ASU ID:

Name:

CPI 200 November 30, 2009

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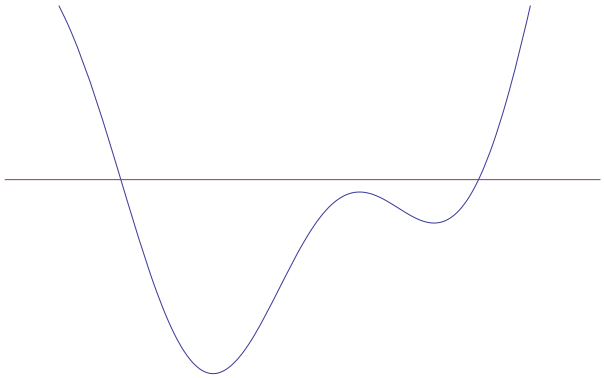
Mock Final

1. Let a function $f(x)$ be given by the following plot. Sketch in its derivative $f'(x)$.



2. What is the slope of $f(x) = 2x^2$ at $x = 1$?

3. What is the area under the curve $f(x) = x^3$ over the interval $[-2, 2]$?

4. What is the definition, in terms of limits, of the derivative of a function $f(x)$ at some $x = a$?

5. Compute the product $C = AB$, where

$$A = \begin{bmatrix} 3 & 0 & 1 \\ 0 & -1 & 0 \\ 0 & 0 & 4 \end{bmatrix} \quad \text{and} \quad \mathrm{A} = \begin{bmatrix} 1 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & -4 \end{bmatrix}$$

6. What is the inverse A^{-1} of the matrix

$$A = \begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

7. Is the vector $\begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix}$ a solution of the linear system

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$$

8. The matrix

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

has an eigenvector $\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$. What is the corresponding eigenvalue?

9. Find numbers a, b, c for which the determinant of

$$A = \begin{bmatrix} 1 & 0 & a \\ 0 & 1 & b \\ 0 & 0 & c \end{bmatrix}$$

is zero.

10. What is an example of a matrix which has no eigenvectors?