1. x: one number
   x + 11: the other number

   {-3,8} or {3,-8}

$$x(x + 11) = -24$$
$$x^2 + 11x + 24 = 0$$
$$(x + 3)(x + 8) = 0$$
$$x + 3 = 0, x + 8 = 0$$
$$x = -3 \text{ or } x = -8$$

2. x: length of the square (6 meters)

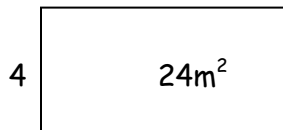$$(x + 2)(x - 2) = 32$$
$$x^2 - 4 = 32$$
$$x^2 = 36$$
$$x = \pm 6$$

-6 doesn't make sense for a side length of
a square, therefore the answer is 6

3. x: 1st neg consec int (-5)
   x + 1: 2nd neg consec int (-4)

$$x(x + 1) = 20$$
$$x^2 + x = 20$$
$$x^2 + x - 20 = 0$$
$$(x + 5)(x - 4) = 0$$
$$x + 5 = 0, x - 4 = 0$$
$$x = -5, x = 4 \quad 4 \text{ is not negative so } x = -5$$

4. A = lw
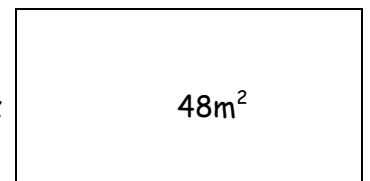   A = 4(6)   4 | 24m^2
   A = 24 m^2

6
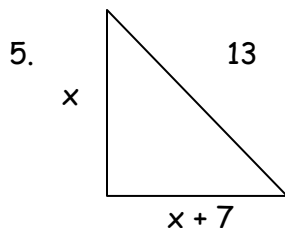
The area is doubled by increasing each side by the same amount   4 + x | 48m^2

A = 48 m^2

6 + x

x: number of units each side is increased by
Each side was increased by 2 meters

$$(x + 4)(x + 6) = 48$$
$$x^2 + 10x + 24 = 48$$
$$x^2 + 10x - 24 = 0$$
$$(x + 12)(x - 2) = 0$$
$$x + 12 = 0, x - 2 = 0$$
$$x = -12, x = 2$$

-12 doesn't make sense, therefore the answer is 2

5.

```
       13
  x
       x + 7
```

x: length of one leg (5 meters)

x + 7: length of the other leg (12 meters)

$a^2 + b^2 = c^2$

$x^2 + (x + 7)^2 = 13^2$

$x^2 + x^2 + 14x + 49 = 169$

$2x^2 + 14x - 120 = 0$

$2(x^2 + 7x - 60) = 0$

$(x - 5)(x + 12) = 0$

$x - 5 = 0, x + 12 = 0$

$x = 5, x = -12$

-12 doesn't make sense for the length of a side
of a triangle, therefore the answer is 5

6. x: width of the rectangle (5 ft)

3x: length of the rectangle (15 ft)

$(x - 1)(3x + 3) = 72$

$3x^2 - 3 = 72$

$3x^2 = 75$

$x^2 = 25$

$x = \pm 5$

-5 doesn't make sense to represent the width

Dimensions of both rectangles: 5 ft by 15 ft

4 ft by 18 ft

7. x: one number (9)

14 – x: the other number (5)

$x^2 - (14 - x)^2 = 56$

$x^2 - (196 - 28x + x^2) = 56$

$x^2 - 196 + 28x - x^2 = 56$

$28x - 196 = 56$

$28x = 252$

$x = 9$

8. 4x : one positive number   (12)

5x: second positive number   (15)

$4x(5x) = 180$

$20x^2 = 180$

$x^2 = 9$

$x = \pm 3$

-3 is not positive, therefore x = 3