Hieu Pham **Brewer_MAT_265_ONLINE_Spring_2014**
Assignment Practice_Test_1 due 03/29/2014 at 03:56pm MST

Problem 1. 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:

- 3
- 8
- DNE
- 8
- NO

(correct)

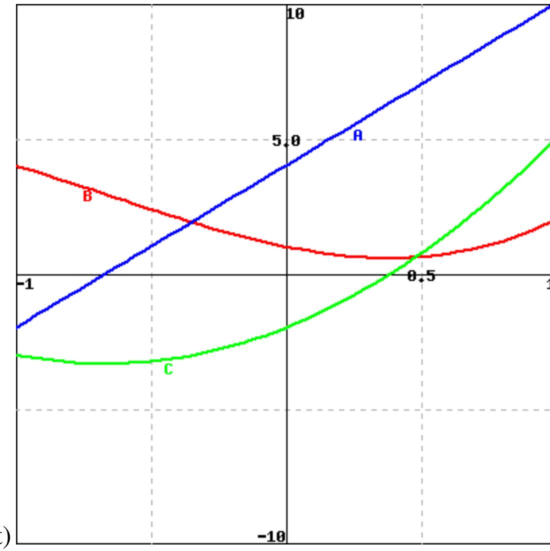
Problem 2. 4. (1 pt) Find (in terms of the constant a)

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

Limit = ______
Answer(s) submitted:

- 4a

(correct)



Problem 3. 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:

- C
- B
- A

(score 0.3333333432674408)

Problem 4. 17. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

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

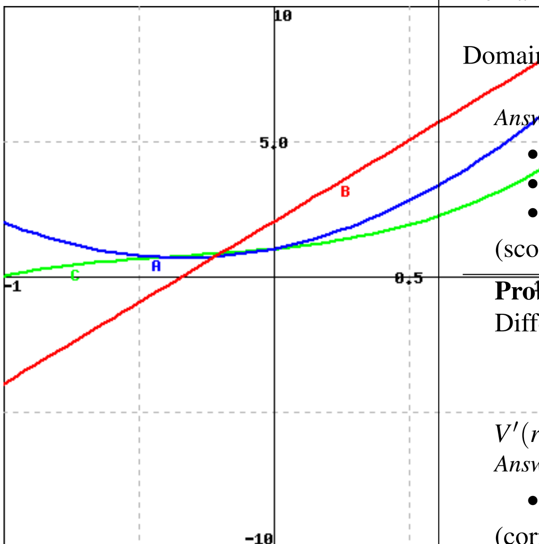
.
(a) Find the velocity and acceleration as functions of t.
Velocity at time $t =$ ______
Acceleration at time $t =$ ______
(b) Find the acceleration after 1 second.
Acceleration after 1 second: ______

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

Answer(s) submitted:

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

(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. 10. (1 pt) Let $h(x) = 6 - 2x^3$,

$h'(1) =$ __________

Use this to find the equation of the tangent line to the curve $y = 6 - 2x^3$ at the point $(1,4)$ and write your answer in the form: $y = mx + b$, where m is the slope and b is the y-intercept.

____

Answer(s) submitted:

- `-6`
- `y = -6x + 10`

(correct)

Problem 7. 13. (1 pt) Use the **definition of the derivative** (don't be tempted to take shortcuts!) to find the derivative of the function

$$f(x) = 7x + 2\sqrt{x}.$$

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:

- `((1/sqrt(x)) + 7)`
- `(0, I)`
- `(0, I)`

(score 0.6666666865348816)

Problem 8. 14. (1 pt)

Differentiate the following function:

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

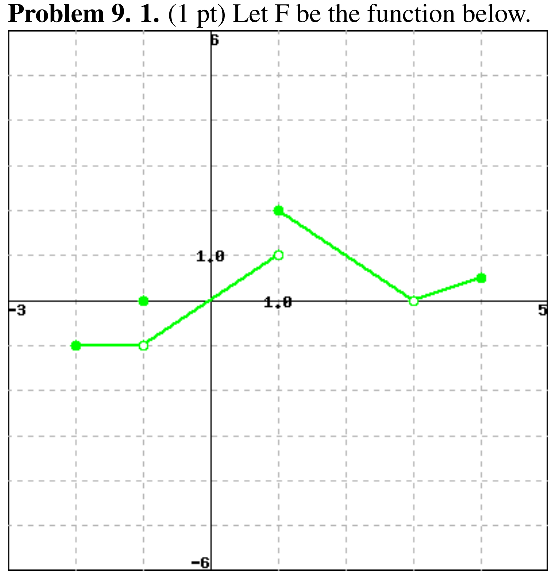
$V'(r) =$ __________

Answer(s) submitted:

- `4 pi r^2`

(correct)

Problem 9. 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`
- `0`

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

(score 0.7777777910232544)

Problem 10. 16. (1 pt) Suppose that the equation of motion for a particle (where s is in meters and t in seconds) is

$$s = (1/3)t^3 - 7t^2 + 49t + 7$$

.

(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-7)^2
- 2(t-7)
- -12
- 0

(correct)

Problem 11. 3. (1 pt) Let

$$f(x) = \begin{cases} -x & \text{if } x \le -3 \\ 9 - x^2 & \text{if } -3 < x < 3 \\ x - 3 & \text{if } x > 3 \end{cases}$$

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

___1. $\lim_{x\to 3^+} f(x)$
___2. $\lim_{x\to 3} f(x)$
___3. $\lim_{x\to 0} f(x)$
___4. $\lim_{x\to -3^-} f(x)$
___5. $\lim_{x\to -3} f(x)$
___6. $\lim_{x\to -3^+} f(x)$

Answer(s) submitted:

- 0
- 0
- 9
- 3
- DNE
- 0

(correct)

Problem 12. 8. (1 pt)
Evaluate the following limits. If needed, enter INF for ∞ and MINF for $-\infty$.
(a)

$$\lim_{x\to\infty} \frac{3+9x}{3-4x} =$$

____
(b)

$$\lim_{x\to-\infty} \frac{3+9x}{3-4x} =$$

____

Answer(s) submitted:

- -9/4
- -9/4

(correct)

Problem 13. 9. (1 pt) Find an equation of the tangent line to the curve $y = 5 - 2x - 3x^2$ at $(1, 0)$.

$y =$ ________

Answer(s) submitted:

- -8x + 8

(correct)

Problem 14. 15. (1 pt) If $f(t) = 5\sqrt{t} + \frac{5}{\sqrt{t}}$, find $f'(t)$.
$f'(t)$ = ____________

Answer(s) submitted:

- ((5(t-1) / (2t^(3/2)))

(incorrect)

Problem 15. 7. (1 pt)
Evaluate the following limits. If needed, enter INF for ∞ and MINF for $-\infty$.
(a)

$$\lim_{x\to\infty} \frac{(8-x)(5+9x)}{(3-5x)(7+4x)} =$$

____
(b)

$$\lim_{x\to-\infty} \frac{(8-x)(5+9x)}{(3-5x)(7+4x)} =$$

____

Answer(s) submitted:

- 9/20
- 9/20

(correct)

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.

$$\lim_{x\to 0} \frac{\sqrt{x+9}-3}{x}$$

______

Answer(s) submitted:

- `DNE`

(incorrect)

Problem 17. 6. (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)