LIMITS & CONTINUITY – Extra Worksheet NAME_____

SHOW ALL WORK AND USE PROPER NOTATION FOR FULL CREDIT. YOUR WORK SHOULD BE NEAT AND ORGANIZED.

1. A. Let $P(x)$ be a polynomial. Explain why $\lim_{x\to a} P(x) = P(a)$.

B. Use a graph to find $\lim_{\theta\to\infty} 5\cos(3\theta)$. Include an accurately drawn graph to support your answer.

C. Use a table to find the exact value of $\lim_{t\to\infty}\left(1+\frac{1}{t}\right)^t$.

D. Use algebra to find the exact value of $\lim_{r\to 3}\frac{2r^2-5r-3}{3-r}$.

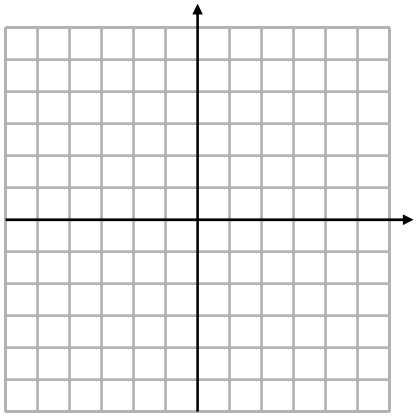
2. A. Suppose the temperature at 6:00 am is $67°$ and at noon it is $95°$. Is there a time in between when the temperature is exactly $81°$?

B. You plan to mail two letters. Your 0.9 ounce letter costs 42¢ and your 1.6 ounce letter costs 59¢. Is there a letter that would cost exactly 50¢?

C. What characteristic of a function determines your answer in parts A and B? Explain.

3. Find each of these limits. Use tables to support your answer. Use the limits to sketch a graph. Be sure to include any asymptotes, holes, or other important characteristics.

$g(x) = x^2 e^{1/x}$



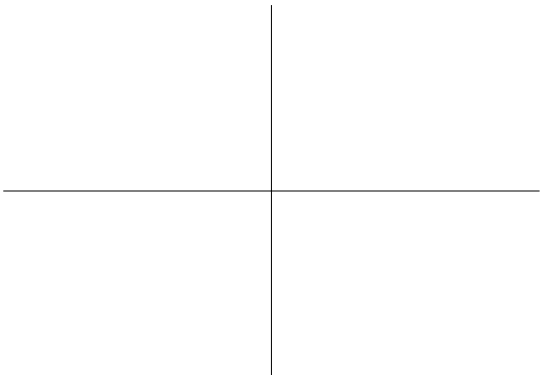
A. $\lim_{x \to 0^-} f(x) =$

B. $\lim_{x \to 0^+} f(x) =$

C. $\lim_{x \to -\infty} f(x) =$

D. $\lim_{x \to \infty} f(x) =$

4. Sketch a possible graph of $f(x)$ with the following properties. Label your graph clearly.



* the domain is [-10, 10]
* $f(-2) = -1$
* $\lim_{x \to 4} f(x) = \infty$
* $f(x)$ is an odd function

5. Let $f(x) = \dfrac{x^k}{Bx^3 + 1}$.

A. What value(s) of *B* will produce a vertical asymptote of $x = \dfrac{1}{4}$?

B. Using your answer in part A. What value(s) of *k* will produce a horizontal asymptote? Include the equation(s) of the horizontal asymptote.