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 #20

Multiple Choice

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

____ 1. Determine whether Rolle's Theorem can be applied to the function $f(x) = x^2 - 2x - 3$ on the closed interval $[-1,3]$.
If Rolle's Theorem can be applied, find all values of c in the open interval $(-1,3)$ such that $f'(c) = 0$.

a. Rolle's Theorem applies; $c = 1$
b. Rolle's Theorem applies; $c = 2$
c. Rolle's Theorem applies; $c = 0$
d. Rolle's Theorem applies; $c = -1$
e. Rolle's Theorem does not apply

____ 2. The height of an object t seconds after it is dropped from a height of 550 meters is $s(t) = -4.9t^2 + 550$.
Find the average velocity of the object during the first 7 seconds.

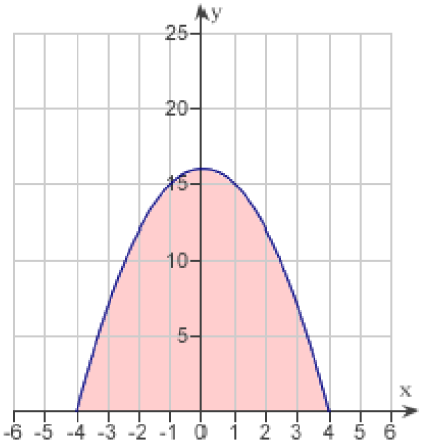
a. 34.30 m/sec
b. –34.30 m/sec
c. –49.00 m/sec
d. 49 m/sec
e. –16.00 m/sec

____ 3. Find an equation of the tangent line to the graph of $y = e^{3x}$ at the point $(0, 1)$.

a. $y = 3x + 1$
b. $y = x + 1$
c. $y = 3x - 1$
d. $y = \ln(3)x + 1$
e. $y = 4x + 1$

____ 4. 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. $\int_{0}^{16} \left(16 - x^2\right) dx$

b. $\int_{-4}^{0} \left(16 - x^2\right) dx$

c. $\int_{0}^{4} \left(16 - x^2\right) dx$

d. $\int_{-16}^{16} \left(16 - x^2\right) dx$

e. $\int_{-4}^{4} \left(16 - x^2\right) dx$

____ 5. Which of the following is a solution of the differential equation $xy' - 4y = x^5 e^x$?

a. $y = 4x^5 e^{2x}$

b. $y = 6e^{2x} - 7\sin 2x$

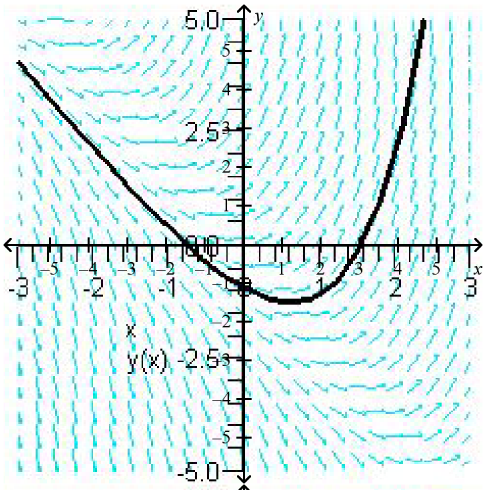
c. $y = x^4 e^x$

d. $y = 5e^{-2x}$

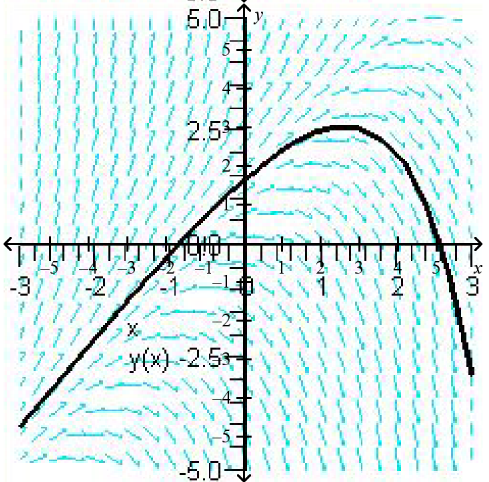
e. $y = \ln x$

____ 6. Sketch the slope field for the differential equation $y' = y - 4x$ and use the slope field to sketch the solution that passes through the point $(2, 2)$.

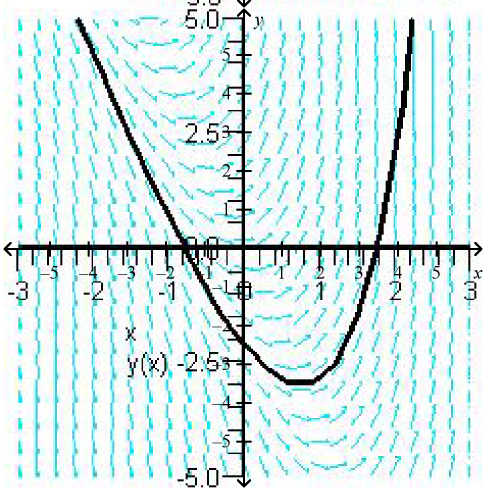
a.



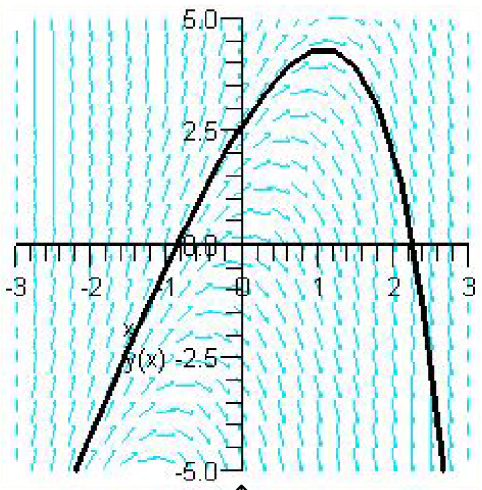
b.



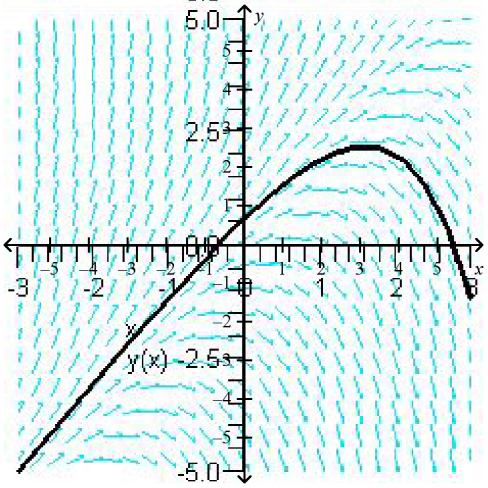
c.



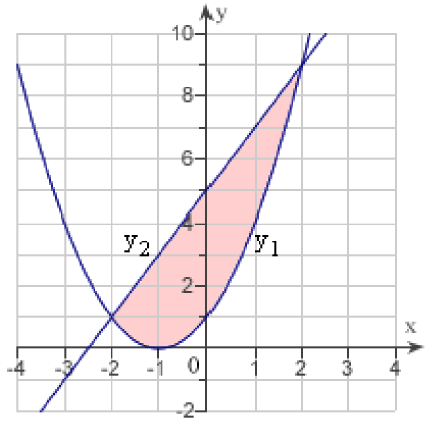
d.



e.



____ 7. Set up the definite integral that gives the area of the region bounded by the graph of $y_1 = x^2 + 2x + 1$ and $y_2 = 2x + 5$.



a. $\int_{-2}^{2} \left(-x^2 + 4\right) dx$

b. $\int_{-2}^{2} \left(x^2 + 2x + 1\right) dx$

c. $\int_{-2}^{2} \left(-x^2 + 4\right) dy$

d. $\int_{-2}^{2} \left(x^2 + 4x + 6\right) dy$

e. $\int_{-2}^{2} \left(x^2 + 4x + 6\right) dx$

____ 8. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region bounded by $y = 8$ and $y = 16 - \frac{x^2}{16}$ about the x-axis.

a. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{7168}{15} \sqrt{2}\pi$

b. $V = \pi \int_{-8\sqrt{2}}^{8\sqrt{2}} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{14336}{15} \sqrt{2}\pi$

c. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{28672}{15} \sqrt{2}\pi$

d. $V = \pi \int_{-8\sqrt{2}}^{8\sqrt{2}} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{28672}{15} \sqrt{2}\pi$

e. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{14336}{15} \sqrt{2}\pi$

____ 9. Find the indefinite integral.

$$\int x \ln(x-8)\, dx$$

a. $\left(\frac{x^2-64}{2}\right)\ln(x-8) - \frac{x^2+16x}{4} + C$

b. $\left(\frac{x^2-64}{2}\right)\ln(x-8) + \frac{x^2+8x}{4} + C$

c. $\left(\frac{x^2-64}{2}\right)\ln(x-8) + \frac{x^2+16x}{4} + C$

d. $\left(\frac{x^2-64}{2}\right)\ln(x-8) - \frac{x^2+16x}{2} + C$

e. $\left(\frac{x^2+64}{2}\right)\ln(x-8) - \frac{x^2-8x}{4} + C$

____ 10. Evaluate the limit $\lim_{x \to 0^+} \frac{3\left(e^x - 1 - x\right)}{10x^3}$ using L'Hopital's Rule if necessary.

a. $\frac{1}{20}$

b. $-\infty$

c. ∞

d. 0

e. $\frac{3}{10}$