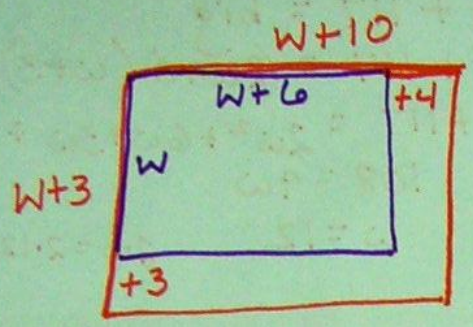
Area Problems; #3

Example:

A rectangle is 6 cm longer than it is wide. If the length is increased by 4 cm and the width is increased by 3 cm, the area is increased by 156 cm^2. Find its original dimensions.



orange

Small (Purple) + 156 = Big

$W(W+6)+156=(W+10)(W+3)$

$W^2+6W+156=W^2+3W+10W+30$

$6W+156=13W+30$

$-6W \quad -6W$

$156=7W+30$

$-30 \quad -30$

$126=7W$

$W=18$

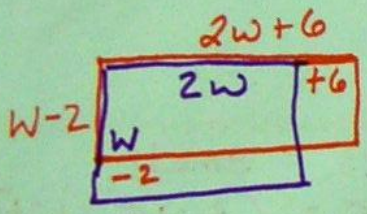
$W+6=18+6=24$

18 × 24

Problems for practice:

1) A rectangle is twice as long as it is wide. If its length is increased by 6 in. and its width is decreased by 2 in., its area is increased by 12 in^2. Find its original dimensions.

(old) Purple + 12 = New (orange)



2) A rectangle is 4 m longer than it is wide. If the length is increased by 2 m and the width is increased by 1 m, the area is increased by 36 m^2. Find the dimensions of the original rectangle.

wing, Growing, Growing Investigation 3.2 and More Scientific Notation

Investing for the Future

yearly growth factor for our rabbit population from Investigation 3.1 was 1.8. Suppose the ulation data fit the equation $P = 100(1.8)^n$ exactly. Then its table would look like the one below.

Growth of Rabbit Population

Time (yr)	Population
0	100
1	180
2	325
3	583
4	1,050

The growth factor of 1.8 is the number by which the population for year n is multiplied to get the population for the next year, $n + 1$.
You can think of the growth factor in terms of a percent change. To find the percent change, compare the difference in population for two consecutive years, n and $n + 1$, with the population of year n.

Big-Small / original * 100

- From year 0 to year 1, the percent change is $\frac{180-100}{100} = \frac{80}{100} = 80\%$.

  The population of 100 rabbits in year 0 *increased* by 80%, resulting in 100 rabbits (80%) = 80 additional rabbits.
- From year 1 to year to the percent change is $\frac{325-180}{180} = \frac{145}{180} = 80\%$.

  The population of 180 rabbits in year 1 *increased* by 80% resulting in 180 rabbits(80%) = 144 additional rabbits.

Growth Factor 1.8

e percent increase is called the ***growth rate***. In some growth situations, the growth rate is given instead of growth factor. For example, changes in the value of investments are often expressed as percents.

OBLEM 3.2

hen Sam was in 7th grade, his aunt gave him a stamp collection worth $2500. Sam considered selling the lection, but his aunt told him that, if he saved it, it would increase in value.

Sam saved the collection, and its value increased by 6% each year for several years in a row.

Make a table showing the value of the collection each year for the five years after Sam's aunt gave it to him. (round to nearest dollar.)

Sam's Stamp Collection at 6%

Year	Value
0	$2,500
1	2650
2	2809
3	2978
4	3157
5	3346

·1.06 ·1.06

100% + 6% = 106% = 1.06

Look at the pattern of growth from one year to the next. Is the value growing exponentially? 1.06

2650 ÷ 2500

Write an equation for the value v of the collection after n years. $V = 1.06^n \cdot 2500$