2 and 3

Answer key

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1. C — square

4 equal sides: square or rhombus. If one corner of a rhombus is square, all four are: it is a square.

2. 9 right angles

Square 4, rectangle 4, triangle 1: 4 + 4 + 1 = 9.

3. 17 corners

Quadrilaterals: 2 × 4 = 8 corners. Triangles: 3 × 3 = 9 corners. 8 + 9 = 17.

4. E — It is still a square: 4 equal sides and 4 right angles.

Turning doesn't change a shape's sides or corners. It is still a square.

5. A — 9

L has 1, H has 2 T-joins so 4, T has 2, F has 3 and Y has none. The three with the most are H, F and T: 4 + 3 + 2 = 9.

6. B — statements 1 and 2 only

A cut from corner to corner gives two equal triangles. A slanting cut through the middle, from the top edge to the bottom edge, gives two equal trapeziums (one is the other turned round). Two squares are impossible: half a square is only half as wide, so it can't have 4 equal sides.

7. E — statements 1, 2 and 3

Corner to corner gives two equal triangles. A cut across the middle of the long sides gives two squares, because each half is as long as it is wide. A cut along the middle of the short sides gives two long, thin rectangles. All three can be true.

8. D — 2 and 3 only

2: cut straight across, from the middle of one side to the opposite side: two rectangles. 3: cut corner to corner: two triangles. 1: cutting off a triangle leaves a slanting cut edge on the other piece, so it can't be a rectangle. So 2 and 3 only.

9. E — a triangle and a trapezium

The left piece has 3 corners: a triangle. The right piece has 4 sides. Its top and bottom are parallel, but its left side is straight up and its right side slants, so only one pair of sides is parallel: a trapezium. It has two square corners, not four, so it is not a rectangle.

10. D — 2 and 3 only

Each end of the cut adds a new corner to both pieces. 2: corner to opposite corner gives 4 and 4 corners. 3: from a corner to the middle of a side gives 4 and 5. 1: a triangle and a quadrilateral have only 3 + 4 = 7 corners, but cutting a hexagon always gives at least 8. So 2 and 3 only.