

Algebra II

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2)	4	10)	5.31
4)	1.38, 3.62	12)	$\frac{1+\sqrt{5}}{2}$
6)	20 × 60 m or 30 × 40 m	14)	14.47 cm
8)	1.21 in		

2) A rectangle is 6 cm long and 5 cm wide. When each dimension is increased by x cm, the area is tripled. Find the value of x .

- 4) Two positive real numbers have a sum of 5 and a product of 5.
Find the numbers.

$$\begin{array}{l} \text{Let } x = 1^{\text{st}} \text{ number} \\ 5-x = 2^{\text{nd}} \end{array} \quad \boxed{\begin{array}{c} 3.62 \\ 1.38 \end{array}}$$

$$x(5-x) = 5$$

$$5x - x^2 = 5$$

$$0 = x^2 - 5x + 5$$

$$\frac{5 \pm \sqrt{25 - 4(1)(5)}}{2(1)}$$

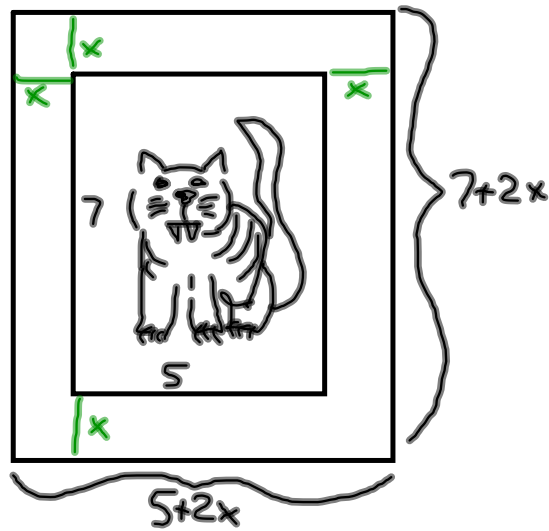
$$\frac{5 \pm \sqrt{5}}{2} = 3.62, 1.38$$

- 6) A rectangular animal pen with area 1200 m^2 has one side along a barn. The other three sides are enclosed by 100 m of fencing. Find the dimensions of the pen.

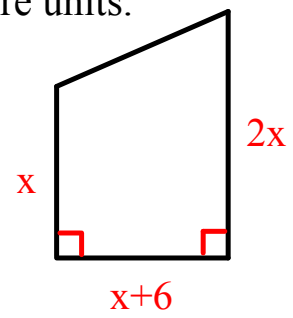
- 8) A 5 in. by 7 in. photograph is surrounded by a frame of uniform width. The area of the frame equals the area of the photograph. Find the width of the frame.

Frame = Whole - hole

$$35 = (7+2x)(5+2x) - 35$$



- 10) The area of the trapezoid shown below is 90 square units.
Find the value of x .



- 12) In a *golden rectangle*, the ratio of the length to the width equals the ratio of the length plus width to length. Find the value of this *golden ratio*.

$$\left(\frac{l}{w} = \frac{l+w}{l}\right) l \cdot w$$

$$l^2 = w(l+w)$$

$$l^2 = wl + w^2$$

$$a=1 \quad b=-w \quad c=-w^2$$

$$l^2 - wl - w^2 = 0$$

$$l = \frac{-(-w) \pm \sqrt{(-w)^2 - 4(1)(-w^2)}}{2(1)}$$

$$= \frac{w \pm \sqrt{w^2 + 4w^2}}{2} = \frac{w \pm \sqrt{5w^2}}{2} = \frac{w \pm w\sqrt{5}}{2} = w \left(\frac{1 \pm \sqrt{5}}{2}\right)$$

$$l = w \left(\frac{1 \pm \sqrt{5}}{2}\right)$$

Golden Ratio

- 14) A box with a square base and no lid is to be made from a square piece of metal by cutting squares from the corners and folding up the sides. The cut-off squares are 5 cm on a side. If the volume of the box is 100 cm^3 , find the dimensions of the original piece of metal.

$$V = lwh$$
$$V = x \cdot x \cdot 5$$
$$V = 5x^2$$
$$100 = 5x^2$$

