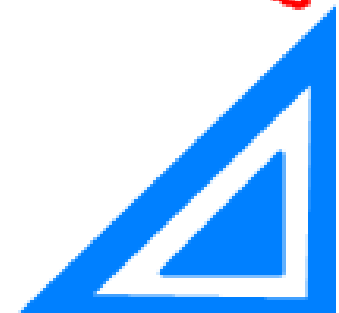# more 6 - 6
Fractals and Self-Similarity

recursive formulas: follow the same steps over and over
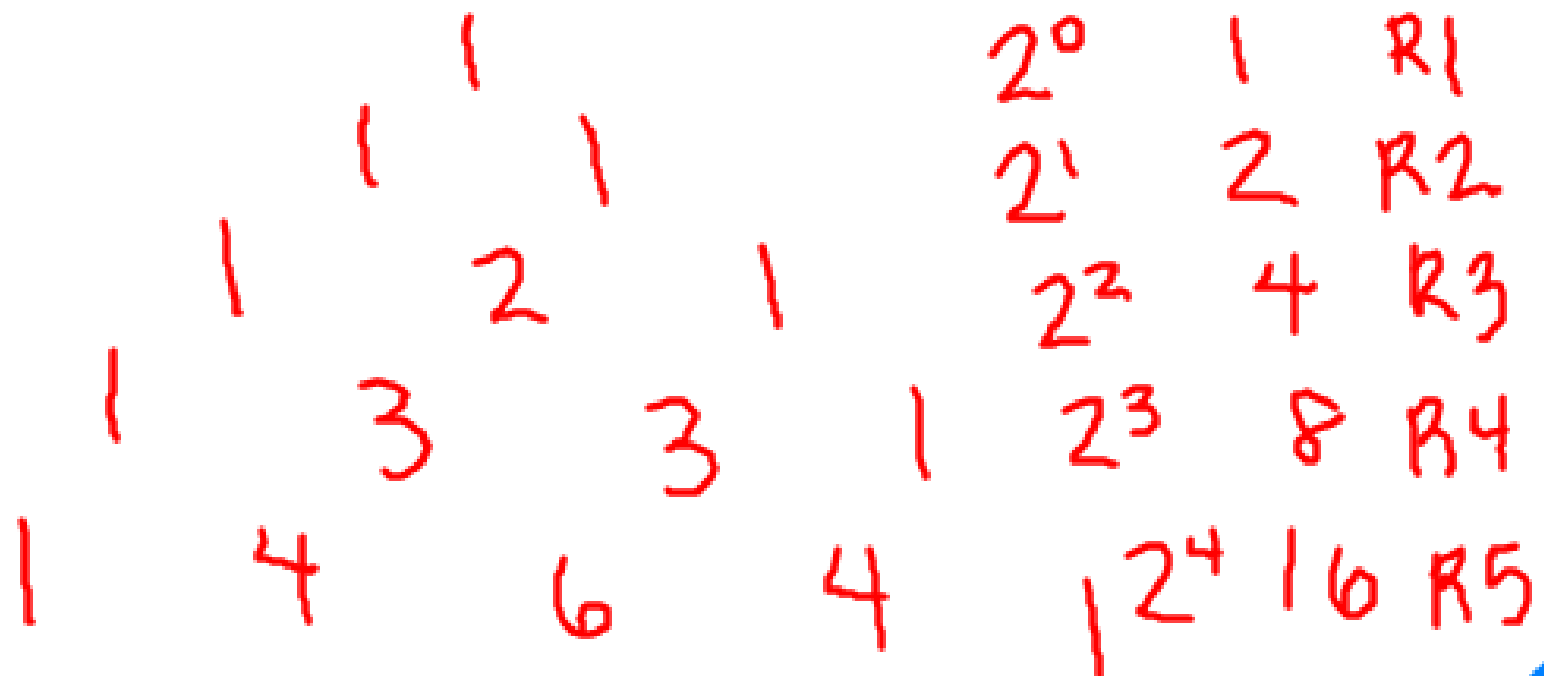
Ex: Find the value of x^2, where x initially equals 2. Then use that value as the next x in the expression. Repeat the process four times.

x	2	4	16	256	65,536
x^2	4	16	256	65,536	4,294,967,296

Pascal's Triangle

A numerical pattern where each row begins and ends with a 1, and all the other terms in the row are the sum of the two numbers above it

$$1$$
$$1 \quad 1$$
$$1 \quad 2 \quad 1$$
$$1 \quad 3 \quad 3 \quad 1$$
$$1 \quad 4 \quad 6 \quad 4 \quad 1$$

$2^0 \quad 1 \quad$ R1
$2^1 \quad 2 \quad$ R2
$2^2 \quad 4 \quad$ R3
$2^3 \quad 8 \quad$ R4
$2^4 \quad 16 \quad$ R5

Row 1   sum =

Row 2   sum =

Row 3   sum =

Row 4   sum =
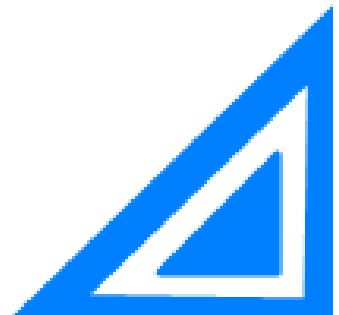
Row 5   sum =

Ex: Find a formula in terms of the row number for the sum of the values in any row in Pascal's Triangle.

$$2^{r-1}$$

$r:$ row #

Ex: What is the sum of the values in the 10th row of Pascal's Triangle.

Ex: Melissa has $2,500 in an account that earns 3.2% interest. If the interest is compounded annually, find the balance of her account after 3 years.
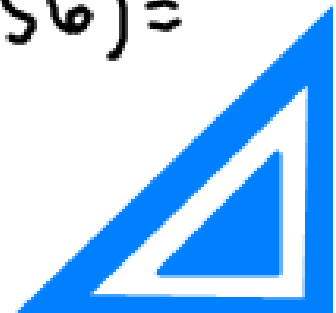
Start : 2,500

after Yr1 : $2500 + (.032 \times 2500) = 2,580$

after Yr2 : $2,580 + (.032 \times 2580) = 2662.56$

after Yr3 : $2,662.56 + (.032 \times 2,662.56) =$

$$\boxed{\$2,747.76}$$

Homework:

p.328 #11, 14, 31, 33, 35, 37, 38

$$\frac{x}{1/x}$$

$$\frac{x}{y^2}$$