

Problem 1. 9. (1 pt) Find an equation of the tangent line to the curve $y = -6 - 2x - 3x^2$ at $(1, -11)$.

$y =$ _____

Answer(s) submitted:

- $-8x - 3$

(correct)

Problem 2. 8. (1 pt)

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

(a)

$$\lim_{x \rightarrow \infty} \frac{1 + 3x}{7 - 6x} =$$

(b)

$$\lim_{x \rightarrow -\infty} \frac{1 + 3x}{7 - 6x} =$$

Answer(s) submitted:

- $-1/2$
- $-1/2$

(correct)

Problem 3. 7. (1 pt)

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

(a)

$$\lim_{x \rightarrow \infty} \frac{(2 - x)(7 + 2x)}{(3 - 11x)(10 + 4x)} =$$

(b)

$$\lim_{x \rightarrow -\infty} \frac{(2 - x)(7 + 2x)}{(3 - 11x)(10 + 4x)} =$$

Answer(s) submitted:

- $1/22$
- $1/22$

(correct)

Problem 4. 6. (1 pt) Let

$$f(x) = \begin{cases} -4x, & x < 5, \\ 1, & x = 5, \\ 4x, & x > 5. \end{cases}$$

Find the indicated one-sided limits of f , and determine the continuity of f at the indicated point.

NOTE: Type DNE if a limit does not exist.

You should also sketch a graph of $y = f(x)$, including hollow and solid circles in the appropriate places.

$$\begin{aligned} \lim_{x \rightarrow 5^-} f(x) &= \text{_____} \\ \lim_{x \rightarrow 5^+} f(x) &= \text{_____} \\ \lim_{x \rightarrow 5} f(x) &= \text{_____} \\ f(5) &= \text{_____} \end{aligned}$$

Is f continuous at $x = 5$? (YES/NO) _____

Answer(s) submitted:

- -20
- 20
- DNE
- 1
- NO

(correct)

Problem 5. 13. (1 pt) Use the **definition of the derivative** (don't be tempted to take shortcuts!) to find the derivative of the function

$$f(x) = 5x + 5\sqrt{x}.$$

Then state the domain of the function and the domain of the derivative.

Note: When entering interval notation in WeBWorK, use **I** for ∞ , **-I** for $-\infty$, and **U** for the union symbol. If the set is empty, enter "" without the quotation marks.

$$f'(x) = \text{_____}$$

$$\text{Domain of } f(x) = \text{_____}$$

$$\text{Domain of } f'(x) = \text{_____}$$

Answer(s) submitted:

- $5 + (5/(2\sqrt{x}))$
- $[0, I)$
- $(0, I)$

(correct)

Problem 6. 12. (1 pt)

Identify the graphs A (blue), B (red) and C (green) as the graphs of a function and its derivatives:

- ___ is the graph of the function
- ___ is the graph of the function's first derivative
- ___ is the graph of the function's second derivative

Answer(s) submitted:

- B
- C
- A

(score 0.3333333432674408)

Problem 7. 16. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

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

(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:

- $(t-4)^2$
- $2(t-4)$
- -6
- 0

(correct)

Problem 8. 10. (1 pt) Let $h(x) = 7 - 2x^3$,
 $h'(2) =$ _____

Use this to find the equation of the tangent line to the curve $y = 7 - 2x^3$ at the point $(2, -9)$ and write your answer in the form:

$y = mx + b$, where m is the slope and b is the y-intercept.

Answer(s) submitted:

• $-24x + 39$

(incorrect)

Problem 9. 14. (1 pt)

Differentiate the following function:

$$V(r) = \frac{4}{3}\pi r^3$$

$V'(r) =$ _____

Answer(s) submitted:

- $4 \pi r^2$

(correct)

Problem 10. 15. (1 pt) If $f(t) = 3\sqrt{t} + \frac{9}{\sqrt{t}}$, find $f'(t)$.

$f'(t) =$ _____

Answer(s) submitted:

- $(3(t-3)) / (2t^{(3/2)})$

(correct)

Problem 11. 4. (1 pt) Find (in terms of the constant a)

$$\lim_{h \rightarrow 0} \frac{3(a+h)^2 - 3a^2}{h}$$

Limit = _____

Answer(s) submitted:

- $6a$

(correct)

Problem 12. 5. (1 pt) Let

$$f(x) = \begin{cases} 8+x, & x < -5, \\ 5-x, & x \geq -5. \end{cases}$$

Find the indicated one-sided limits of f , and determine the continuity of f at the indicated point.

NOTE: Type DNE if a limit does not exist.

You should also sketch a graph of $y = f(x)$, including hollow and solid circles in the appropriate places.

$\lim_{x \rightarrow -5^-} f(x) =$ _____

$\lim_{x \rightarrow -5^+} f(x) =$ _____

$\lim_{x \rightarrow -5} f(x) =$ _____

$f(-5) =$ _____

Is f continuous at $x = -5$? (YES/NO) _____

Answer(s) submitted:

- 3
- 10
- DNE
- 10
- NO

(correct)

Problem 13. 3. (1 pt) Let

$$f(x) = \begin{cases} -x & \text{if } x \leq -7 \\ 49 - x^2 & \text{if } -7 < x < 7 \\ x - 7 & \text{if } x > 7 \end{cases}$$

Sketch the graph of this function and find following limits if they exist (if not, enter DNE).

- ___1. $\lim_{x \rightarrow 7^+} f(x)$
- ___2. $\lim_{x \rightarrow 7^-} f(x)$
- ___3. $\lim_{x \rightarrow 0} f(x)$
- ___4. $\lim_{x \rightarrow -7^-} f(x)$
- ___5. $\lim_{x \rightarrow -7^+} f(x)$
- ___6. $\lim_{x \rightarrow -7^+} f(x)$

Answer(s) submitted:

- 0
- 0
- 49
- 7
- DNE
- 0

(correct)

Problem 14. 17. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

$$s = (1/3)t^3 - 5t^2 + 25t + 4$$

(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.

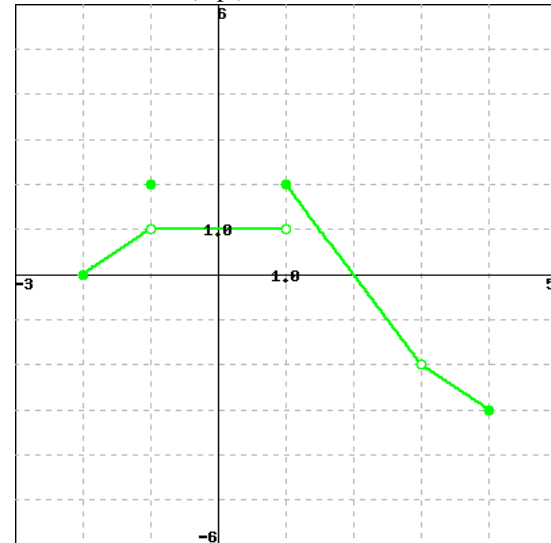
Acceleration: _____

Answer(s) submitted:

- $(t-5)^2$
- $2(t-5)$
- -8
- 0

(correct)

Problem 15. 1. (1 pt) Let F be the function below.



Evaluate each of the following expressions.

Note: Enter 'DNE' if the limit does not exist or is not defined.

- a) $\lim_{x \rightarrow -1^-} F(x) =$ _____
- b) $\lim_{x \rightarrow -1^+} F(x) =$ _____
- c) $\lim_{x \rightarrow -1} F(x) =$ _____
- d) $F(-1) =$ _____
- e) $\lim_{x \rightarrow 1^-} F(x) =$ _____
- f) $\lim_{x \rightarrow 1^+} F(x) =$ _____
- g) $\lim_{x \rightarrow 1} F(x) =$ _____
- h) $\lim_{x \rightarrow 3} F(x) =$ _____
- i) $F(3) =$ _____

Answer(s) submitted:

- 1
- 2
- DNE
- 2
- 1
- 2
- DNE
- DNE
- -2

(score 0.5555555820465088)

Problem 16. 2. (1 pt) Use a table of values to estimate the value of the limit. Confirm your result graphically by graphing the function with a graphing device.

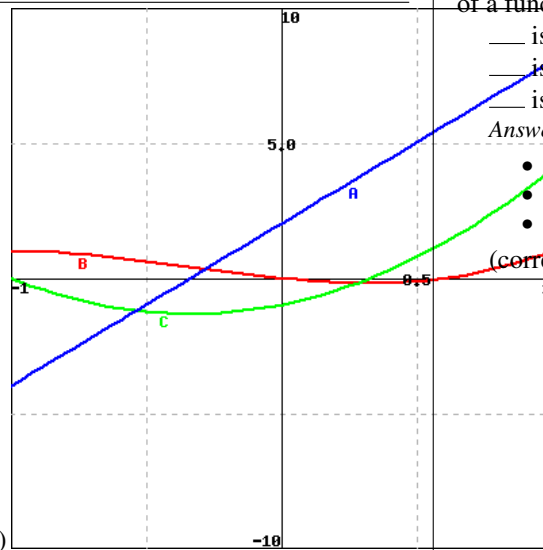
If the limit does not exist enter DNE.

$$\lim_{x \rightarrow 0} \frac{\sqrt{x+16} - 4}{x}$$

Answer(s) submitted:

• 1/8

(correct)



Identify the graphs A (blue), B(red) and C (green) as the graphs of a function and its derivatives:

___ is the graph of the function

___ is the graph of the function's first derivative

___ is the graph of the function's second derivative

Answer(s) submitted:

- B
- C
- A

(correct)

Problem 17. 11. (1 pt)