Know $S_5 = \frac{u_1(1-r^5)}{1-r} = 3798$ $\quad S_7 =$

$S_\infty = \frac{u_1}{1-r} = 4374$ $\quad u_1 =$ $\quad r =$

$(1-r^5)\ \frac{u_1}{1-r} = 4374(1-r^5)$

$\frac{4374(1-r^5)}{4374} = \frac{3798}{4374}$

$-r^5 = \frac{3798}{4374} - 1$

$r^5 = -\frac{3798}{4374} + 1$

$r = \frac{2}{3}$

$\frac{u_1}{1-\frac{2}{3}} = 4374$

$\frac{u_1}{\frac{1}{3}} = 4374$

$u_1 = 1458$

Cornell Notes	Topic/Objective: 6.8 Applications of Geometric + Arithmetic patterns	Name:
AVID Decades of College Dreams		Class/Period: 4
		Date: 5/1/17

Essential Question: What are some of the applications of sequences & series?

Questions:

Notes:

① Compound Interest.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

P = Principal
r = interest rate
n = # times compounded anually
t = # of years

Ex) In a geometric sequence $V_1 = 6$, $r = 1.5$
In an arith. seq, $u_1 = 75$ and $d = 100$
after how many terms will the
Sum of the geo seq > Sum arith?

6L p. 182 1-4

$$S_{Geo} \frac{6(1.5^n - 1)}{1.5 - 1} > \frac{n}{2}\left(2(75) + (n-1)100\right) = S_{arith}$$

6.9 Pascal's Triangle

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
⋮

to be continued...

1. $u_6 = 3u_4$

$u_8 = 50$

$u_1 =$

$u_n = u_1 + (n-1)d$

$u_4 = u_1 + 3d$

$u_6 = 3u_4 = 3(u_1 + 3d)$

$u_6 = u_1 + 5d$

$u_8 = u_6 + 2d$

$u_8 = u_1 + 7d$

$50 = -2d + 7d$

$d = 10$

$u_1 = -2d$

$u_1 = -20$

2. $u_1 = 12$, $u_5 = 15$

$u_5 = u_1 + 4d$

$15 = 12 + 4d$

$d = \frac{3}{4}$

a. $u_{20} = u_1 + 19d$

b. $u_n \geq 100$

$12 + (n-1)\left(\frac{3}{4}\right) \geq 100$

$n > 118$

119

3. $A = p\left(1 + \frac{r}{n}\right)^{nt}$

$p = 250$

$r = .06$

$t = 8$

a. $n = 1$

b. $n = 4$

c. $n = 12$

Questions:	Notes:
	Combinations
	- primarily in probability
	A combination of n items taken r at a time is written
	${}_nC_r$, $\binom{n}{r}$, or $C\,{}^n_r$
	* Recall:
	$P(\text{Event}) = \frac{\#\text{ of ways an event can happen}}{\text{Total \# of poss. outcomes}}$
	Ex 5 balls, 1Y, 1R, 1B, 1G, 1P How many ways can 2 balls be chosen?
	YR YB YG YP RB RG RP 10 BG BP GP
$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$	
$5! = 5 \cdot 4!$	Combinations 1. by hand $\binom{n}{r} = {}_nC_r$
	$= \frac{n!}{r!(n-r)!}$
HW 6M p. 185 # 1-6	ex $n=5, r=2$ $\binom{5}{2} = \frac{5!}{2!(5-2)!}$
	$= \frac{5 \cdot 4 \cdot 3!}{2 \cdot 1 \cdot 3!} = 10$
	2. By Calculator