

MATH 1080, SPRING 2006, HW SET 2

You need to show all your work and explain with following the guideline described in the class webpage to get the full credit.

HW 2 Due on Thursday 01/26/06

0. Memorize all definitions and go over examples given in class.

1. Do Question 2, Question 3 on p.13 and Exercises #1-#5 on p.20 after reading p.11-p.21 of Sawyer's book carefully.

2. Suppose an object moves following the rule $s(t) = -t^2 + 2t + 1$ which is the position of the object at the time t seconds.

(1) Find the average rate of change (average velocity) between $t = 1$ and $t = 2$, between $t = 2$ and $t = 3$.

(2) Describe the motion of objects between $t = 1$ and $t = 3$ by using the information given in (1). Does it travel backwards or forwards or rapidly or slowly etc...?

3. Which of the following functions are continuous at every real number x ? Justify your answer by verifying all conditions of the definition of continuity.

$$(1) f(x) = \begin{cases} \frac{x^2 - 2x + 1}{x - 1} & \text{if } x \neq 1 \\ 0 & \text{if } x = 1 \end{cases}$$

$$(2) f(x) = \begin{cases} \frac{x}{|x|} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

$$(3) f(x) = \begin{cases} \frac{x^2 - 3x}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

4. Find $f'(t)$, $f'(1)$ and $f'(0)$ of the following functions by using the original limit definition of the derivative. (Don't use the derivative formula directly.)

$$(1) f(t) = 3t + 1$$

$$(2) f(t) = 4$$

$$(3) f(t) = 2t^2 - 1$$

$$(4) f(t) = -t^3 + 2t - 1$$

$$(5) f(t) = \frac{1}{t}$$