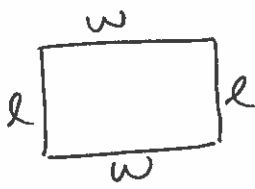


1)



$$2w + 2l = 110$$

$$2w = -2l + 110$$

$$w = -l + 55$$

$$A = l(w)$$

$$750 = l(-l + 55)$$

$$-l^2 + 55l - 750 = 0$$

$$l^2 - 55l + 750 = 0$$

$$(l - 30)(l - 25) = 0$$

$$l = 30 \quad l = 25$$

Dimensions are

25m x 30m.

2) $x, x+2$

$$x(x+2) = 48$$

$$x^2 + 2x - 48 = 0$$

$$(x+8)(x-6) = 0$$

$$x = -8 \quad x = 6$$

reject.

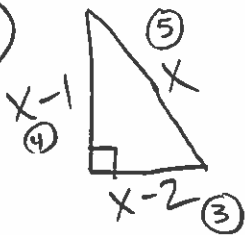
$$p - 48$$

$$\frac{52}{8, -6}$$

$$8, -6$$

Numbers are 6 and 8.

3)



$$(x-1)^2 + (x-2)^2 = x^2$$

$$(x^2 - 2x + 1) + (x^2 - 4x + 4) = x^2$$

$$2x^2 - x^2 - 6x + 5 = 0$$

$$x^2 - 6x + 5 = 0$$

$$(x-5)(x-1) = 0$$

$$x = 5 \quad x = 1$$

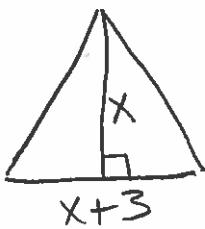
reject.

$$\frac{p \quad 5}{5 - 6}$$

$$-5, -1$$

Side lengths are 3, 4, 5cm.

4)



$$A = \frac{1}{2} b \cdot h$$

$$A = \frac{1}{2} (x+3)(x)$$

$$9 = \frac{1}{2} (x^2 + 3x)$$

$$18 = x^2 + 3x$$

$$x^2 + 3x - 18 = 0$$

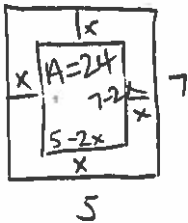
$$(x+6)(x-3) = 0$$

$$x = -6 \quad x = 3$$

reject

∴ Height is 3cm.

5)



$$(5-2x)(7-2x) = 24$$

$$35 - 14x + 4x^2 = 24$$

$$4x^2 - 14x + 11 = 0$$

$$4x^2 - 24x + 11 = 0$$

$$(2x-1)(2x-11) = 0$$

$$x = \frac{1}{2}$$

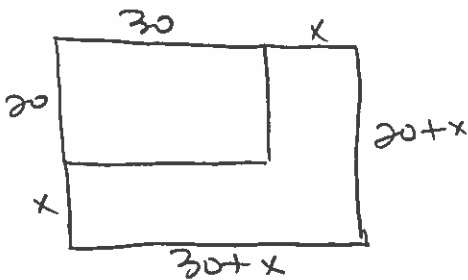
$$2x = 11$$

$$x = \frac{11}{2} = 5.5$$

reject (too large)

∴ Width of the frame is $\frac{1}{2}$ in.

6)



$$A = 2(600)$$

$$(30+x)(20+x) = 1200$$

$$600 + 30x + 20x + x^2 = 1200$$

$$x^2 + 50x + 600 - 1200 = 0$$

$$x^2 + 50x - 600 = 0$$

$$(x+60)(x-10) = 0$$

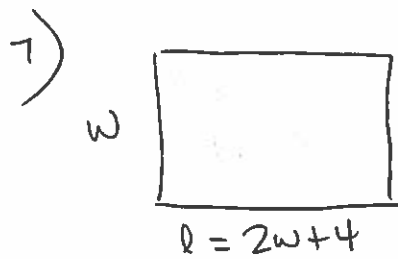
$$x = -60$$

$$x = 10$$

reject

∴ Width of the strip is 10m.

Dimensions of the new rink are 40 x 30 m.



$$A = l \cdot w$$

$$96 = (2w + 4)(w)$$

$$2w^2 + 4w - 96 = 0$$

$$w^2 + 2w - 48 = 0$$

$$(w - 6)(w + 8) = 0$$

$$w = 6 \quad w = -8$$

reject

$$l = 2w + 4$$

$$l = 2(6) + 4$$

$$l = 16$$

Dimensions are
6 x 16 m.

8)

$$x + y = 14$$

$$y = 14 - x$$

$$x \cdot y = 45$$

$$x(14 - x) = 45$$

$$14x - x^2 = 45$$

$$x^2 - 14x + 45 = 0$$

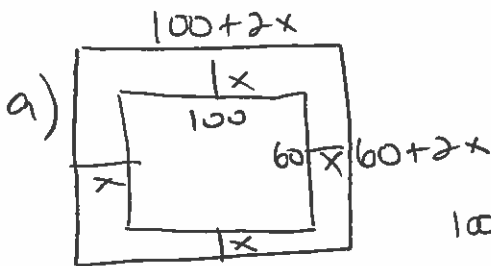
$$(x - 9)(x - 5) = 0$$

$$x = 9 \quad x = 5$$

$$y = 14 - 9 \quad y = 14 - 5$$

$$y = 5 \quad y = 9$$

Two numbers
are
5 and 9.



Safety zone = $A_{\text{outside}} - A_{\text{inside}}$.
(Area of plant)

$$100(60) = (100 + 2x)(60 + 2x) - 100(60)$$

$$6000 = 6000 + 200x + 120x + 4x^2 - 6000$$

$$4x^2 + 320x - 6000 = 0$$

$$x^2 + 80x - 1500 = 0$$

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

$$x = \frac{-80 \pm \sqrt{80^2 - 4(1)(-1500)}}{2(1)}$$

$$x = \frac{-80 \pm \sqrt{6400 + 6000}}{2}$$

$$x = \frac{-80 \pm \sqrt{12400}}{2}$$

$$x = \frac{-80 \pm 111.4}{2}$$

$$x = \frac{-80 + 111.4}{2}$$

$$x = 15.7$$

$$x = \frac{-80 - 111.4}{2}$$

$$x = -95.7$$

reject

Width of the safety zone is

15.7 m.