

SIGMABUDGIE · GRADE 3

Shapes

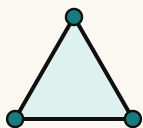
A gentle walkthrough & a 24-question exam

Part 1 walks through polygons, angles, quadrilaterals, and solids from the very beginning, with drawings. Part 2 is a 24-question exam that starts easy and slowly builds to harder, ISEE-style reasoning questions. Work through the lesson together first, then let your child try the exam. The answer key at the back explains every question.

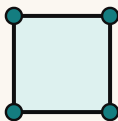
1 · Sides and vertices

A **polygon** is a closed shape made of straight sides. Where two sides meet is a corner, called a **vertex** (more than one: vertices).

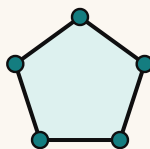
Count the sides to name it: **triangle** 3, **quadrilateral** 4, **pentagon** 5, **hexagon** 6, **octagon** 8. A polygon has the same number of vertices as sides.



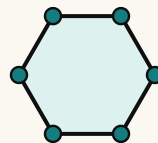
triangle: 3 sides, 3 vertices



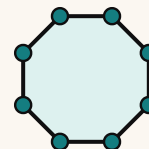
quadrilateral: 4



pentagon: 5



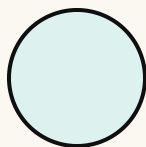
hexagon: 6



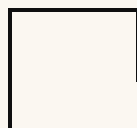
octagon: 8

2 · Not a polygon

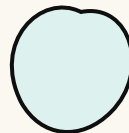
A circle has no straight sides, so it is not a polygon. An open shape is not a polygon either: the sides must close up with no gap. Curvy sides do not count.



no straight sides



not closed



curved sides

3 · Angles

An **angle** is the opening at a vertex. A **right angle** is a perfect square corner, like the corner of a book. We mark it with a tiny square.

Smaller than a right angle is **acute** (sharp). Bigger is **obtuse** (wide).



acute: smaller



right: a square corner



obtuse: wider

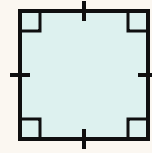
4 • Rectangles and squares

A **rectangle** has 4 right angles, and its opposite sides are equal. A **square** has 4 right angles **and** all 4 sides equal (the tick marks show equal sides).

So every square is also a rectangle. But a rectangle is only a square if all its sides match.



rectangle: 4 right angles

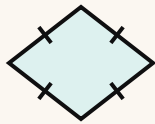


square: 4 right angles + 4 equal sides

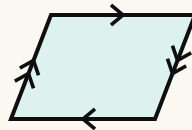
5 • The rest of the quadrilateral family

Any 4-sided shape is a quadrilateral. A **rhombus** has 4 equal sides but its corners can lean. A **parallelogram** has two pairs of parallel sides (the arrows), like a leaning rectangle. A **trapezoid** has just **one** pair of parallel sides.

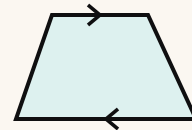
Parallel sides run side by side and never meet, like train tracks.



rhombus: 4 equal sides



parallelogram: 2 pairs of parallel sides

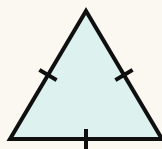


trapezoid: 1 pair of parallel sides

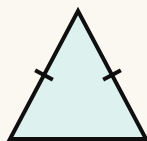
6 • Kinds of triangles

Triangles get names from their sides: **equilateral** (all 3 equal), **isosceles** (2 equal), **scalene** (none equal).

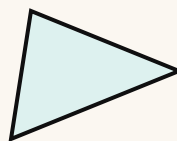
A triangle with a square corner is a **right triangle**.



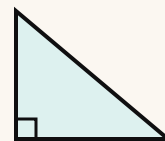
equilateral



isosceles



scalene

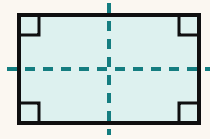


right triangle

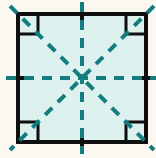
7 • Symmetry

A shape has a **line of symmetry** if you can fold it on that line and the two halves match exactly.

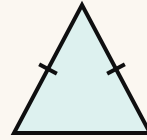
A rectangle has 2 lines of symmetry. A square has 4: two through the middles and two through the corners.



rectangle: 2 lines



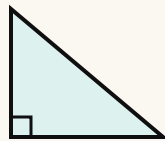
square: 4 lines



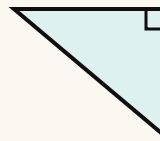
isosceles triangle: 1 line, down the middle

8 • Congruent: same size and shape

Two shapes are **congruent** if they are exactly the same size and shape, even if one is turned or flipped. You could lay one on top of the other.



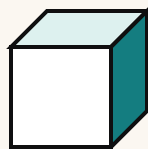
this triangle...



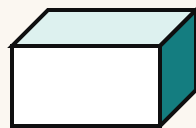
...turned: still congruent

9 • Solid shapes

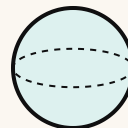
Solids are 3D: they have height, width, and depth. The **cube** (a dice), the **rectangular prism** (a box), the **sphere** (a ball), the **cylinder** (a can), the **cone** (an ice-cream cone), and the **pyramid**.



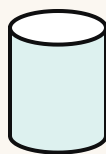
cube



rectangular prism



sphere



cylinder



cone

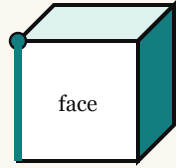


square pyramid

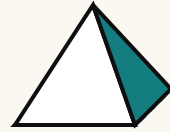
10 • Faces, edges, vertices

A **face** is a flat side. An **edge** is where two faces meet. A **vertex** is a corner point.

A cube has **6 faces**, **12 edges**, **8 vertices**. A rectangular prism has the same counts. A square pyramid has 5 faces (1 square + 4 triangles), 8 edges, 5 vertices. A sphere has no faces, edges, or vertices at all.



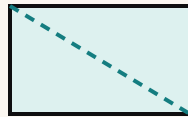
a face, an edge (thick), a vertex (dot)



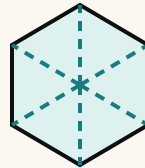
square pyramid: 5 faces, 8 edges, 5 vertices

11 • Shapes inside shapes

Cut a rectangle corner to corner and you get **2 triangles**. A hexagon can be split into **6 triangles** from its center. Splitting into equal parts is how fractions begin.



rectangle = 2 triangles



hexagon = 6 triangles

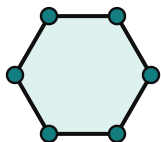
12 • Sorting by the rules

Test questions describe a shape and ask you to name it. Go rule by rule: "4 sides" (quadrilateral), "opposite sides parallel" (parallelogram, rectangle, rhombus, or square), "no right angles" (parallelogram or rhombus), "all sides equal" → **rhombus**.

Check every rule, then cross off the shapes that break one. You are ready for the test! 🎉

Read each drawing first, then choose the best answer. Take your time, there is no clock here. Questions start gentle and get harder toward the end. Circle your answer.

- 1 How many sides does a hexagon have?



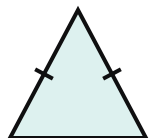
A 5

B 8

C 6

D 7

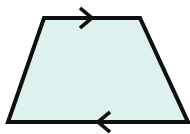
-
- 2 Which shape is a quadrilateral?



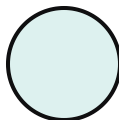
A



B



C



D

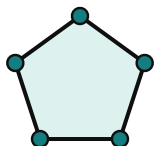
A A

B C

C B

D D

-
- 3 How many vertices does this pentagon have?



A 4

B 6

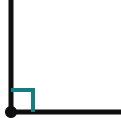
C 10

D 5

4 Which angle is a right angle?



A



B



C

A B

C C

B A

D None of them

5 Which shape has 4 equal sides and 4 right angles?

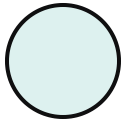
A rectangle

B square

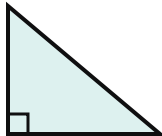
C triangle

D trapezoid

6 Which shape is NOT a polygon?



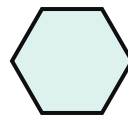
A



B



C



D

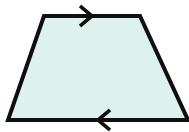
A B

C A

B C

D D

7 How many pairs of parallel sides does a trapezoid have?



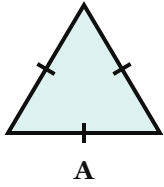
A 1

B 2

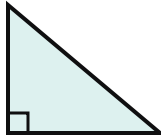
C 0

D 4

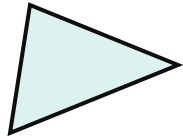
8 Which triangle has a right angle?



A



B



C

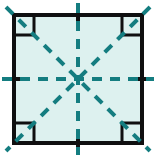
A A

C All of them

B C

D B

9 How many lines of symmetry does a square have?



A 2

C 4

B 1

D 8

10 Which statement is true?

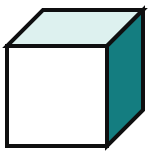
A Every rectangle is a square.

C A triangle can have 2 right angles.

B Every square is a rectangle.

D A circle is a polygon.

11 How many faces does a cube have?



A 4

C 12

B 8

D 6

12 Which solid has no flat faces and can roll in any direction?

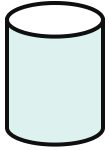
A sphere

C cube

B cylinder

D cone

13 How many flat faces does a cylinder have?



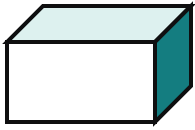
A 1

B 2

C 3

D 0

14 How many edges does a rectangular prism have?



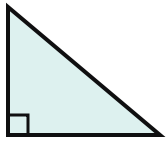
A 8

B 6

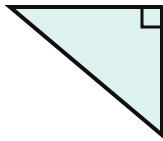
C 12

D 10

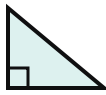
15 Which two triangles are congruent?



A



B



C

A A and B

B A and C

C B and C

D None of them

16 How is a rhombus different from a square?

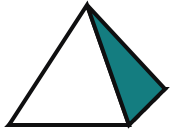
A A rhombus has 5 sides.

B A rhombus has sides that are not equal.

C A rhombus is not a quadrilateral.

D A rhombus does not need right angles.

- 17 How many triangular faces does a square pyramid have?



- A 4
B 5
C 3
D 1

- 18 A shape has 4 sides. Its opposite sides are parallel. It has no right angles, and its sides are not all the same length. What is it?

- A rectangle
B rhombus
C trapezoid
D parallelogram

- 19 How many right angles does a rectangle have?

- A 2
B 4
C 1
D 0

- 20 Which has more vertices: a pentagon or a hexagon? How many more?

- A a pentagon, by 1
B a hexagon, by 2
C a hexagon, by 1
D They have the same number

- 21 How many vertices does a square pyramid have?

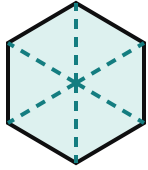


- A 4
B 8
C 6
D 5

- 22 Kim drew a quadrilateral with exactly one pair of parallel sides. What did she draw?

- A trapezoid
B parallelogram
C rectangle
D rhombus

- 23 A hexagon is cut from its center into equal triangles. How many triangles are there?



A 3

B 4

C 6

D 8

-
- 24 Which shape is a rectangle, a rhombus, AND a parallelogram all at once?

A trapezoid

B square

C kite

D hexagon

ANSWER KEY & EXPLANATIONS

- 1 C** Hex means six. A hexagon has 6 sides and 6 vertices.
- 2 B** A quadrilateral has 4 sides. Only shape C (the trapezoid) has 4 sides.
- 3 D** A pentagon has 5 sides and 5 corners (vertices).
- 4 A** B is a square corner, marked with the little square.
- 5 B** A square has 4 right angles and all 4 sides the same length.
- 6 C** A circle has no straight sides, so it is not a polygon.
- 7 A** A trapezoid has exactly one pair of parallel sides (the arrows).
- 8 D** Triangle B has a square corner, so it is a right triangle.
- 9 C** Two through the middles of the sides and two through the corners: 4.
- 10 B** A square has 4 right angles, so it fits the rule for a rectangle. Rectangles are only squares if all sides are equal.
- 11 D** A cube has 6 square faces, like a dice.
- 12 A** A sphere is round all over, with no faces, edges, or vertices.
- 13 B** A cylinder has a flat circle on the top and on the bottom: 2 faces.
- 14 C** Like a cube: 4 edges on top, 4 on the bottom, 4 going up and down. 12.
- 15 A** A and B are the same size and shape; B is just turned. C is smaller.
- 16 D** Both have 4 equal sides. A square must have 4 right angles; a rhombus can lean.
- 17 A** One triangle rises from each of the 4 sides of the square base.
- 18 D** Two pairs of parallel sides with no right angles is a parallelogram. A rhombus would need all sides equal.
- 19 B** Every corner of a rectangle is a right angle: 4.
- 20 C** A hexagon has 6 vertices and a pentagon has 5.
- 21 D** 4 corners on the square base plus the point at the top: 5.
- 22 A** Only the trapezoid has exactly one pair. The others have two pairs.
- 23 C** One triangle for each of the 6 sides.
- 24 B** A square has 4 right angles (rectangle), 4 equal sides (rhombus), and 2 pairs of parallel sides (parallelogram).