

Fair Share Detectives

Find partitions with equal-area parts.

CCSS.Math.Content.3.G.A.2 "Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape."

NAME _____

DATE _____

EQUAL AREAS

All parts cover the same amount of space. If a whole has n equal parts, each part is $\frac{1}{n}$ of the whole.

A hexagon is divided into 6 equal regions. Each region is $\frac{1}{6}$ of the hexagon.

UNEQUAL AREAS

At least one part covers more or less space than another part. The parts cannot all be the same unit fraction of the whole.

An oval is divided into 2 regions, and one region is larger than the other.

1 SORT _____ 8 items

For each item, circle EQUAL or UNEQUAL, then pick two items and explain how you know whether all parts have the same area.

1. A rectangle is split into 2 same-size squares.

EQUAL

UNEQUAL

2. A circle is split into 3 slices, and one slice is larger.

EQUAL

UNEQUAL

3. A shape is split into 4 parts. Three parts cover 2 square units each, and one part covers 1 square unit.

EQUAL

UNEQUAL

4. A square is split along both diagonals into 4 triangles.

EQUAL

UNEQUAL

5. A rectangle is split into 3 strips with widths of 1 unit, 1 unit, and 2 units. All strips have the same height.

EQUAL

UNEQUAL

6. An L-shaped figure is split into 2 parts. Each part covers 5 square units.

EQUAL

UNEQUAL

7. A triangle is split from one vertex to the midpoint of the opposite side.

EQUAL

UNEQUAL

8. A rectangle is split into 4 parts with areas of 3, 3, 3, and 2 square units.

EQUAL

UNEQUAL

2 PROVE IT Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ HOW I KNEW _____

ITEM # _____ HOW I KNEW _____

3 MAKE YOUR OWN One of each

Write or draw one new EQUAL partition and one new UNEQUAL partition. For each one, tell how you know.

EQUAL _____

UNEQUAL _____

CHALLENGE

Draw a shape split into 3 equal-area parts that are not all the same shape. Label each part with its unit fraction.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	A rectangle is split into 2 same-size squares.	EQUAL	The two squares have the same area, so each is $\frac{1}{2}$ of the rectangle.
2	A circle is split into 3 slices, and one slice is larger.	UNEQUAL	One slice has more area than the others.
3	A shape is split into 4 parts. Three parts cover 2 square units each, and one part covers 1 square unit.	UNEQUAL	The fourth part has a different area.
4	A square is split along both diagonals into 4 triangles.	EQUAL	The diagonals make four equal-area triangles, so each is $\frac{1}{4}$ of the square.
5	A rectangle is split into 3 strips with widths of 1 unit, 1 unit, and 2 units. All strips have the same height.	UNEQUAL	The 2-unit-wide strip has twice the area of each 1-unit-wide strip.
6	An L-shaped figure is split into 2 parts. Each part covers 5 square units.	EQUAL	Both parts have area 5 square units, even if their shapes look different.
7	A triangle is split from one vertex to the midpoint of the opposite side.	EQUAL	The two new triangles have equal areas, so each is $\frac{1}{2}$ of the original triangle.
8	A rectangle is split into 4 parts with areas of 3, 3, 3, and 2 square units.	UNEQUAL	One part has area 2 square units while the others have area 3 square units.

PART 2 • PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 • MAKE YOUR OWN (SAMPLE ANSWERS)

- **EQUAL:** A trapezoid is split into 5 parts with 4 square units in each part. Each part is $\frac{1}{5}$ of the whole.
- **UNEQUAL:** A pentagon is split into 3 parts with areas of 2, 2, and 3 square units. The parts are unequal.

Challenge: Draw a 3-by-2 rectangle. Make the left 1-by-2 rectangle one part, then split the remaining 2-by-2 square with a diagonal to make two triangles. Each part has area 2 square units, so label every part $\frac{1}{3}$.

Equal-area parts can have different shapes. For PROVE IT, accept explanations that compare areas or correctly name the unit fraction when all parts are equal.