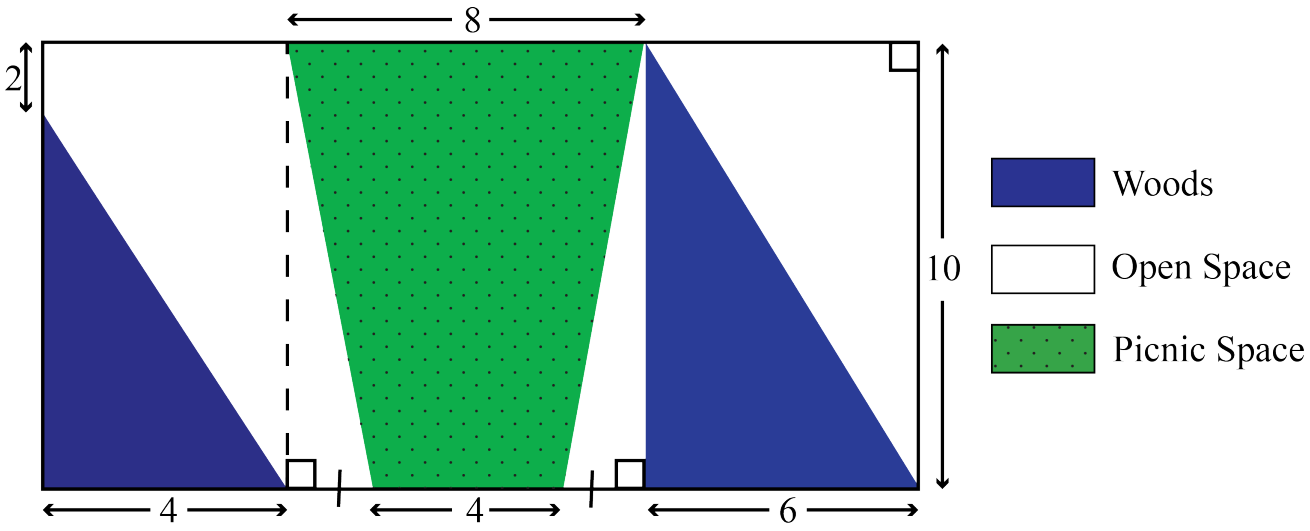
Problem of the Week
Problem B and Solution
Welcome to Shape City Park

Problem

Shape City has built a new park. The park is in the shape of a rectangle, and is divided into woods, open space, and picnic space, as shown.



What is the total area of each type of space?

Solution

Both woods regions are right-angled triangles. One triangle has base 4 and height $10 - 2 = 8$, and thus has area equal to $\frac{1}{2}(4 \times 8) = 16$ square units. The other triangle has base 6 and height 10, and thus has area equal to $\frac{1}{2}(6 \times 10) = 30$ square units. Thus, the area of the woods is $16 + 30 = 46$ square units.

The picnic space is in the shape of a trapezoid with height 10 and parallel sides of length 8 and 4. Thus, the area of the picnic space is $\frac{1}{2}(8 + 4) \times 10 = 60$ square units.

Alternatively, the area of the trapezoidal picnic space can be determined by calculating the area of the rectangular strip containing the trapezoid, and subtracting the two triangular regions of open space. That is, the area of the picnic space is $8 \times 10 - \frac{1}{2}(2 \times 10) - \frac{1}{2}(2 \times 10) = 60$ square units.

The entire park has vertical length 10 and width equal to $4 + 8 + 6 = 18$. Hence the total area of the park is $10 \times 18 = 180$ square units.

The area of the open space is equal to the total area of the park minus the areas of the picnic space and woods, or $180 - 46 - 60 = 74$ square units.