

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 #27

Multiple Choice

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

_____ 1. Find $G'(x)$ if $G(x) = \int_0^{e^{10x}} \ln(t+5) dt$.

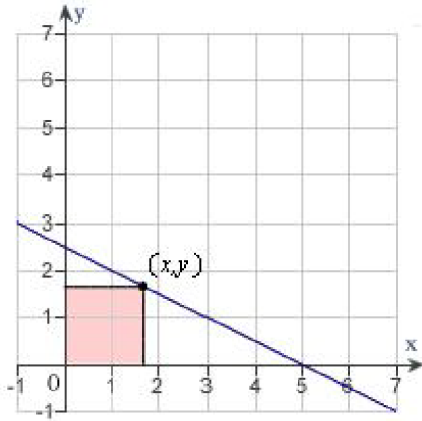
- a. $G'(x) = e^{10x} \ln(e^{10x} + 5)$
- b. $G'(x) = 10e^{10x} \ln(e^{10x} + 5)$
- c. $G'(x) = \ln(e^{10x} + 5)$
- d. $G'(x) = 10e^{10x+5}$
- e. $G'(x) = e^{10x} + 5$

_____ 2. Solve the differential equation.

$$y' = \frac{-x}{y}$$

- a. $y^2 = x^2 + C$
- b. $y^2 = -x^3 + C$
- c. $2 \ln y = x^3 + C$
- d. $y^2 = -x^2 + C$
- e. $2 \ln y = -x^2 + C$

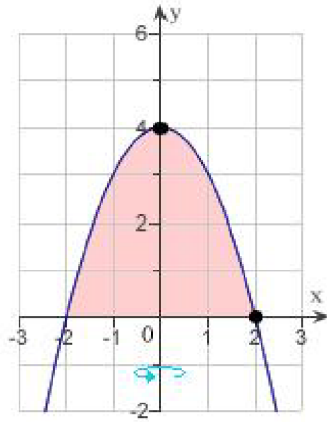
- _____ 3. A rectangle is bounded by the x - and y -axes and the graph of $y = \frac{(5-x)}{2}$ (see figure). What length and width should the rectangle have so that its area is a maximum?



- a. $x = 5; y = 3$
 b. $x = 2.5; y = 1.25$
 c. $x = 3; y = 5$
 d. $x = 1.25; y = 2.5$
 e. $x = 2.5; y = 3$
- _____ 4. Find all points of inflection on the graph of the function $f(x) = -5e^{-5x^2}$.

- a. $\left(\frac{1}{\sqrt{10}}, -\frac{5}{\sqrt{e}}\right), \left(-\frac{1}{\sqrt{10}}, -\frac{5}{\sqrt{e}}\right)$
 b. $\left(\frac{1}{\sqrt{5}}, -\frac{5}{e}\right), \left(-\frac{1}{\sqrt{5}}, -\frac{5}{e}\right)$
 c. $\left(\frac{1}{\sqrt{5}}, -\frac{5}{e^2}\right), \left(-\frac{1}{\sqrt{5}}, -\frac{5}{e^2}\right)$
 d. $\left(\frac{1}{\sqrt{10}}, -\frac{5}{\sqrt{e}}\right)$
 e. $\left(\frac{1}{\sqrt{10}}, -\frac{5}{e}\right), \left(-\frac{1}{\sqrt{10}}, -\frac{5}{e}\right)$

- _____ 5. Set up and evaluate the definite integral for the area of the surface formed by revolving the graph of $y = 4 - x^2$ about the y -axis. Round your answer to three decimal places.



- a. 73.401
b. 18.088
c. 1.635
d. 36.177
e. 3.271
- _____ 6. Find the function $y = f(t)$ passing through the point $(0, 19)$ with the first derivative $\frac{dy}{dt} = \frac{9}{5}y$.

- a. $y(t) = e^{\frac{9}{5}t} + 19$
b. $y(t) = e^{\frac{9}{5}t^2} + 19$
c. $y(t) = \frac{9}{5}t^2 + 19$
d. $y(t) = 19e^{\frac{9}{5}t^2}$
e. $y(t) = 19e^{\frac{9}{5}t}$

_____ 7. If the accumulation function $F(x)$ is given by

$$F(x) = \int_0^x \left(\frac{1}{11}t^2 + 9 \right) dt, \text{ evaluate } F(8).$$

a. $A = \frac{2888}{33}$

b. $A = \frac{4472}{33}$

c. $A = \frac{809}{33}$

d. $A = \frac{4024}{33}$

e. $A = \frac{559}{33}$

_____ 8. Use integration to find a general solution of the differential equation $\frac{dy}{dx} = \frac{3x}{13 + x^2}$.

a. $y = \frac{3}{2x} \ln \left(\left| 16 + x^2 \right| \right) + C$

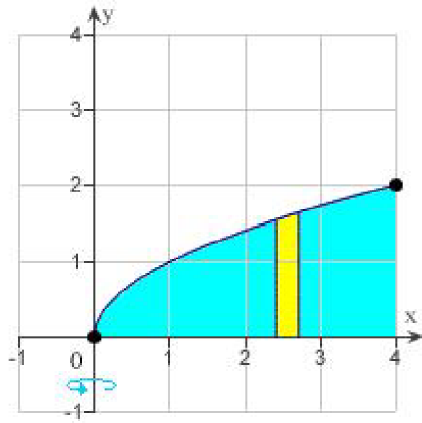
b. $y = \frac{6}{x^2} \ln \left(\left| 13 + x^2 \right| \right) + C$

c. $y = \frac{3}{2} \ln \left(\left| 13 + x^2 \right| \right) + C$

d. $y = \frac{3x^2}{\ln \left(\left| 13 + x^2 \right| \right)} + C$

e. $y = \frac{3}{x \ln \left(\left| 13 + x^2 \right| \right)} + C$

- _____ 9. Use the shell method to set up and evaluate the integral $y = \sqrt{x}$ that gives the volume of the solid generated by revolving the plane region about the y -axis.



- a. $\frac{64\pi}{7}$
- b. $\frac{64\pi}{5}$
- c. $\frac{32\pi}{5}$
- d. $\frac{128\pi}{5}$
- e. $\frac{128\pi}{7}$

_____ 10. A conical tank (with vertex down) is 16 feet across the top and 14 feet deep. If water is flowing into the tank at a rate of 18 cubic feet per minute, find the rate of change of the depth of the water when the water is 6 feet deep.

a. $\frac{49}{128\pi}$ ft/min

b. $\frac{49}{32\pi}$ ft/min

c. $\frac{147}{64\pi}$ ft/min

d. $\frac{7}{64\pi}$ ft/min

e. $\frac{21}{128\pi}$ ft/min