Chapter 8 Lesson 6 Areas of Polygons

Answers

A. The green triangle has a base of 2.3 cm and a height of 2 cm. The area is $(2.3 \times 2) \div 2 = 4.6 \div 2 = 2.3$ cm^2.

B. Six triangles cover one hexagon, so the area of the hexagon is $2.3 \times 6 = 13.8$ cm^2.

C. The blue parallelogram has a base of 2.3 cm and a height of 2 cm, so its area is $2.3 \times 2 = 4.6$ cm^2.

D. Three blue parallelograms cover one hexagon, so the area of the hexagon is $4.6 \times 3 = 13.8$ cm^2.

E. She will need $13.8 \times 60 = 828$ cm^2 of metal.

1. Yes. This makes sense because the methods are just two different ways in which to measure the same area.

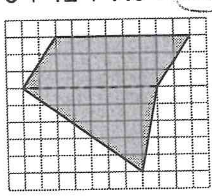
2. The hexagon could be divided into both triangles and parallelograms. By finding their areas and adding them, I could find the area of the hexagon.

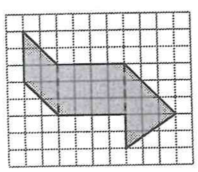
3. I could have used four triangles and one parallelogram, or two triangles and two parallelograms.

4. For example:

a) I divided this polygon horizontally into a parallelogram (top) and an acute scalene triangle (bottom). The height of the parallelogram was 3 square units and its base was 8 square units, so its area was $3 \times 8 = 24$ square units. The triangle's height was 5 square units and its base was 8 square units, for an area of $5 \times 8 = 40 \div 2 = 20$ square units. Adding the areas of the parallelogram and triangle together gave me $24 + 20 = 44$ square units for the area of the polygon.

b) I divided this polygon vertically into three shapes: a parallelogram at the left with a base of 3 and a height of 2, a rectangle in the middle with a base of 4 and a height of 3, and an acute scalene triangle at the right with a base of 5 and a height of 3. Their areas were as follows: parallelogram, $3 \times 2 = 6$; rectangle, $4 \times 3 = 12$; triangle, $(5 \times 3) = 15 \div 2 = 7.5$. Adding these areas gives me the area of the polygon: $6 + 12 + 7.5 = 25.5$ square units.

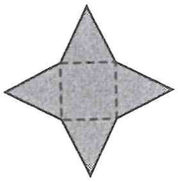


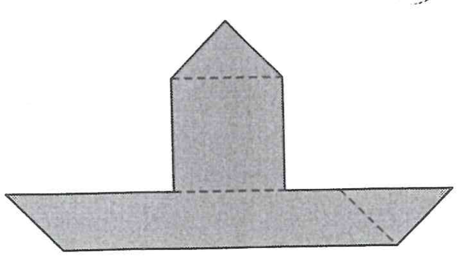


5. For example:

a) Each triangle has a base of 1 cm and a height of 1 cm, so the area of each one is $(1 \times 1) \div 2 = 0.5$ cm^2. Since there are four triangles, their combined area is $4 \times 0.5 = 2$ cm^2. The square measures 1 cm $\times$ 1 cm, so its area is 1 cm^2. The total area of the polygon is thus $2 + 1 = 3$ cm^2.

b) I divided this shape as follows: an isosceles triangle at its top, a rectangle in its middle and, at its bottom, a parallelogram at its left and an isosceles triangle at its right. Their areas were as follows: top triangle, $(2 \times 1) \div 2 = 1$ cm^2; rectangle, $2 \times 2 = 4$ cm^2; parallelogram, $1 \times 6 = 6$ cm^2; and bottom triangle, $(2 \times 1) \div 2 = 1$ cm^2. The total area is $1 + 4 + 6 + 1 = 12$ cm^2.





6. For example:

a) I divided the top of this shape into two right triangles and a rectangle, which left a large rectangle at the bottom. The triangles had a base of 2 and a height of 2.2, so the area of each was $(2 \times 2.2) \div 2 = 2.2$ cm^2. The small rectangle measured 2×2.2, so its area was $2 \times 2.2 = 4.4$ cm^2. The large rectangle measured 4×6, so its area was $4 \times 6 = 24$ cm^2. Adding these together gave me $2.2 + 2.2 + 4.4 + 24 = 32.8$ cm^2 for the area of this polygon.

b) The dimensions of the large rectangle were 4×6, so its area was $4 \times 6 = 24$ cm^2. The dimensions of the white rectangle were 2×4 for an area of 8 cm^2. The two right triangles each had bases of 1 and heights of 2, so their areas were each $(1 \times 2) \div 2 = 1$ cm^2. Now, I could figure out the area of the green polygon as follows: $24 - 8 = 18 + 1 + 1 = 20$ cm^2.