Quadratic Equations

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10^{th} Maths - Chapter 4

This is Problem-5from Exercise 4.2

1. The altitude of a right triangle is 7 cm less than its base.if the hypotenuse is 13 cm, find the other two sides.
   Solution:
   Given Data:
   hypotenuse = 13
   Let, base = x
   altitude = x-7

$$base^2 + altitude^2 = hypotenuse^2 \tag{1}$$
$$x^2 + (x-7)^2 = 13^2 \tag{2}$$
$$x^2 + x^2 + 49 - 14x = 169 \tag{3}$$
$$2x^2 - 14x - 120 = 0 \tag{4}$$
$$2(x^2 - 7x - 60) = 0 \tag{5}$$
$$(x^2 - 12x + 5x - 60) = 0 \tag{6}$$
$$x(x-12) + 5(x-12) = 0 \tag{7}$$
$$(X+5)(x-12) = 0 \tag{8}$$
$$x = -12 or 5 \tag{9}$$

   sides cannot be negative so x = 12
   so, base = 12cm,
   altitude = 12-7= 5cm