BC Calculus **Name _____ _____ / 30**

Summer Review packet

The following questions are due **the second day of school**.
All problems will be graded for work and accuracy. This will be your first homework grade for the semester.

ALL QUESTIONS ON THIS FIRST PAGE ARE TO BE DONE WITH A CALCULATOR.
Show any equations or graphs used to justify your answer.

1.) A cone has slant height of 9 cm and radius x cm. Find the maximum volume of the cone.

2.) A silo is to be made out of two pieces of material, one for the sides of the silo, and another for the hemispherical dome that will go on top of the cylinder. The silo must be able to contain 2500 m^3 of material. If the cost for the cylinder part is \$150/m^2 and the cost for the hemisphere is \$225/m^2, what dimensions for the silo will minimize the cost of construction?

3.) Find the acute angle between the lines $5x - 2y = 1$ and $y + 4 = \frac{-1}{3}(x - 2)$

Pages 2 – 6 are NO CALCULATOR.
Sufficient work must be shown to justify your answer. All answers must be simplified.

4.) Solve the equation: $5\log_x 2 - \frac{1}{2}\log_x 8 = 2 - \frac{1}{2}\log_x 2$

5.) Solve: $|3x - 2| < 5$

6.) Solve: $2x^3 - 7x^2 - 7x + 12 \leq 0$

7.) Show that $y = 3\sin x + 2\cos x$ is a sinusoid in the form $y = A\sin(x + \delta)$ by finding A and δ. Assume $A > 0$, and $0 < \delta < \frac{\pi}{2}$

8.) Find the exact value of $\cos\left(\frac{7\pi}{12}\right)$

9.) For each equation below write the equations of any asymptotes. Indicate if they are vertical, horizontal, or oblique.

a.) $y = \frac{6x^2 + 7x - 5}{2x^2 + 13x - 7}$

b.) $y = \frac{x^2 - 5x + 6}{x^3 - 8}$

c.) $y = \frac{10x^2 - 3x + 5}{2x + 1}$

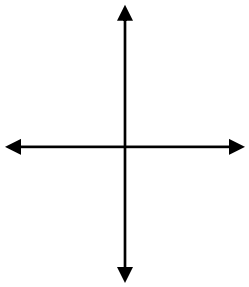
10.) Solve: $\sin(2x) - \cos(4x) = 0,\ 0 \le x < 2\pi$

11.) Solve: $\tan^3(3x) + \tan^2(3x) - 3\tan(3x) = 3$

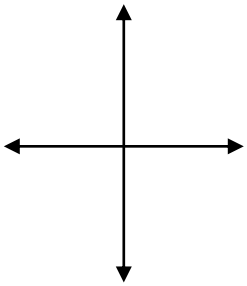
12a.) Sketch the closed region bounded by y = 5, y = 2x - 1 and the y-axis. Find the surface area of the solid formed if the region is rotated about the y-axis.

b.) Find the measure of the angle formed by the line y = 2x - 1 and the y-axis.

c.) Find the exact volume of the solid formed if the region in part a is rotated around the line x = 3.



13.) Graph $r = 5\cos\theta$ and then rewrite the equation in terms of x and y. Write your equation in standard form.



14.) Solve: $e^{-4x} - 5e^{-2x} + 6 = 0$

15.) Find the coordinates of any "holes"

a.) $f(x) = \dfrac{x-5}{\sqrt{x+4}-3}$

b.) $f(x) = \dfrac{x}{\dfrac{1}{3+x} - \dfrac{1}{3}}$

16.) Find the coordinates of the points of intersection of the two graph: r = 2 and r = $3+2\cos\theta$ for $0 \le \theta < 2\pi$.

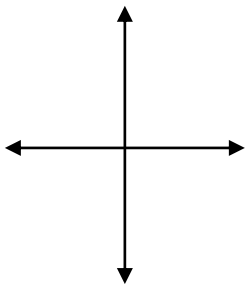
17a.) Given $\sum_{n=0}^{\infty} \frac{(-1)^n (2x-3)^n}{4^n}$. Write out the partial sum of the first three terms of the series..

b.) Find the values of x which make the series converge. (Hint: Rewrite it as a geometric series $\sum_{n=0}^{\infty} ar^n$)

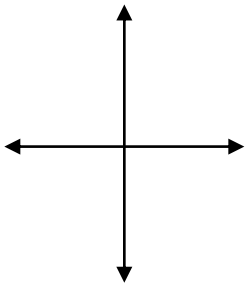
c.) If x = 2, write the formula and find the sum of the series.

18.) Graph the following on the xy plane, use tick marks to indicate magnitude:

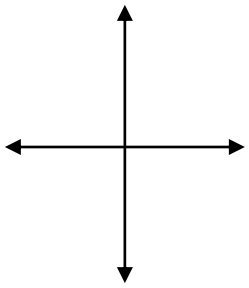
a.) $r\cos\theta = 2$



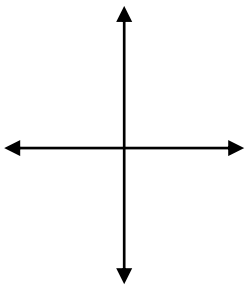
b.) $r = 2 - 4\sin\theta$



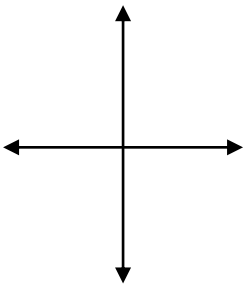
c.) $r = 2\cos 3\left(\theta - \frac{\pi}{4}\right)$



d.) $\begin{cases} x = t - 1 \\ y = t^2 + 2 \end{cases} \quad t \varepsilon \Re$



e.) $\begin{cases} x = 3\cos t \\ y = 4\sin t \end{cases} \quad 0 \le t < 2\pi$



f.) $\begin{cases} x = \tan t \\ y = 3\sec t \end{cases} \quad , 0 \le t < 2\pi$