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

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

.

(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 2. 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.

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

_____

Answer(s) submitted:

- 1/8

(correct)

Problem 3. 3. (1 pt) Let

$$f(x) = \begin{cases} -x & \text{if } x \le -9 \\ 81 - x^2 & \text{if } -9 < x < 9 \\ x - 9 & \text{if } x > 9 \end{cases}$$

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

___1. $\lim_{x\to 9^+} f(x)$
___2. $\lim_{x\to 9} f(x)$
___3. $\lim_{x\to 0} f(x)$
___4. $\lim_{x\to -9^-} f(x)$
___5. $\lim_{x\to -9} f(x)$
___6. $\lim_{x\to -9^+} f(x)$

Answer(s) submitted:

- 0
- 0
- 81
- 9
- DNE
- 0

(correct)

Problem 4. 7. (1 pt)
Evaluate the following limits. If needed, enter INF for ∞ and MINF for $-\infty$.
(a)

$$\lim_{x\to\infty} \frac{(6-x)(4+8x)}{(3-4x)(5+8x)} =$$

_____

(b)

$$\lim_{x\to-\infty} \frac{(6-x)(4+8x)}{(3-4x)(5+8x)} =$$

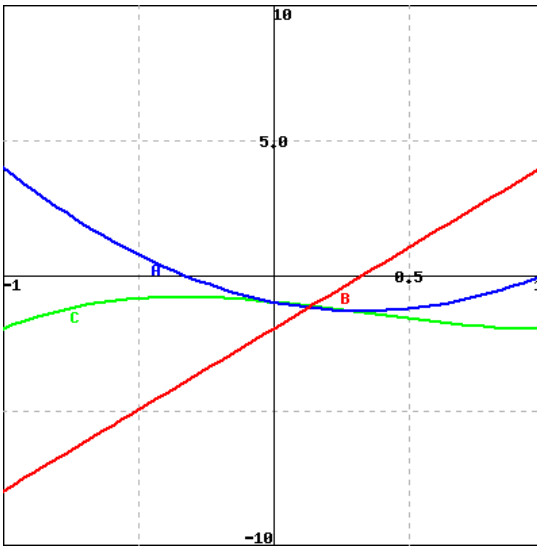
_____

Answer(s) submitted:

- 1/4
- 1/4

(correct)

Problem 5. 11. (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

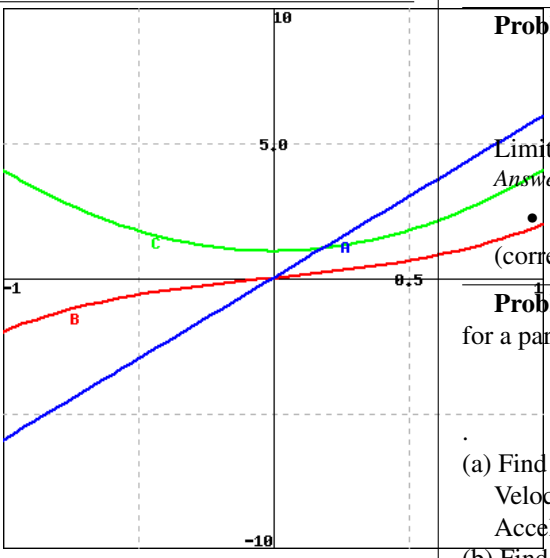
Answer(s) submitted:

- C
- A

- B

(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

(correct)

Problem 7. 5. (1 pt) Let

$$f(x) = \begin{cases} 6+x, & x < 3, \\ 5-x, & x \geq 3. \end{cases}$$

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:

- 9
- 2
- DNE
- 2

- NO

(correct)

Problem 8. 4. (1 pt) Find (in terms of the constant a)

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

Limit = _____

Answer(s) submitted:

- 6a

(correct)

Problem 9. 17. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

$$s = (1/3)t^3 - 4t^2 + 16t + 6$$

.

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

(correct)

Problem 10. 13. (1 pt) Use the **definition of the derivative** (don't be tempted to take shortcuts!) to find the derivative of the function

$$f(x) = 6x + 8\sqrt{x}.$$

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 $f(x)$ = _____

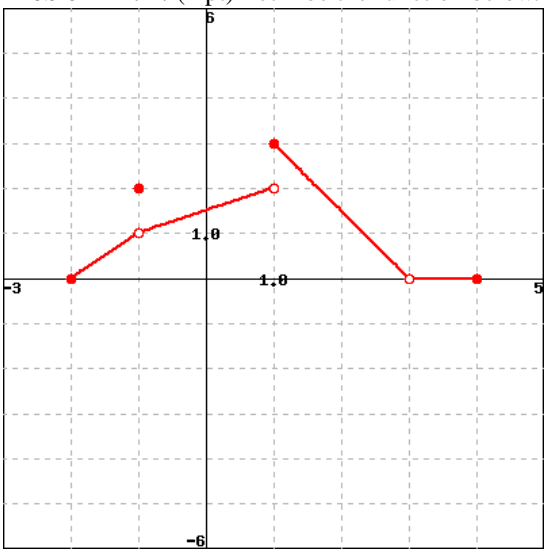
Domain of $f'(x)$ = _____

Answer(s) submitted:

- 6+ (4/sqrt(x))
- [0,I)
- (0,I)

(correct)

Problem 11. 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) $\lim_{x\to -1^-} F(x) =$ ___

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:

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

(score 0.7777777910232544)

Problem 12. 9. (1 pt) Find an equation of the tangent line to the curve $y = -1-2x-3x^2$ at $(1,-6)$.

$y =$ _____

Answer(s) submitted:

- 2-8x

(correct)

Problem 13. 6. (1 pt) Let

$$f(x) = \begin{cases} -6x, & x < 1, \\ 1, & x = 1, \\ 6x, & x > 1. \end{cases}$$

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:

- -6
- 6
- DNE
- 1
- NO

(correct)

Problem 14. 8. (1 pt)

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

(a)

$$\lim_{x\to\infty} \frac{2+8x}{7-2x} =$$

_____

(b)

$$\lim_{x\to -\infty} \frac{2+8x}{7-2x} =$$

_____

Answer(s) submitted:

- -4
- -4

(correct)

Problem 15. 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 16. 10. (1 pt) Let $h(x) = 3 - 2x^3$,

$h'(2) =$ _____

Use this to find the equation of the tangent line to the curve $y = 3 - 2x^3$ at the point $(2, -13)$ and write your answer in the form:

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

_____

Answer(s) submitted:

- `-24`
- `y = 35 - 24x`

(correct)

Problem 17. 15. (1 pt) If $f(t) = 3\sqrt{t} + \frac{10}{\sqrt{t}}$, find $f'(t)$.

$f'(t) =$ _____

Answer(s) submitted:

- `(3t - 10) / (2t^(3/2))`

(correct)