

Beverly Hills High School -- AP Calculus BC -- F'16 Exam #1 -- Sections 2.1-2.4 -- 95 pts

Show all your work. Partial credit for partial performance. No copying of any kind. Show everything you want considered in a neat and complete manner. If I cannot read it, you don't score.

- 1) A particle moves in one dimension. The distance in cm it covers in the x direction is governed by the equation (ten points)

$$x(t) = -\frac{2}{3}t^3 + 3t^2 - t + 2$$

- Calculate its displacement over the first three seconds of its motion.
- To the nearest second, when is the particle once again motionless (after $t=0$)?
- To the nearest second, when has the particle returned to position zero, that is, when is $x(t) = 0$

Determine the following limits (five points each):

2) $\lim_{x \rightarrow 4} \frac{8-x}{x^2}$

3) $\lim_{x \rightarrow 16} (\log_8 x)$

4) $\lim_{x \rightarrow \pi/6} \left(\frac{\pi}{x} \cos 2x\right)$

5) $\lim_{t \rightarrow 0} \frac{4 \sin 5t}{5 \sin 3t}$

6) $\lim_{x \rightarrow 0} \frac{e^x \sin x + \sin x}{x}$

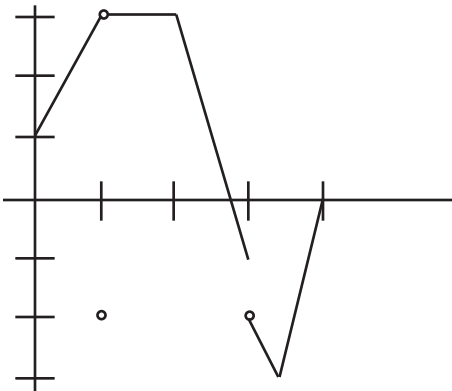
7) $\lim_{x \rightarrow \infty} \frac{4x^3 + 2x - 8}{24 - 12x^2 - 3x^3}$

For ten points each, using the equation we derived in class for finding the slope of a tangent to a curve, find the slope of the tangent to the graph of the following functions (MUST SHOW WORK!):

8) $f(x) = -3x^2 + 2x - 4$

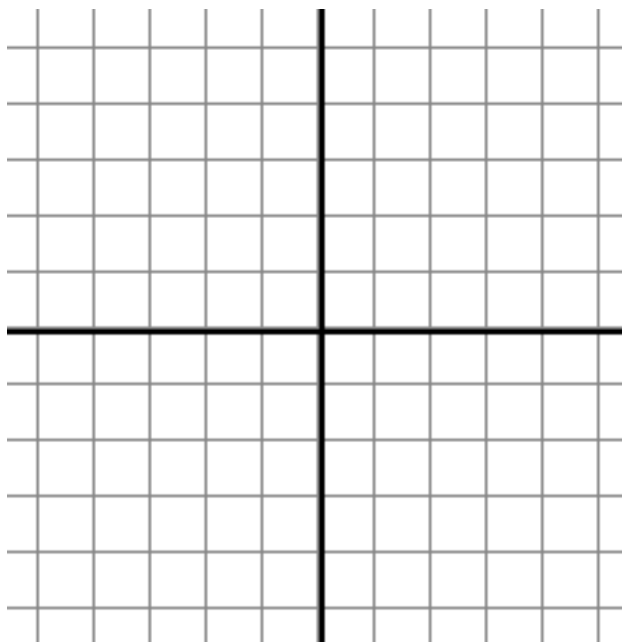
9) $f(t) = \frac{-3}{t}$

10) Using the fictitious (and silly) function below, discuss the continuity of each interval and discuss the limits and values of the function at each integral value of x . Ten points.



11) For the following function, determine what asymptotes exist (and their location); then graph it (ten pts):

$$f(x) = \frac{x^2 + x - 2}{x^2 - 1}$$



12) For the following function, state appropriate right- AND left-end behavior models. Five points.

$$f(x) = 5x^3 - 2\ln x^4 + \frac{\sin x}{2} + e^{-2x}$$

13) For $x \neq 4$, the function $g(x)$ is equal to $\frac{3x^2 - 19x + 28}{3x - 12}$. What value should be assigned to $g(4)$ to make $g(x)$ continuous at $x = 4$? Five points.

14) The curve $y = ax^2 + bx + c$ (with constants a , b , and c) passes thru the point $(1, 3)$ and the tangent line at the point $(0, 4)$ is given by $y = -2x + 4$. Find a , b , and c .