

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 #25

Multiple Choice

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

_____ 1. $\lim_{x \rightarrow 0} \frac{x-9}{3-\sqrt{x}} =$

- a. -12
- b. -3
- c. 0
- d. 3
- e. ∞

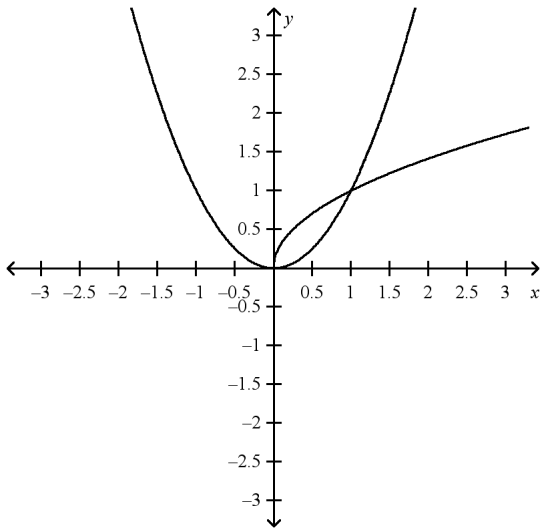
_____ 2. What is the instantaneous rate of change for $f(x) = \frac{x^3 + 3x^2 + 3x + 1}{x + 1}$ at $x = 2$

- a. -27
- b. -6
- c. 6
- d. 9
- e. 27

_____ 3. The function f is given by $3e^{\sin x}$. f is decreasing over which interval?

- a. $[0, \pi]$
- b. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
- c. $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$
- d. $\left[\frac{3\pi}{2}, \frac{5\pi}{2}\right]$
- e. $[-\infty, \infty]$

4.



The area of the shaded region in the diagram above is equivalent to

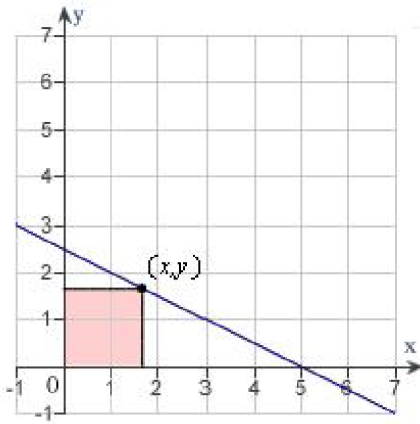
- a. $\int_0^1 (x^2 - \sqrt{x}) dx$
- b. $\pi \int_0^1 (x^4 - x) dx$
- c. $\int_0^1 (\sqrt{x} - x^2) dx$
- d. $2\pi \int_0^1 (x(\sqrt{x} - x^2)) dx$
- e. $\pi \int_0^1 (\sqrt{x} - x^2)^2 dx$

_____ 5. Find the derivative of the function.

$$f(x) = x^7 (5 + 8x)^3$$

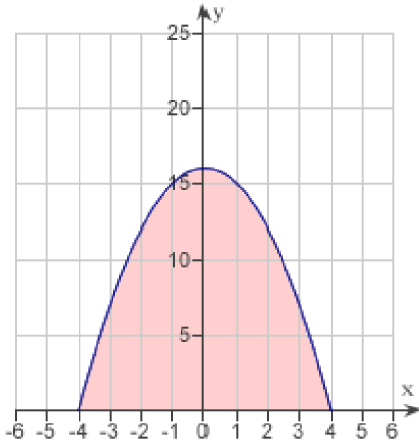
- a. $f'(x) = x^2 (5 + 8x)^6 (35 + 80x)$
- b. $f'(x) = x^6 (5 + 8x)^2 (35 + 80x)$
- c. $f'(x) = 8x^7 (5 + 8x)^2 (35 + 80x)$
- d. $f'(x) = x^6 (5 + 8x)^3 (35 + 80x)$
- e. $f'(x) = x^6 (5 + 8x)^2 (35 + 8x)$

_____ 6. A rectangle is bounded by the x - and y -axes and the graph of $y = \frac{(5-x)}{2}$ (see figure).
What length and width should the rectangle have so that its area is a maximum?



- a. $x = 2.5; y = 3$
- b. $x = 3; y = 5$
- c. $x = 2.5; y = 1.25$
- d. $x = 5; y = 3$
- e. $x = 1.25; y = 2.5$

- _____ 7. The graph of the function $f(x) = 16 - x^2$ is given below. Which of the following definite integrals yields the area of the shaded region?



- a. $\int_{-16}^{16} (16 - x^2) dx$
- b. $\int_{-4}^4 (16 - x^2) dx$
- c. $\int_{-4}^0 (16 - x^2) dx$
- d. $\int_0^4 (16 - x^2) dx$
- e. $\int_0^{16} (16 - x^2) dx$

- _____ 8. Sketch the region whose area is given by the definite integral and then use a geometric formula to evaluate the integral.

$$\int_{-1}^1 (1 - |u|) du$$

- a. -1
- b. 1
- c. 2
- d. 4
- e. 15

- _____ 9. Find the derivative of the function $f(x) = x^6 e^x$.

- a. $6x^5 + e^x$
- b. $6x^5 + xe^x$
- c. $x^5 e^x (x+6)$
- d. $6x^5 e^x$
- e. $x^5 e^x$

- _____ 10. Differentiate the function $f(x) = \ln \left(\frac{e^{5x} + 1}{e^{2x} + 1} \right)$.

- a. $\frac{2e^{2x} + 1}{5e^{2x} + 1}$
- b. $\frac{5e^{5x}}{e^{5x} + 1} - \frac{2e^{2x}}{e^{2x} + 1}$
- c. $\frac{5e^{5x}}{e^{5x} + 1} + \frac{2e^{2x}}{e^{2x} + 1}$
- d. $\frac{e^{2x} + 1}{e^{5x} + 1}$
- e. $\frac{e^{5x}}{e^{5x} + 1} + \frac{e^{2x}}{e^{2x} + 1}$