

## BC Calculus Summer Math 2017

This is IN ADDITION TO the AB Calculus summer math

You should NOT use a calculator except for graphing problem 4.

- Convert the following points from polar into rectangular coordinates:
  - $(2,0)$
  - $(0,-4)$
  - $(3, \frac{\pi}{3})$
- Convert the point  $(2, -1)$  from rectangular form into polar coordinates in two different ways.
- What is the graph of  $r = \sin \theta$ ? Describe it using words, being as specific as you can.
- Find all of the points of intersection of  $r = 2$  and  $r = 4 \cos 3\theta$  in both polar and rectangular coordinates.  
*(Use a calculator if you wish to see what the graph looks like, but then find the intersection points without it i.e. use an algebraic technique)*
- \*\* What are the magnitude and direction of the vector  $(-2,5)$ ?
- For each of the following infinite geometric series, find the sum or state that it has no sum:
  - $2 - 2 + 2 - 2 + 2 - \dots$
  - $3 + 1 + \frac{1}{3} + \frac{1}{9} + \dots$
  - $3 - 1 + \frac{1}{3} - \frac{1}{9} + \dots$
  - $1 - 3 + 9 - 27 + \dots$
- Find each of the following sums:
  - $\sum_{n=1}^5 n^3$
  - $\sum_{i=1}^4 \frac{1}{i}$
  - $\sum_{n=1}^{20} 3n$
- Write each of the following sums in summation notation:
  - $3 - 5 + 7 - 9 + 11 - 13 + 15$
  - $2 - 2^2 + 2^3 - 2^4 + \dots + 2^{2n+1}$

\*\* assuming you considered vectors in Physics. If not, try to work it out!