Key

2nd Semester Review – Pre-Calculus **Chapter 10**

1. Write out the first five terms of the sequence $a_n = \dfrac{2n}{(n+2)!}$ $\frac{1}{3}, \frac{1}{6}, \frac{1}{20}, \frac{1}{90}, \frac{1}{504}$

2. Find the sum $\sum_{i=1}^{6}(2i-1)$ $S_n = (a_1 + a_n)\frac{n}{2}$ $= (1+11)\frac{6}{2} = 36$

3. Write the first 5 terms of the sequence: $a_1 = 20, a_{k+1} = 3 + a_k$, ~~$a_n = 12$~~

20, 23, 26, 29, 32

4. Find a_n of an arithmetic sequence where $a_5 = 30$ and $a_{10} = 45$.

$30 + 5d = 45$

$5d = 15$

$d = 3$

$a_n = 3n + 15$

5. Find a_{500} for the arithmetic sequence where $a_1 = 12$ and d = 5.

$a_n = 12 + 5(n-1)$

$a_{500} = 12 + 5(500-1) = 2507$

6. Find the sum of the first 200 positive integers.

$S_n = (1+200)\frac{200}{2} = 20{,}100$

7. Find a_{100} of the geometric sequence with $a_1 = 7$ and r = 2.

$a_n = 7 \cdot 2^{n-1}$

$a_{100} = 7 \cdot 2^{99} = 4.4 \times 10^{30}$

Evaluate each sum:

8. $\sum_{n=0}^{9} 6\left(\frac{2}{3}\right)^n$

$6\left(\frac{1-\frac{2}{3}^{10}}{1-\frac{2}{3}}\right)$

17.69

9. $\sum_{n=0}^{\infty}(0.03)^n$

$\frac{1}{1-.03}$

1.03

10. Expand $(x+3)^5$.

$1x^5 + 5x^4 \cdot 3 + 10x^3 \cdot 3^2 + 10x^2 \cdot 3^3 + 5x \cdot 3^4 + 1 \cdot 3^5$

$x^5 + 15x^4 + 90x^3 + 270x^2 + 405x + 243$

11. Find the term involving x^7 in $(x-2)^{12}$.

$\binom{12}{7} x^7 (-2)^5$

$-25{,}344\,x^7$