1) The length of a rectangle is 4 times its width. If the area of the rectangle is 256 in^2, find the length and width of the rectangle.

Let x = width

Let 4x = length

$A = lw$

$256 = 4x(x)$

$\frac{256}{4} = \frac{4x^2}{4}$

$64 = x^2$

$\pm\sqrt{64} = \sqrt{x^2}$

$\pm 8 = x$ reject – 8 (cannot have a negative width)

width = 8 inches
length = 32 inches (4)(8)

Check: length = 4(width)
32 = 4(8)
32 = 32

$A = lw$
$256 = 8(32)$
$256 = 256$

2) One number is 10 less than another number. The product of the two numbers is -25. Find both numbers.

Let x = the larger number

Let x – 10 = the smaller number

$x(x - 10) = -25$

$x^2 - 10x = -25$

$x^2 - 10x + 25 = 0$

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

$x - 5 = 0$ $x - 5 = 0$

$x = 5$ $x = 5$

larger number = 5
smaller number = -5 (5 – 10)

Check: -5 is 10 less than 5

$5(-5) = -25$
$-25 = -25$

3) When the first of three *positive* consecutive integers is multiplied by the third, the result is one less than six times the second. Find the integers.

Let x = 1st positive consecutive integer

Let x + 1 = 2nd positive consecutive integer

Let x + 2 = 3rd consecutive positive integer

$x(x + 2) = 6(x + 1) - 1$

$x^2 + 2x = 6x + 6 - 1$

$x^2 - 4x = 5$

$x^2 - 4x - 5 = 0$

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

$x - 5 = 0$ $x + 1 = 0$

$x = 5$ $x = -1$ (reject -1, not positive)

The consecutive integers are 5, 6, 7

Check: (5)(7) = 6(6) – 1 ← (1st)(3rd) = (6)(2nd) – 1
35 = 35