Solve $ax^2+bx+c=0$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

a) $1x^2-6x-91=0$ (a, b, c)

$$x=\frac{-(-6)\pm\sqrt{(-6)^2-4(1)(-91)}}{2(1)}$$

$$x=\frac{6\pm\sqrt{36-(-364)}}{2}$$

$$x=\frac{6\pm\sqrt{400}}{2}$$

$$x=\frac{6\pm 20}{2}$$

$x_1=\frac{6+20}{2}=\frac{26}{2}=13$

$x_2=\frac{6-20}{2}=\frac{-14}{2}=-7$

b) $9x^2+30x+25=0$

$$x=\frac{-30\pm\sqrt{30^2-4(9)(25)}}{2(9)}$$

$$x=\frac{-30\pm\sqrt{0}}{18} \Rightarrow x=\frac{-30\pm 0}{18}$$

$$=-\frac{30}{18}$$

$$=-\frac{5}{3}$$

c) $5x^2 + 9x + 12 = 0$

a b c

$$x = \frac{-9 \pm \sqrt{81 - 4(5)(12)}}{2(5)}$$

$$x = \frac{-9 \pm \sqrt{81 - 240}}{10}$$

$$x = \frac{-9 \pm \sqrt{-159}}{10}$$

→ not possible

No Real Solution

The Discriminant (Δ)

- the portion under the root sign: $\Delta = b^2 - 4ac$

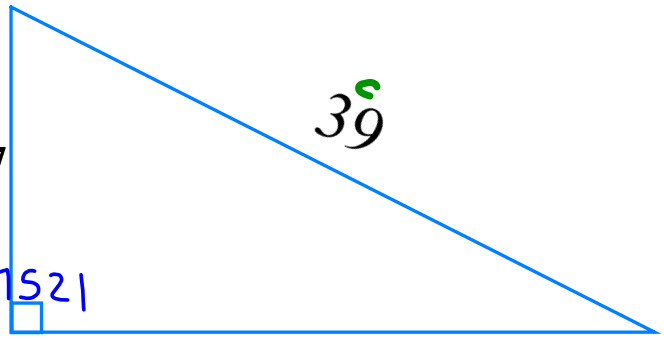
If ...

$b^2 - 4ac > 0$ (+) there are 2 real answers

$b^2 - 4ac = 0$ there is one real answer

$b^2 - 4ac < 0$ (−) there are no real answers

Determine the value of x



$(x+7)^2 + (5x-4)^2 = 39^2$

$x^2 + 14x + 49 + 25x^2 - 40x + 16 = 1521$

$26x^2 - 26x + 65 = 1521$

$-1521 \quad -1521$

$\frac{26x^2 - 26x - 1456}{26} = \frac{0}{26}$

$x^2 - x - 56 = 0$

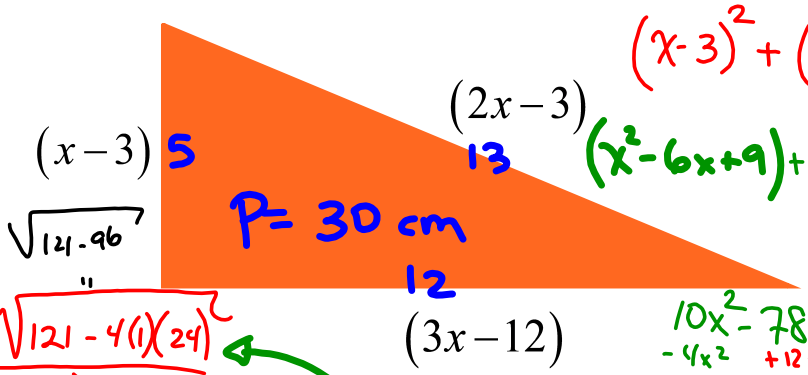
$(x+7)(x-8) = 0$

$x+7=0$ or $x-8=0$

$x=-7$ $\quad x=8$

Test Reject

Determine the numerical perimeter of the right triangle shown below. All measurements are in centimetres.



$(x-3)^2 + (3x-12)^2 = (2x-3)^2$

$(x^2-6x+9)+(9x^2-72x+144) = (4x^2-12x+9)$

$10x^2-78x+153 = 4x^2-12x+9$

$-4x^2 \quad +12x \quad -9 \quad -4x^2 \quad +12 \quad -9$

$\frac{6x^2-66x+144}{6} = \frac{0}{6}$

$x^2-11x+24=0$

$(x-3)(x-8)=0$

$x-3=0$ or $x-8=0$

$x = \frac{11 \pm \sqrt{121-4(1)(24)}}{2(1)}$

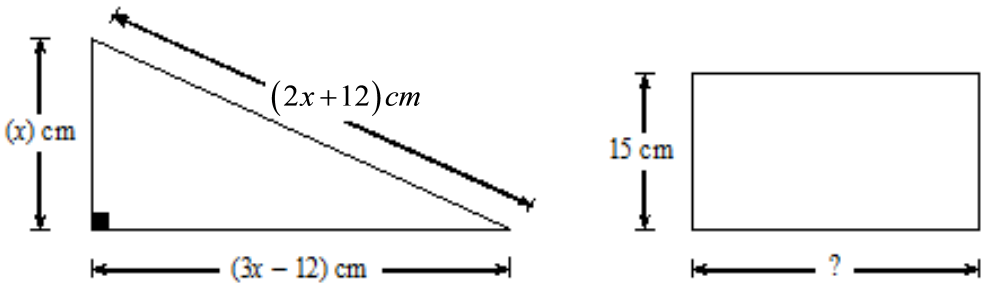
$= \frac{11 \pm \sqrt{25}}{2}$

$= \frac{11 \pm 5}{2}$

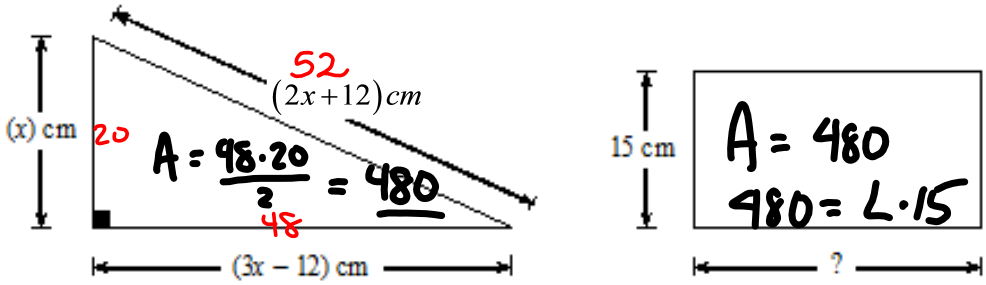
$x_1 = \frac{11+5}{2} = \frac{16}{2} = 8$

$x_2 = \frac{11-5}{2} = \frac{6}{2} = 3$ X

The right triangle and the rectangle given below are equivalent. The sides of the right angle of the triangle measure (x) cm and $(3x - 12)$ cm respectively and the hypotenuse measures $(2x + 12)$ cm. The height of the rectangle is 15 cm.



What is the numerical length of the base of the rectangle?



What is the numerical length of the base of the rectangle?

$x^2 + (3x-12)^2 = (2x+12)$

$x^2 + 9x^2 - 72x + 144 = 4x^2 + 48x + 144$

$10x^2 - 72x + 144 = 4x^2 + 48x + 144$

$6x^2 - 120x = 0$

$6x(x-20) = 0$

$6x = 0$ or $x - 20 = 0$

Reject $x = 0$ $\quad x = 20$

$L = \frac{480}{15}$

$L = 32\,cm$