

Task Suppose the perimeter of an equilateral triangle is 72 m. Find its area.

Answer. Equilateral triangle is the triangle all of whose sides are equal. Let a be the side of that triangle, then

$$P = a + a + a = 3a = 72$$

whence

$$a = \frac{72}{3} = 24m.$$

Recall that the area of a triangle with sides a , b and the angle α between them is equal to

$$A = \frac{1}{2}ab \sin \alpha.$$

The angle between any two sides of such an equilateral triangle is $\frac{\pi}{3}$, whence its area is equal to

$$A = \frac{1}{2}a \cdot a \cdot \sin \frac{\pi}{3} = \frac{1}{2} \cdot 24 \cdot 24 \cdot \frac{\sqrt{3}}{2} = 144\sqrt{3}m^2.$$