
Problem 1. 10. (1 pt) Find two positive numbers whose product is 169 and whose sum is a minimum.

Answer: _____, _____

Answer(s) submitted:

- 13
- 13

(correct)

Problem 2. 11. (1 pt) If $f(x) = \int_x^{16} t^2 dt$ then $f'(x) =$ _____

Answer(s) submitted:

- t^2

(incorrect)

Problem 3. 7. (1 pt) Find the most general antiderivative for the function $\left(8x^4 - \frac{5}{x^6} - 3\right)$.

Note: Don't enter the **+C** . It's included for you.

Antiderivative = _____ + C.

Answer(s) submitted:

- ((8(x^5)/5) - (5/(7(x^7))) - (3x))

(incorrect)

Problem 4. 2. (1 pt) Suppose that $f(x) = 15e^x - ex^e$. Find $f'(3)$.

$f'(3)$ = _____

Answer(s) submitted:

- (15 (e^3) (ln(e))) - [(1/3)((e^2)(3^e))]

(correct)

Problem 5. 5. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

$$s = (1/3)t^3 - 4t^2 + 16t + 5$$

.

(a) Find the velocity and acceleration as functions of t.

Velocity at time t = _____

Acceleration at time t = _____

(b) Find the acceleration after 1 second.

Acceleration after 1 second: _____

(c) Find the acceleration at the instant when the velocity is 0.

Acceleration: _____

Answer(s) submitted:

- (x^2) - (8x) + 6
- 2x - 8
- -6
- 0

(score 0.5)

Problem 6. 13. (1 pt)

Evaluate the following limits. If needed, enter INF for ∞ and MINF for $-\infty$.

(a)

$$\lim_{x\to\infty} \frac{(5-x)(7+7x)}{(3-10x)(11+9x)} =$$

_____

(b)

$$\lim_{x\to-\infty} \frac{(5-x)(7+7x)}{(3-10x)(11+9x)} =$$

_____

Answer(s) submitted:

- (7/90)
- (7/90)

(correct)

Problem 7. 12. (1 pt) Evaluate the integral below by interpreting it in terms of areas. In other words, draw a picture of the region the integral represents, and find the area using high school geometry.

$$\int_{-5}^{5} \sqrt{25-x^2}\,dx$$

_____

Answer(s) submitted:

- (25 (pi)) / 2

(correct)

Problem 8. 6. (1 pt) Find the absolute maximum and absolute minimum values of the function

$$f(x) = x^3 + 6x^2 - 63x + 5$$

over each of the indicated intervals.

(a) Interval = $[-8, 0]$.

1. Absolute maximum = _____
2. Absolute minimum = _____

(b) Interval = $[-5, 4]$.

1. Absolute maximum = _____
2. Absolute minimum = _____

(c) Interval = $[-8, 4]$.

1. Absolute maximum = _____
2. Absolute minimum = _____

Answer(s) submitted:

- 397
- 5
- 345
- -103
- 397
- -103

(correct)

Problem 9. 3. (1 pt) Find an equation for the line tangent to the graph of

$$f(x) = \frac{\sqrt{x}}{8x-6}$$

at the point $(2, f(2))$.

$y =$ _____

Answer(s) submitted:

- ((1/100)(21 sqrt(2))) - ((1/200)(11 sqrt(2))x)

(correct)

Problem 10. 9. (1 pt) Evaluate the indefinite integral:

$$\int 7x^4 - \frac{3}{x^6} - 3\,dx = \_\_\_\_\_ + C.$$

Answer(s) submitted:

- ((7(x^5)/5) - 3x + (3/(5(x^5)))

(incorrect)

Problem 11. 4. (1 pt) Use implicit differentiation to find the slope of the tangent line to the curve

$$2xy^3 + 5xy = 35$$

at the point $(5, 1)$.

$m =$ _____

Answer(s) submitted:

- -7/55

(correct)

Problem 12. 1. (1 pt) Find an equation of the tangent line to the curve $y = 6 - 2x - 3x^2$ at $(1, 1)$.

$y =$ _____

Answer(s) submitted:

- 9-8x

(correct)

Problem 13. 15. (1 pt) Find (in terms of the constant a)

$$\lim_{h\to 0} \frac{5(a+h)^2 - 5a^2}{h}.$$

Limit = _____

Answer(s) submitted:

- 10a

(correct)

Problem 14. 8. (1 pt) (A) Estimate the area under the graph of

$$f(x) = 25 - x^2$$

from $x = 0$ to $x = 5$ using 5 approximating rectangles and right endpoints.

Estimate = _____

(B) Repeat part (A) using left endpoints.

Estimate = _____

(C) Repeat part (A) using midpoints.

Estimate = _____

Answer(s) submitted:

- 70
- 95
- 83.75

(correct)

Problem 15. 14. (1 pt) Suppose that

$$f(x) = 8x^2 - x^3 + 3.$$

(A) Find all critical numbers of f. If there are no critical numbers, enter 'NONE'.
Critical numbers = _____

(B) Use interval notation to indicate where $f(x)$ is increasing.
Note: Use 'INF' for ∞, '-INF' for $-\infty$, and use 'U' for the union symbol.

Increasing: _____

(C) Use interval notation to indicate where $f(x)$ is decreasing.
Decreasing: _____

(D) List the x-coordinates of all local maxima of f. If there are no local maxima, enter 'NONE'.
x values of local maxima = _____

(E) List the x-coordinates of all local minima of f. If there are no local minima, enter 'NONE'.
x values of local minima = _____

(F) Use interval notation to indicate where $f(x)$ is concave up.
Concave up: _____

(G) Use interval notation to indicate where $f(x)$ is concave down.
Concave down: _____

(H)List the x values of all inflection points of f. If there are no inflection points, enter 'NONE'.
x values of inflection points = _____

(I) Use all of the preceding information to sketch a graph of f. When you're finished, enter a "1" in the box below.
Graph Complete: _____

Answer(s) submitted:

- `0, (16/3)`
- `(0, (16/3))`
- `(-INF, 0) U ((16/3), INF)`
- `(16/6)`
- `NONE`
- `(-INF, (16/6))`
- `((16/6), INF)`
- `(16/6)`
- `1`

(score 0.7777777910232544)