Calculus Web Assignments

Web Assignments are intended to be completed with a partner. Both partners should individually work each of the problems, followed by a collaborative discussion about the problem.

Both partners are required to participate in the "Honor-System" Grading of the Web Assignment.

Calculus: Web Assignment #18

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. Read the following four statements and choose the correct answer below. If f is continuous on the interval $[a, b]$, then:

(i) $\int_a^b f(x)\,dx$ is the area bounded by the graph of f, the x-axis and the lines $x = a$ and $x = b$

(ii) $\int_a^b f(x)\,dx$ is a number

(iii) $\int_a^b f(x)\,dx$ is an antiderivative of $f(x)$

(iv) $\int_a^b f(x)\,dx$ may not exist

a. (i) and (ii) only
b. (ii) only
c. (i) and (iii) only
d. (iv) only

____ 2. Water is pouring out of a pipe at the rate of $f(t)$ gallons/minute. You collect the water that flows from the pipe between $t = 2$ and $t = 4$. The amount of water you collect can be represented by:

a. the average of $f(4)$ and $f(2)$ times the amount of time that elapsed
b. $(4 - 2)f(4)$
c. $f(4) - f(2)$
d. $\int_2^4 f(x)\,dx$

____ 3. A sprinter practices by running various distances back and forth in a straight line in a gym. Her velocity at t seconds is given by the function $v(t)$.

What does $\int_0^{60} |v(t)|dt$ represent?

a. The sprinter's average velocity in one minute
b. The total distance the sprinter ran in one minute
c. The sprinter's distance from the starting point after one minute
d. None of the above

____ 4. **True** or **False**. If $\int f(x)\,dx = \int g(x)\,dx$, then $f(x) = g(x)$.

a. True
b. False

____ 5. If f is continuous and $f(x) < 0$ for all $x \in [a, b]$, then $\int_a^b f(x)dx$

a. must be negative
b. might be 0
c. not enough information

____ 6. You are traveling with velocity $v(t)$ that varies continuously over the interval $[a, b]$ and your position at time t is given by $s(t)$.
Which of the following represent your average velocity for that time interval:

(I) $\dfrac{\int_a^b v(t)dt}{b-a}$

(II) $\dfrac{s(b)-s(a)}{b-a}$

(III) $v(c)$ for at least one c between a and b

a. I, II, and III
b. I only
c. I and II only

____ 7. **True** or **False**.

For $f(x) = |x|$ on the interval $\left[-\frac{1}{2}, 2\right]$, you can find a point c in $\left(-\frac{1}{2}, 2\right)$ such that:

$$f'(c) = \frac{f(2) - f\left(-\frac{1}{2}\right)}{2 - \left(-\frac{1}{2}\right)}$$

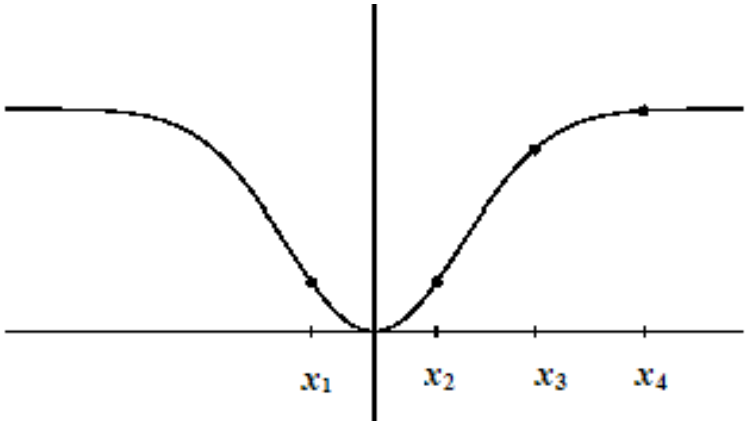
a. True
b. False

____ 8. The limit $\lim_{x \to \infty} \left[xe^{1/x} - x \right]$

a. Is 1 because $xe^{1/x}$ grows faster than x .
b. Converges to 0 .
c. Does not exist because $\infty - \infty$ is not defined.
d. Converges to 1 .

____ 9. We will use each of the x_n below as the starting point for Newton's method.

For which of them do you expect Newton's method to work and lead to the root of the function?



a. x_1 and x_2 only.
b. x_1 , x_2 and x_3 only.
c. x_2 only.
d. All four

____ 10. Newton's method is a cool technique, because:

a. It can help us get decimal representations of numbers like $\sqrt[4]{3}$, $\sqrt[8]{5}$ and $\sqrt[5]{13}$

b. It can be used to find a solution to $x^7 = 3x^3 + 1$