

# Contest Problem Set 12117

## Target Round Problem 4

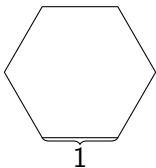
**David Sun**

Math League, LLC

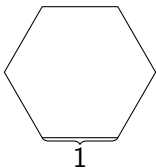
Identify the objective.

An equiangular but not equilateral hexagon has three times the area of a regular hexagon with side length 1. If both hexagons have whole number side lengths, then what is the perimeter of the larger hexagon?

Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.

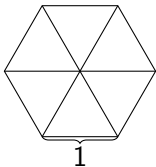


Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.



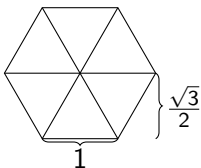
Area

Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.



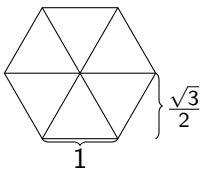
Area

Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.



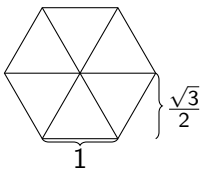
$$\text{Area} = 6 \cdot \frac{1}{2} \cdot 1 \cdot \frac{\sqrt{3}}{2}$$

Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.



$$\text{Area} = 6 \cdot \frac{1}{2} \cdot 1 \cdot \frac{\sqrt{3}}{2} = \frac{3}{2} \cdot \sqrt{3}$$

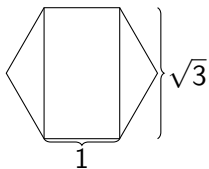
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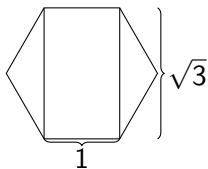


Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.

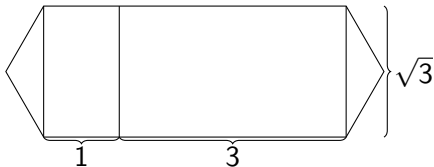


Area =  $\frac{3}{2} \cdot \sqrt{3}$ , so we need an additional  $3 \cdot \sqrt{3}$ .

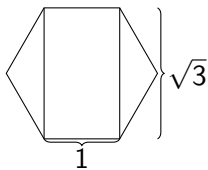
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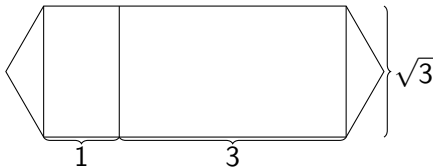
Area =  $\frac{3}{2} \cdot \sqrt{3}$ , so we need an additional  $3 \cdot \sqrt{3}$ .



Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.

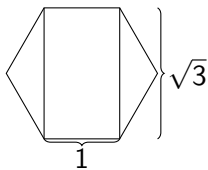


Area =  $\frac{3}{2} \cdot \sqrt{3}$ , so we need an additional  $3 \cdot \sqrt{3}$ .

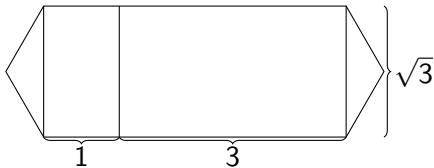


$$\text{Area} = \frac{3}{2} \cdot \sqrt{3} + 3 \cdot \sqrt{3} = \frac{9}{2} \cdot \sqrt{3}$$

Find the perimeter of an equiangular (non-equilateral) hexagon that has thrice the area of a regular hexagon with side length 1.



Area =  $\frac{3}{2} \cdot \sqrt{3}$ , so we need an additional  $3 \cdot \sqrt{3}$ .



Area =  $\frac{3}{2} \cdot \sqrt{3} + 3 \cdot \sqrt{3} = \frac{9}{2} \cdot \sqrt{3}$ , Perimeter =  $2 \cdot 4 + 4 \cdot 1 = \boxed{12}$

Review the concepts.

# Concepts

- area of an equilateral triangle

Review the concepts.

# Concepts

- area of an equilateral triangle
- area of a rectangle

Review the concepts.

# Concepts

- area of an equilateral triangle
- area of a rectangle
- area of a regular hexagon