Answer on Question# #49011 – Mathematics – Algebra

Question:

A triangle has side lengths of (*4x-2)*. A square with the same perimeter has side lengths of (*x+6*). What is the perimeter of each shape?

Solution:

As the sides of triangle have the same length, then the given triangle is equilateral (fig.1).

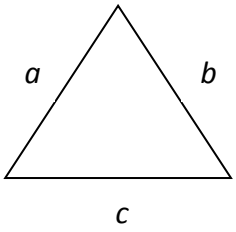

Fig.1

The perimeter of this triangle is

$$\mathrm{P}_{\Delta} = \mathrm{a} + \mathrm{b} + \mathrm{c} = 3\mathrm{a} = 3(4\mathrm{x} - 2), \quad (1)$$

Where *a* is the length of side and *a=b=c=(4x-2).*

The perimeter of the square

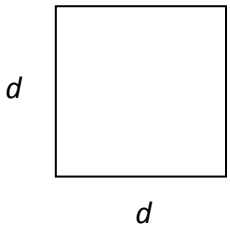

Fig.2

is defined as

$$\mathrm{P}_{\square} = 4\mathrm{d} = 4(\mathrm{x} + 6), \quad (2)$$

By condition of the problem

$$\mathrm{P}_{\Delta} = \mathrm{P}_{\square} = \mathrm{P}. \quad (3)$$

Hence we obtain

$$3(4\mathrm{x} - 2) = 4(\mathrm{x} + 6) \implies 12\mathrm{x} - 6 = 4\mathrm{x} + 24,$$

$$8x = 30, \qquad \Longrightarrow \quad x = \frac{30}{8} = \frac{15}{4} = 3.75$$

Thus the perimeter of each object is

$$\mathrm{P}_{\Delta} = 3(4 \cdot 3.75 - 2) = 3 \cdot 13 = 39 \text{ square units}, \tag{4}$$

$$\mathrm{P}_{\square} = 4(3.75 + 6) = 15 + 24 = 39 \text{ square units}, \tag{5}$$

where the triangle and square have a side of length *a=13* units and *d=9.75* units respectively.

Answer: $\mathrm{P}_{\Delta} = \mathrm{P}_{\square} = \mathrm{P} = 39$ square units.