Notes 14.3 Continued

Hannah Alexia are 200inches away from each other. If Hannah walks ½ the remaining distance each time towards Alexia, her steps will be of length 100, 50, 25, 12.5, 6.25, …

Will Hannah ever reach Alexia?
The total distance Hannah traveled is given by the geometric series 100 + 50 + 25 + 12.5 + 6.25

$S_n = t_1 \cdot \frac{1-r^n}{1-r}$ r = ____

as n gets really large, S_n approaches a **limit** $\lim_{n\to\infty} S_n =$

> If | r | < 1, the geometric series will ***converge***.
> If | r | ≥ 1, the geometric series will ***diverge.***

<u>If the series converges, find the limit to which it converges.</u>

1. 25 + 20 + 16 + …

2. 200 – 140 + 98 + …

Remember Pascal's Triangle: If you expand the binomial series

1	row 0
1 1	row 1
1 2 1	row 2
1 3 3 1	row 3
1 4 6 4 1	row 4
1 5 10 10 5 1	row 5

$(a+b)^5$

$5C0 \cdot a^5 b^0 + 5C1 \cdot a^4 b^1 + 5C2 \cdot a^3 b^2 + 5C3 \cdot a^2 b^3 +$
$5C4 \cdot a^1 b^4 + 5C5 \cdot a^0 b^5$

Binomial Formula

$$(a+b)^n = \sum_{r=0}^{n} nCr \cdot a^{n-r} \cdot b^r$$

Expand.

3. $(3x+2)^4$

4. Find the 4th term of the binomial series $(a+b)^5$
   Means it would contain b^3 (b is one less power than the term it is asking for)
   Means it would contain a^2b^3 since exponents add to n = 5
   So 5C3 a^2b^3 or 10a^2b^3

5. Find the 8th term of the binomial series $(3-2x)^{12}$