LESSON MAKER PRO

Shape Split Strategy

Break apart composite figures to find area and perimeter.

GRADE 8 · 8.MG.5

8.MG.5 "The student will solve area and perimeter problems involving composite plane figures, including those in context. Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, circles, and semicircles..."

NAME _____ DATE _____

SPLIT, SOLVE, COMBINE

Split a composite figure into familiar shapes, then find and add the areas of the parts. To find perimeter, trace only the outside boundary. Do not count a shared side inside the figure, and use the curved arc when a semicircle replaces a side.

WORKED EXAMPLE

A 13-unit by 4-unit rectangle has a triangle on top. The triangle has a base of 13 units and a height of 2 units. Find the total area.

1. Rectangle area = 13 x 4 = 52 square units.
2. Triangle area = 13 x 2 / 2 = 13 square units.
3. Total area = 52 + 13 = 65 square units.

Answer: 65 square units

PRACTICE 6 problems

1 A composite figure is made from a 12-unit by 7-unit rectangle and a 7-unit by 7-unit square attached along one full 7-unit side. Find the area.

ANSWER _____

2 A 14-unit by 9-unit rectangle has a semicircle attached to one 14-unit side. The 14-unit side is not part of the outside boundary. Find the perimeter in terms of pi.

ANSWER _____

3 A 10-unit by 5-unit rectangle has a right triangle attached along a 10-unit side. The triangle has a base of 10 units and a height of 7 units. Find the total area.

ANSWER _____

4 A semicircle with a diameter of 12 units is attached to one side of a square with side length 12 units. Find the outside perimeter in terms of pi.

ANSWER _____

5 A 16-unit by 3-unit rectangle has a semicircle attached along its 16-unit side. Find the total area in terms of pi.

ANSWER _____

6 A trapezoid has bases of 8 units and 14 units and a height of 6 units. Its 14-unit base is attached to a 14-unit by 5-unit rectangle. Find the total area.

ANSWER _____

APPLY IT Show your work

1 A skate park is planning a painted practice zone shaped like a 20-foot by 12-foot rectangle with a semicircle attached to one 12-foot end. How many square feet will be painted, and how many feet of edging are needed around the outside? Give exact answers in terms of pi.

WORK SPACE

ANSWER _____

2 An esports club designs a screen backdrop shaped like an 18-foot by 10-foot rectangle with an isosceles triangle on top. The triangle has a base of 18 feet and equal sides of 15 feet. Find the area of the backdrop and the length of border tape needed around its outside edge.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A 18-unit by 10-unit rectangle has a semicircle attached outward to each of its opposite 10-unit sides. Find the total area and the outside perimeter in terms of pi.

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_____

ANSWER KEY

Shape Split Strategy

GRADE 8 · 8.MG.5

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A composite figure is made from a 12-unit by 7-unit rectangle and a 7-unit by 7-unit square attached along one full 7-unit side. Find the area.	**133 square units**
2	A 14-unit by 9-unit rectangle has a semicircle attached to one 14-unit side. The 14-unit side is not part of the outside boundary. Find the perimeter in terms of pi.	**32 + 7pi units**
3	A 10-unit by 5-unit rectangle has a right triangle attached along a 10-unit side. The triangle has a base of 10 units and a height of 7 units. Find the total area.	**85 square units**
4	A semicircle with a diameter of 12 units is attached to one side of a square with side length 12 units. Find the outside perimeter in terms of pi.	**36 + 6pi units**
5	A 16-unit by 3-unit rectangle has a semicircle attached along its 16-unit side. Find the total area in terms of pi.	**48 + 32pi square units**
6	A trapezoid has bases of 8 units and 14 units and a height of 6 units. Its 14-unit base is attached to a 14-unit by 5-unit rectangle. Find the total area.	**136 square units**

PART 2 · APPLY IT

1. **Area = 240 + 18pi square feet; perimeter = 52 + 6pi feet** The rectangle has area 240, and the semicircle has radius 6, so its area is 18pi. The outside edge includes two 20-foot sides, one 12-foot side, and a semicircle arc of 6pi.
2. **Area = 288 square feet; perimeter = 68 feet** The triangle's height is 12 feet because each half forms a 9-12-15 right triangle. Add the rectangle area, 180, to the triangle area, 108, then add the outside sides only.

CHALLENGE

Area = 180 + 25pi square units; perimeter = 36 + 10pi units

Accept equivalent exact expressions with terms in a different order. Require pi to remain exact, not replaced by a decimal.