The perimeter of an isosceles triangle is 42 centimeters. Two equal sides are 3 centimeters shorter than the base. Find the dimensions of the triangle.

Solution: We are looking for three sides. The sides are described in terms of the base.

Let the base $= x$ cm

Second side $=$ Third side $= x - 3$

Translate the problem:

$$\text{Perimeter} = \text{Sum of three sides}$$
$$42 = x + (x - 3) + (x - 3)$$

Solve the equation:

$$x + (x - 3) + (x - 3) = 42$$
$$x + x - 3 + x - 3 = 42$$
$$3x - 6 = 42$$
$$3x - 6 + 6 = 42 + 6 \quad \text{Add 6 to both the sides.}$$
$$3x = 48$$
$$\frac{3x}{3} = \frac{48}{3}$$
$$x = 16$$

So, the base $=$ **16** cm

Second side $=$ Third side $= 16 - 3 =$ **13** cm

Verification

$$13 + 13 + 16 = \text{Perimeter}$$
$$42 = \text{Perimeter}$$

The answer is verified.