
Problem 1. 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 2. 12. (1 pt) Let

$$f(x) = \begin{cases} -x & \text{if } x \leq -6 \\ 36 - x^2 & \text{if } -6 < x < 6 \\ x - 6 & \text{if } x > 6 \end{cases}$$

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

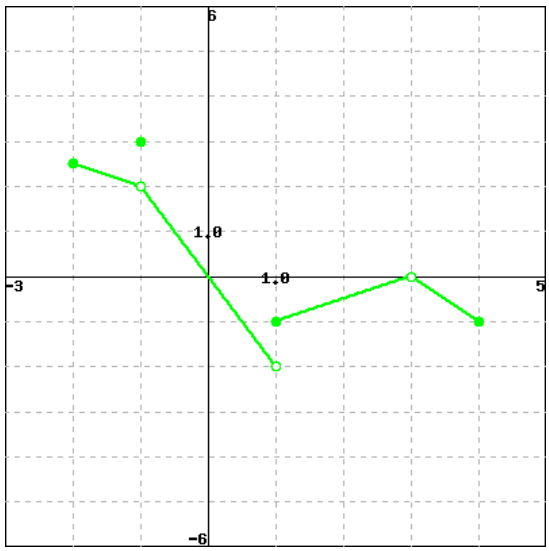
___1. $\lim_{x \to 6^+} f(x)$
___2. $\lim_{x \to 6} f(x)$
___3. $\lim_{x \to 0} f(x)$
___4. $\lim_{x \to -6^-} f(x)$
___5. $\lim_{x \to -6} f(x)$
___6. $\lim_{x \to -6^+} f(x)$

Answer(s) submitted:

- 0
- 0
- 36
- 6
- DNE
- 0

(correct)

Problem 3. 8. (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) $\lim_{x \to -1^-} F(x) =$ ___
b) $\lim_{x \to -1^+} F(x) =$ ___
c) $\lim_{x \to -1} F(x) =$ ___
d) $F(-1) =$ ___
e) $\lim_{x \to 1^-} F(x) =$ ___
f) $\lim_{x \to 1^+} F(x) =$ ___
g) $\lim_{x \to 1} F(x) =$ ___
h) $\lim_{x \to 3} F(x) =$ ___
i) $F(3) =$ ___

Answer(s) submitted:

- 2
- 3
- DNE
- 3
- -2
- -1
- DNE
- 0
- DNE

(score 0.7777777910232544)

Problem 4. 2. (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.

$f'(x)$ = _____

Domain of $f(x)$ = _____

Domain of $f'(x)$ = _____

Answer(s) submitted:

- `5 + (5/(2sqrt(x)))`
- `[0,I)`
- `(0,I)`

(correct)

Problem 5. 10. (1 pt)

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

(a)

$$\lim_{x\to\infty} \frac{(2-x)(10+8x)}{(3-7x)(7+8x)} =$$

_____

(b)

$$\lim_{x\to-\infty} \frac{(2-x)(10+8x)}{(3-7x)(7+8x)} =$$

_____

Answer(s) submitted:

- `1/7`
- `1/7`

(correct)

Problem 6. 4. (1 pt) If $f(t) = 7\sqrt{t} + \frac{5}{\sqrt{t}}$, find $f'(t)$.

$f'(t)$ = _____

Answer(s) submitted:

- `(7t-5) / (2t^(3/2))`

(correct)

Problem 7. 6. (1 pt) Let $h(x) = 7 - 2x^3$,

$h'(1)$ = _____

Use this to find the equation of the tangent line to the curve $y = 7 - 2x^3$ at the point $(1,5)$ and write your answer in the form: $y = mx + b$, where m is the slope and b is the y-intercept.

_____

Answer(s) submitted:

-
- `y = 11 - 6x`

(score 0.5)

Problem 8. 11. (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.

$$\lim_{x\to0} \frac{\sqrt{x+9}-3}{x}$$

_____

Answer(s) submitted:

- `1/6`

(correct)

Problem 9. 5. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

$$s = (1/3)t^3 - 2t^2 + 4t + 6$$

.

(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-2)^2`
- `2(t-2)`
- `-2`
- `0`

(correct)

Problem 10. 3. (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 11. 14. (1 pt) Let

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

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.

$\lim_{x\to 1^-} f(x)$ = _____
$\lim_{x\to 1^+} f(x)$ = _____
$\lim_{x\to 1} f(x)$ = _____
$f(1)$ = _____

Is f continuous at $x = 1$? (YES/NO) _____

Answer(s) submitted:

- -5
- 5
- DNE
- 1
- NO

(correct)

Problem 12. 9. (1 pt)
Evaluate the following limits. If needed, enter INF for ∞ and MINF for $-\infty$.
(a)

$$\lim_{x\to\infty} \frac{5+3x}{5-7x} =$$

_____
(b)

$$\lim_{x\to-\infty} \frac{5+3x}{5-7x} =$$

_____
Answer(s) submitted:

- -3/7
- -3/7

(correct)

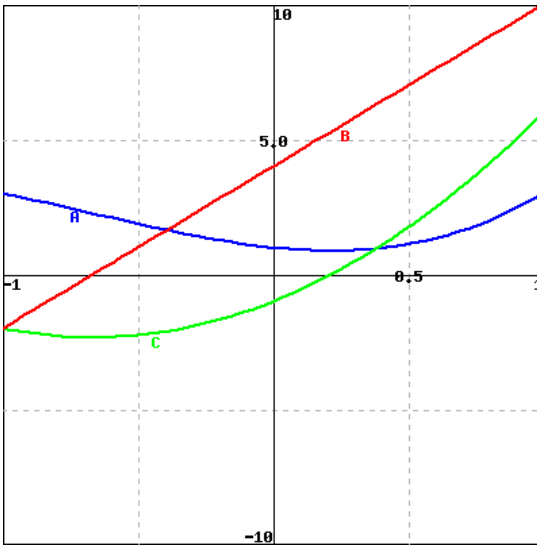
Problem 13. 15. (1 pt) Find (in terms of the constant a)

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

Limit = _____
Answer(s) submitted:

- 10a

(correct)



Problem 14. 7. (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:

- A
- C
- B

(correct)

Problem 15. 13. (1 pt) Let

$$f(x) = \begin{cases} 8+x, & x < -3, \\ 9-x, & x \geq -3. \end{cases}$$

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.
$\lim_{x\to -3^-} f(x)$ = _____
$\lim_{x\to -3^+} f(x)$ = _____
$\lim_{x\to -3} f(x)$ = _____
$f(-3)$ = _____

Is f continuous at $x = -3$? (YES/NO) _____

Answer(s) submitted:

- 5
- 12
- DNE
- 12
- NO

(correct)