**Gestur Olafsson** **Math-1550-22-Fall**

**WeBWorK assignment number Sections_2.1_2.2 is due : 09/09/2008 at 11:59pm CDT.**

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**1. (1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_L /2.1.5.pg**

From Rogawski ET section 2.1, exercise 5.

A stone is tossed in the air from ground level with an initial velocity of 20 $m/s$. Its height at time $t$ is $h(t) = 20t - 4.9t^2$ $m$.

Compute the stone's average velocity over the time interval $[1.5, 4]$.

Average velocity = _____

---

**2. (1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_L /2.1.9.pg**

From Rogawski ET section 2.1, exercise 9.

$P(x) = 3x^2 - 1$

Estimate the instaneous rate of change at the point $x = -1$

ROC = _____

---

**3. (1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_L /2.1.13.pg**

From Rogawski ET section 2.1, exercise 13.

Estimate the instaneous rate of change at the point $x = 0$ for $f(x) = e^x$

ROC = _____

---

**4. (1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_L /2.1.15.pg**

From Rogawski ET section 2.1, exercise 15.

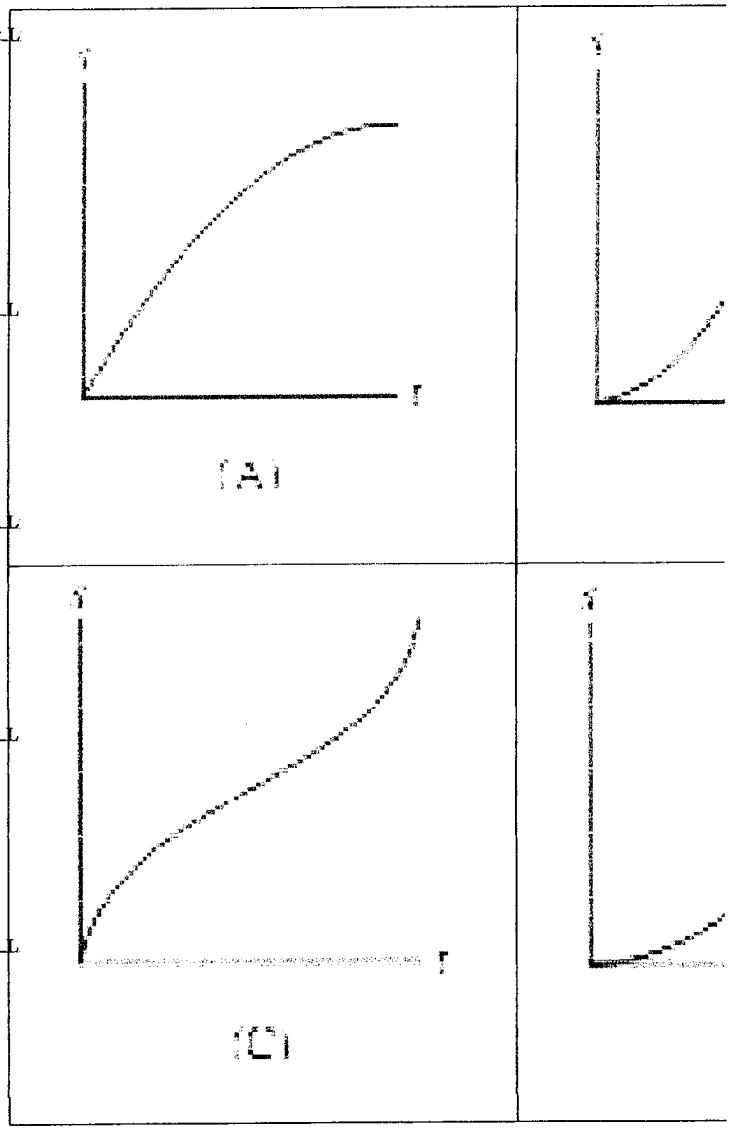
Estimate the instantaneous rate of change at the point $x = 4$ for $f(x) = \ln x$

ROC = _____

---

**5. (1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_L /2.1.23.pg**

From Rogawski ET section 2.1, exercise 23.



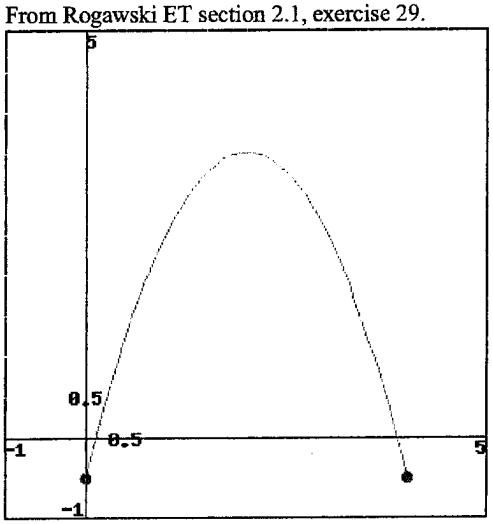
The graphs represent the position $s$ of a particle as a function of time $t$. Match each graph with one of the following statements:

___ - speeding up
___ - speeding up and then slowing down
___ - slowing down
___ - slowing down and then speeding up

---

**6.** **(1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_Lines_/2.1.29.pg**

From Rogawski ET section 2.1, exercise 29.




Refer to the graph above and without making any computations find:

The average ROC over $[0,4]$ : ___
The (instantaneous) ROC at $x = 2$ : ___

? 1. Choose the values of $x$ at which the ROC is positive.

---

**7.** **(1 pt) Rogawski-ET/2_Limits/2.1_Limits,_Rates_of_Change,_and_Tangent_Lines_/2.1.1.pg**

From Rogawski ET section 2.1, exercise 1.
A ball is dropped from a state of rest at time $t = 0$.
The distance traveled after $t$ seconds is $s(t) = 16t^2$ ft.

(a) How far does the ball travel during the time interval $[8, 8.5]$ ?

$\Delta s =$ _____ ft

(b) Compute the average velocity over $[8, 8.5]$ .

$\frac{\Delta s}{\Delta t} =$ _____ $\frac{\text{ft}}{\text{sec}}$

(c) Compute the average velocity over time intervals $[8, 8.01]$ , $[8, 8.001]$ , $[8, 8.0001]$ , $[7.9999, 8]$ , $[7.999, 8]$ , $[7.99, 8]$ .

Use this to estimate the object's instantaneous velocity at $t = 8$ .

$V(8) =$ _____ $\frac{\text{ft}}{\text{sec}}$

---

**8.** **(1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach-/2.2.1.pg**

From Rogawski ET section 2.2, exercise 1.
Fill in the table and guess the value of the limit:
$\lim_{x \to 1} f(x)$, where $f(x) = \frac{x^3-1}{x^2-1}$

| $x$ | $f(x)$ | $x$ | $f(x)$ |
|---|---|---|---|
| 1.002 | | 0.998 | |
| 1.001 | | 0.999 | |
| 1.0005 | | 0.9995 | |
| 1.0001 | | 0.9999 | |

The limit as $x \to 1$ is ___

---

**9.** **(1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach-/2.2.5.pg**

From Rogawski ET section 2.2, exercise 5.
Fill in the table and guess the value of the limit:
$\lim_{x \to 0} f(x)$, where $f(x) = \frac{e^x - x - 1}{4x^2}$.

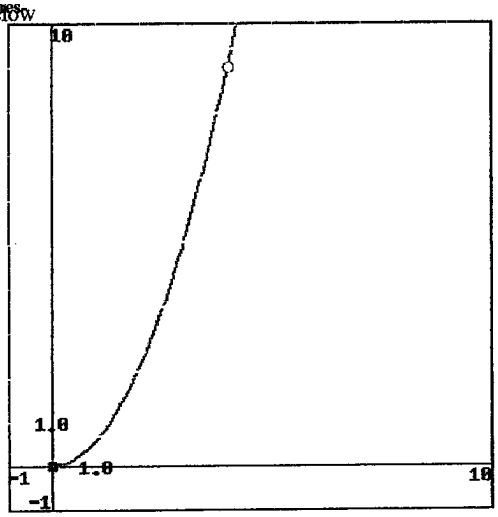
| $x$ | plusmn;0.00005 | plusmn;0.002 | plusmn;0.00001 | plusmn;0.000 |
|---|---|---|---|---|
| $f(x)$ | | | | |

The limit as $x \to 0$ is _____

---

**10.** **(1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach-/2.2.7.pg**

From Rogawski ET section 2.2, exercise 7.
Determine $\lim_{x \to 4} f(x)$ for the function $f(x)$ shown in the figure below




The limit as $x \to 4$ is ___

**11.** (1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approa /2.2.21.pg

From Rogawski ET section 2.2, exercise 21.

Estimate the limit numerically or state that the limit doesn't exist:

$\lim_{x\to 2} \frac{\sqrt{x}-2}{x-4} =$ _____

Enter F if the limit doesn't exist.

---

**12.** (1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach- /2.2.25.pg

From Rogawski ET section 2.2, exercise 25.

Estimate the limit numerically or state that the limit doesn't exist

$\lim_{x\to 0} \frac{\sin(5x)}{x} =$ ___

(Enter F if the limit doesn't exist)

---

**13.** (1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach- /2.2.29.pg

From Rogawski ET section 2.2, exercise 29.

Estimate the limit numerically or state that the limit doesn't exist

$\lim_{h\to 0} \cos\left(\frac{4}{h}\right) =$ ___

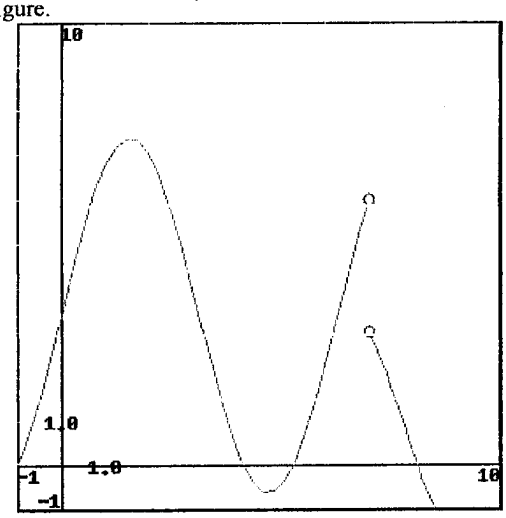
(Enter F if the limit doesn't exist)

---

**14.** (1 pt) Rogawski-ET/2_Limits/2.2_Limits-_A_Numerical_and_Graphical_Approach /2.2.37.pg

From Rogawski ET section 2.2, exercise 37.

Determine $\lim_{x\to 7+} f(x)$ and $\lim_{x\to 7-} f(x)$ for the function shown in figure.




The left-hand limit: ___

The right-hand limit: ___

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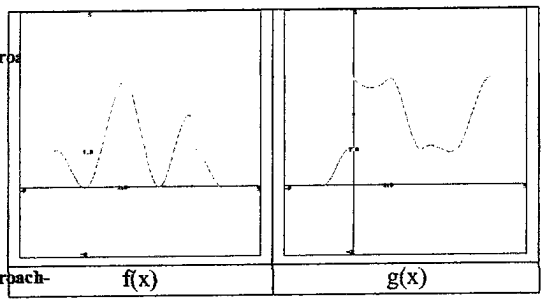
**15.** (1 pt) Library/Rochester/setLimitsRates2Limits/ur_lr_2_10.pg




The graphs of $f$ and $g$ are given above. Use them to evaluate each quantity below. Write 'DNE' if the limit or value does not exist (or if it's infinity).

___1. $\lim_{x\to 3+}[f(x)/g(x)]$

___2. $f(0)g(0)$

___3. $\lim_{x\to 3+}[f(x)g(x)]$

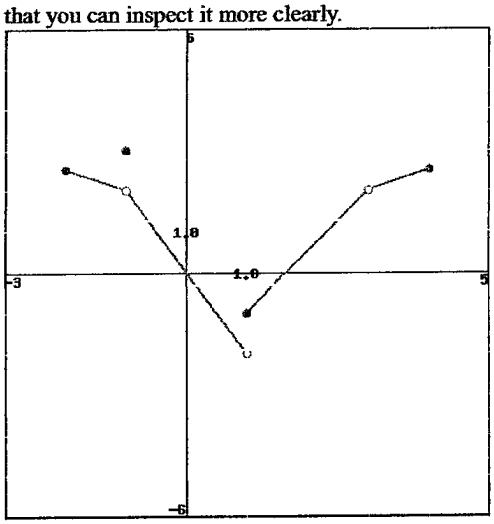
___4. $\lim_{x\to 3+}[f(g(x))]$

---

**16.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S02-Limits/2-2-05.pg

Let $F$ be the function below.

If you are having a hard time seeing the picture clearly, click on the picture. It will expand to a larger picture on its own page so that you can inspect it more clearly.




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) $F(3) =$ ___

**Gestur Olafsson**

**Math-1550-22-Fall**

**WeBWorK assignment number Sections_2.3_2.4 is due : 09/12/2008 at 11:59pm CDT.**

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**1.** **(1 pt) Rogawski-ET/2_Limits/2.3_Basic_Limit_Laws/2.3.1.pg**

From Rogawski ET section 2.3, exercise 1.

Evaluate the limit using the Limit Laws:

$lim_{x \to 12} x =$ ___

---

**2.** **(1 pt) Rogawski-ET/2_Limits/2.3_Basic_Limit_Laws/2.3.3.pg**

From Rogawski ET section 2.3, exercise 3.

Evaluate the limit using the Limit Laws:

$lim_{x \to -3} 5 =$ ___

---

**3.** **(1 pt) Rogawski-ET/2_Limits/2.3_Basic_Limit_Laws/2.3.17.pg**

From Rogawski ET section 2.3, exercise 17.

Evaluate the limit using the Limit Laws:

$lim_{x \to 3} \frac{1-x}{1+x} =$ ___

---

**4.** **(1 pt) Rogawski-ET/2_Limits/2.3_Basic_Limit_Laws/2.3.25.pg**

From Rogawski ET section 2.3, exercise 25.

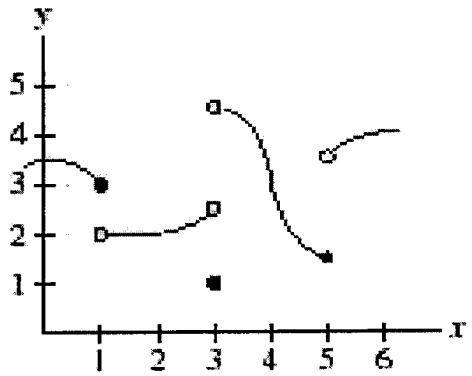
Evaluate the limit assuming that $lim_{x \to 4} f(x) = -5$ and $lim_{x \to 4} g(x) = 8$:

$lim_{x \to 4} f(x)g(x) =$ ___

---

**5.** **(1 pt) Rogawski-ET/2_Limits/2.4_Limits_and_Continuity/2.4.1.pg**

From Rogawski ET section 2.4, exercise 1.




State whether the function shown in the figure is left-continuous, right-continuous, or neither at the following points:

? 1. at $x = 4$

? 2. at $x = 3$

? 3. at $x = 5$

---

**6.** **(1 pt) Rogawski-ET/2_Limits/2.4_Limits_and_Continuity/2.4.17.pg**

From Rogawski ET section 2.4, exercise 17.

Determine the point at which the function $f(x) = \frac{1}{x-4}$ is discontinuous and state the type of discontinuity: removable, jump, infinite, or none of these.

$x =$ ___

? 1. Choose the type

---

**7.** **(1 pt) Rogawski-ET/2_Limits/2.4_Limits_and_Continuity/2.4.19.pg**

From Rogawski ET section 4.2, exercise 19.

Determine the points at which the function is discontinuous and state the type of discontinuity: removable, jump, infinite, or none of these.

$f(x) = \frac{x-2}{|x-1|}$

$x =$ ___

[?] 1. Choose the type

---

**8.** (1 pt) Rogawski-ET/2_Limits/2.4_Limits_and_Continuity/2.4.67.pg

From Rogawski ET section 2.4, exercise 67.

Evaluate the limit $\lim_{x\to\frac{\pi}{12}} \tan(36\cdot x)$.

$\lim_{x\to\frac{\pi}{12}} \tan(36\cdot x) =$ _____

---

**9.** (1 pt) Library/Rochester/setLimitsRates2Limits/ns2_2_xx.pg

Let

$$f(x) = \begin{cases} 10 & \text{if } x > 9 \\ -1 & \text{if } x = 9 \\ -x+10 & \text{if } -1 \le x < 9 \\ 11 & \text{if } x < -1 \end{cases}$$

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. $\lim_{x\to 9} f(x)$

___4. $\lim_{x\to -1^-} f(x)$

___5. $\lim_{x\to -1^+} f(x)$

___6. $\lim_{x\to -1} f(x)$

---

**10.** (1 pt) Library/ASU-topics/setCalculus/stef/stef2-3p1.pg

Let $f(x) = \begin{cases} 6-x-x^2, & \text{if } x \le 4 \\ 2x-7, & \text{if } x > 4 \end{cases}$

Calculate the following limits. Enter DNE if the limit does not exist.

$\lim_{x\to 4^-} f(x) =$ _____ $\lim_{x\to 4^+} f(x) =$ _____ $\lim_{x\to 4} f(x) =$ _____

---

**11.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S05-Continuity/2-5-33.pg

Use continuity to evaluate

$$\lim_{x\to 1} e^{x^3-x^1}$$

Enter **I** for $\infty$, **-I** for $-\infty$, and **DNE** if the limit does not exist.

Limit = _____

---

**12.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S05-Continuity/2-5-39.pg

For what value of $c$ is the function defined below continuous on $(-\infty, \infty)$?

$$f(x) = \begin{cases} cx+3, & x < 2, \\ cx^2-3, & x \ge 2. \end{cases}$$

$c =$ _____

---

**13.** (1 pt) Library/maCalcDB/setLimitsRates5Continuity/ur_lr_5_1.pg

A function $f(x)$ is said to have a **removable** discontinuity at $x = a$ if:

**1.** $f$ is either not defined or not continuous at $x = a$.

**2.** $f(a)$ could either be defined or redefined so that the new function IS continuous at $x = a$.

---

Let $f(x) = \frac{2x^2+3x-5}{x-1}$

Show that $f(x)$ has a removable discontinuity at $x = 1$ and determine what value for $f(1)$ would make $f(x)$ continuous at $x = 1$.

Must define $f(1) =$ _____.

---

**14.** (1 pt) Library/maCalcDB/setLimitsRates5Continuity/ur_lr_5_4.pg

A function $f(x)$ is said to have a **jump** discontinuity at $x = a$ if:

**1.** $\lim_{x\to a^-} f(x)$ exists.

**2.** $\lim_{x\to a^+} f(x)$ exists.

**3.** The left and right limits are not equal.

---

Let $f(x) = \begin{cases} 7x-7, & \text{if } x < 7 \\ \frac{1}{x+9}, & \text{if } x \ge 7 \end{cases}$

Show that $f(x)$ has a jump discontinuity at $x = 7$ by calculating the limits from the left and right at $x = 7$.

$\lim_{x\to 7^-} f(x) =$ _____

$\lim_{x\to 7^+} f(x) =$ _____

Now for fun, try to graph $f(x)$.

---

**15.** (1 pt) Library/ma122DB/set2/s2_5_40.pg

For what value of the constant $c$ is the function $f$ continuous on $(-\infty, \infty)$ where

$$f(x) = \begin{cases} x^2-c & \text{if } x \in (-\infty, 3) \\ cx+9 & \text{if } x \in [3, \infty) \end{cases}$$

Answer: _____

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**16.** (1 pt) Library/ASU-topics/setCalculus/stef/stef2_5p3.pg

Let

$$f(x) = 7x^8 - 1x^4 + 1.$$

Use interval notation to indicate where $f(x)$ is continuous.

**Note:** Use 'INF' for $\infty$, '-INF' for $-\infty$, and use 'U' for the union symbol.

Interval(s) of Continuity:

_____

**Gestur Olafsson** **Math-1550-22-Fall**

**WeBWorK assignment number Sections_2.5_2.6 is due : 09/16/2008 at 11:59pm CDT.**

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**1.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.5.pg**

From Rogawski ET section 2.5, exercise 5.

Evaluate the limit:

$\lim_{x\to 6} \frac{x^2-36}{x-6} =$ ___

---

**2.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.15.pg**

From Rogawski ET section 2.5, exercise 15.

Evaluate the limit:

$\lim_{y\to 8} \frac{(y-8)^3}{y^3-6y^2-17y+8} =$ ___

---

**3.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.19.pg**

From Rogawski ET section 2.5, exercise 19.

Evaluate the limit:

$\lim_{h\to 0} \frac{\sqrt{h+5}-5}{h} =$ ___

If the limit doesn't exist enter *F*

---

**4.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.27.pg**

From Rogawski ET section 2.5, exercise 27.

Evaluate the limit:

$\lim_{x\to 0} \frac{\cot 7x}{\csc 7x} =$ ___

---

**5.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.39.pg**

From Rogawski ET section 2.5, exercise 39.

Evaluate the limit:

$\lim_{x\to 1} \frac{x^2-9x+8}{x^3-1} =$ ___

---

**6.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.49.pg**

From Rogawski ET section 2.5, exercise 49.

Evaluate the limit:

$\lim_{x\to a} \frac{\sqrt{x}-\sqrt{a}}{2(x-a)} =$ ___

---

**7.** **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S03-CalcLimits/2-3-38a.pg**

Evaluate the limit

$$\lim_{x\to 2^+} \frac{|x-2|}{x-2}$$

Enter **I** for $\infty$, **-I** for $-\infty$, and **DNE** if the limit does not exist.

Limit = _____

---

**8.** **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S03-CalcLimits/2-3-42.pg**

Evaluate the limit

$$\lim_{x\to 2^+} \left(\frac{1}{x-2} - \frac{1}{|x-2|}\right)$$

Enter **I** for $\infty$, **-I** for $-\infty$, and **DNE** if the limit does not exist.

Limit = _____

---

**9.** **(1 pt) Library/ASU-topics/setRateChange/3-2-73.pg**

Find (in terms of the constant *a*)

$$\lim_{h\to 0} \frac{6(a+h)^2 - 6a^2}{h}.$$

Limit = _____

---

**10.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.5.pg**

From Rogawski ET section 2.6, exercise 5.

Use the Squeeze Theorem to evaluate the limit:

$\lim_{x\to 0} x\cos(8/x) =$ ___

---

**11.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.9.pg**

From Rogawski ET section 2.6, exercise 9.

Evaluate the limit using Theorem 2 as necessary:

$\lim_{x\to 0} \frac{\cos(9x)\sin(8x)}{x} =$ ___

---

**12.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.19.pg**

From Rogawski ET section 2.6, exercise 19.

Evaluate the limit:

$\lim_{h\to 0} \frac{\sin 8h}{h} =$ ___

**13.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.27.pg**
From Rogawski ET section 2.6, exercise 27.
Evaluate the limit:
$\lim_{t\to 0} \frac{\tan 9t}{t \sec t} =$ ___

**14.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.31.pg**
From Rogawski ET section 2.6, exercise 31.
Evaluate the limit:
$\lim_{x\to 0} \frac{\tan 5x}{\tan 8x} =$ ___

**15.** **(1 pt) Rogawski-ET/2_Limits/2.6_Trigonometric_Limits/2.6.41.pg**
From Rogawski ET section 2.6, exercise 41.
Calculate:

$\lim_{x\to 0+} \frac{\sin 4x}{|4x|} =$ ___

and
$\lim_{x\to 0-} \frac{\sin 4x}{|4x|} =$ ___

**16.** **(1 pt) Rogawski-ET/2_Limits/2.5_Evaluating_Limits_Algebraically-/2.5.9.pg**
From Rogawski ET section 2.5, exercise 9.
Evaluate the limit:
$\lim_{x\to 4} \frac{x-4}{x^3-16x} =$ ___

**WeBWorK assignment number Sections_3.1_3.2 is due : 09/19/2008 at 11:59pm CDT.**

The
**(* replace with url for the course home page *)**
for the course contains the syllabus, grading policy and other information.

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This file is /conf/snippets/setHeader.pg you can use it as a model for creating files which introduce each problem set.

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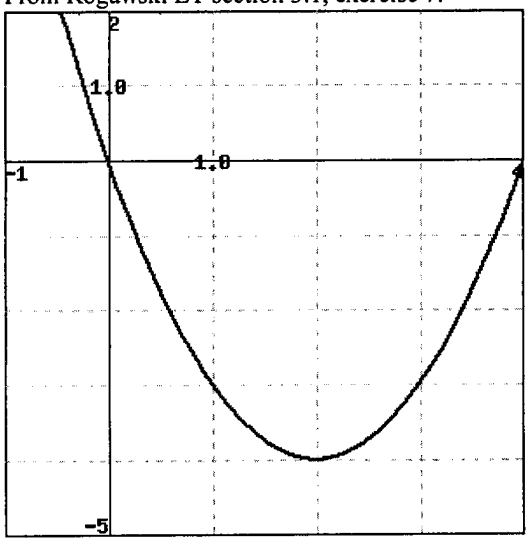
**1.** **(1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.7.pg**

From Rogawski ET section 3.1, exercise 7.




Calculate the slope of the secant line through the points on the graph where $x = 1$ and $x = 3$.

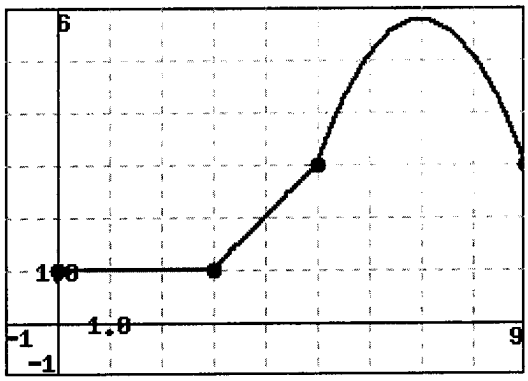
slope = ____

---

**2.** **(1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.11.pg**

From Rogawski ET section 3.1, exercise 11.

Let $f(x)$ be the function whose graph is shown below.




Determine $f'(a)$ for $a = 1, 2, 4, 7$.

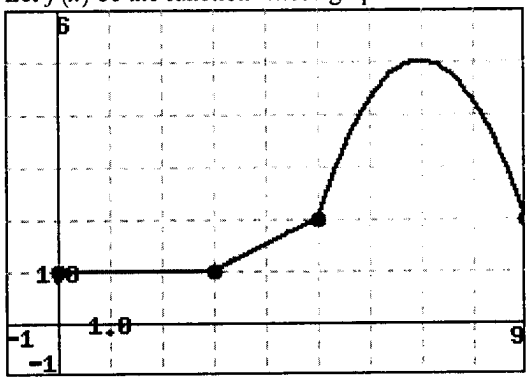
$f'(1) =$ _____
$f'(2) =$ _____
$f'(4) =$ _____
$f'(7) =$ _____

---

**3.** **(1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.13.pg**

From Rogawski ET section 3.1, exercise 13.

Let $f(x)$ be the function whose graph is shown below.




Which is larger?

- A. $f'(5.5)$

- B. $f'(6.5)$

---

**4.** (1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.15.pg

From Rogawski ET section 3.1, exercise 15.

Use the definition of the derivative to find the derivative of: $f(x) = 3x + 9$.

$f'(x) =$ _____

---

**5.** (1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.19.pg

From Rogawski ET section 3.5, exercise 19.

let $f(x) = \frac{1}{x}$. Compute the difference quotient for $f(x)$ at $x = 4$ with $h = 0.2$

difference quotient = _____

---

**6.** (1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.53.pg

From Rogawski ET section 3.1, exercise 53.

The limit below represents a derivative $f'(a)$. Find $f(x)$ and $a$.

$$\lim_{h\to 0} \frac{(2+h)^4 - 16}{h}$$

$f(x) =$ _____

$a =$ _____

---

**7.** (1 pt) Rogawski-ET/3_Differentiation/3.1_Definition_of_the_Derivative-/3.1.57.pg

From Rogawski ET section 3.1, exercise 57.

The limit below represents a derivative $f'(a)$. Find $f(x)$ and $a$.

$$\lim_{h\to 0} \frac{2^{3+h} - 8}{h}$$

$f(x) =$ _____

$a =$ _____

---

From Rogawski ET section 3.2, exercise 11.

Use the Power Rule to compute the derivative:

$\frac{d}{dt} t^{2/3}|_{t=3} =$ _____

---

**9.** (1 pt) Rogawski-ET/3_Differentiation/3.2_The_Derivative_as_a_Function-/3.2.13.pg

From Rogawski ET section 3.2, exercise 13.

Use the power rule to compute the derivative.

$$\frac{d}{dx} x^{0.15}$$

$f'(x) =$ _____

---

**10.** (1 pt) Rogawski-ET/3_Differentiation/3.2_The_Derivative_as_a_Function-/3.2.23.pg

From Rogawski ET section 3.2, exercise 23.

Find the derivative of the function $f(x) = x^3 + x^2 - 11$.

$f'(x) =$ _____

---

From Rogawski ET section 3.2, exercise 27.

Find the derivative of the function $f(x) = 2x^{-3} + x^2 + 14$.

$f'(x) =$ _____

---

**12.** (1 pt) Rogawski-ET/3_Differentiation/3.2_The_Derivative_as_a_Function-/3.2.55.pg

From Rogawski ET section 3.2, exercise 55.

Find all values of $x$ where the tangent lines to $y = x^8$ and $y = x^9$ are parallel.

$x =$ _____

---

**13.** (1 pt) Rogawski-ET/3_Differentiation/3.2_The_Derivative_as_a_Function-/3.2.57.pg

From Rogawski ET section 3.2, exercise 57.

Determine coefficients $a$ and $b$ such that $p(x) = x^2 + ax + b$ satisfies $p(1) = 16$ and $p'(1) = 11$.

$a =$ _____

$b =$ _____

---

**14.** (1 pt) Rogawski-ET/3_Differentiation/3.2_The_Derivative_as_a_Function-/3.2.77.pg

From Rogawski ET section 3.2, exercise 77.

Find the points $c$ (if any) such that $f'(c)$ does not exist.

$$f(x) = |x - 3|$$

$c =$ _____

---

**15.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C02S09-DerivAsFunct/2-9-23.pg

Use the **definition of the derivative** (don't be tempted to take shortcuts!) to find the derivative of the function

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

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

**Note:** When entering interval notation in WeBWorK, use **I** for $\infty$, **-I** for $-\infty$, and **U** for the union symbol. If the set is empty, enter **(0,0)** .

$f'(x) =$ _____

Domain of $f(x) =$ _____

Domain of $f'(x) =$ _____

---

**16.** (1 pt) Library/ASU-topics/setDerivativeFunction/3-3-05.pg

Suppose that

$$f(x+h) - f(x) = -3hx^2 - 1hx + 2h^2x + 8h^2 - 7h^3.$$

Find $f'(x)$.

$f'(x) =$ _____

**Gestur Olafsson** **Math-1550-22-Fall**

**WeBWorK assignment number Sections_3.3_3.4 is due : 08/14/2017 at 09:57am CDT.**

The
**(* replace with url for the course home page *)**
for the course contains the syllabus, grading policy and other information.

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---

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**1.** **(1 pt) Rogawski-ET/3_Differentiation/3.3_Product_and_Quotient_Rules/3.3.5.pg**

From Rogawski ET section 3.3, exercise 5.

Use the Product Rule to compute the derivative:

$\frac{d}{dt}((t^2+1)(t+9))|_{t=2}$ = _____

---

**2.** **(1 pt) Rogawski-ET/3_Differentiation/3.3_Product_and_Quotient_Rules/3.3.19.pg**

From Rogawski ET section 3.3, exercise 19.

Compute the derivative:

$\frac{d}{dx}(\frac{1}{x+5})|_{x=4}$ = _____

---

**3.** **(1 pt) Rogawski-ET/3_Differentiation/3.3_Product_and_Quotient_Rules/3.3.53.pg**

From Rogawski ET section 3.3, exercise 53.

Calculate $F'(0)$, where

$$F(x)=\frac{6x^7-7x^9-3x^2-2x}{4x^8-2x^6+2x-4}.$$

**Hint:** Do not calculate $F'(x)$. Instead, write $F(x)=f(x)/g(x)$ and express $F'(0)$ directly in terms of $f(0), f'(0), g(0), g'(0)$.

$F'(0)$ = _____

---

**4.** **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S02-ProdQuotRules/3-2-31b.pg**

Consider the functions $f(x)$ and $g(x)$, for which $f(0)=7$, $g(0)=7$, $f'(0)=-1$, and $g'(0)=2$.

Find $h'(0)$ for the function $h(x)=\frac{f(x)}{g(x)}$.

$h'(0)$ = _____

---

**5.** **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S02-ProdQuotRules/3-2-23.pg**

Find an equation for the line tangent to the graph of

$$f(x)=\frac{2x}{x+4}$$

at the point (3, 0.857142857142857).

$y$ = _____

---

**6.** **(1 pt) Rogawski-ET/3_Differentiation/3.4_Rates_of_Change/3.4.5.pg**

From Rogawski ET section 3.4, exercise 5.

Calculate the rate of change $\frac{dV}{dr}$ where $V$ is the volume of a cylinder whose height is equal to 3 times its radius. (The volume of a cylinder of height $h$ and radius $r$ is $\pi r^2 h$).

The rate of change is _____

---

**7.** **(1 pt) Rogawski-ET/3_Differentiation/3.4_Rates_of_Change/3.4.13.pg**

From Rogawski ET section 3.4, exercise 13.

A stone is tossed vertically upward with an initial velocity of 30 ft/s from the top of a 42 ft building.

(a) What is the height of the stone after 0.13 s?

(b) Find the velocity of the stone after 1 s.

(c) When does the stone hit the ground?

(a) _____

(b) _____

(c) _____

---

**8.** **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S03-RatesofChange/3-3-01.pg**

Suppose that a particle moves according to the law of motion

$$s=t^2-7t+26, \qquad t\geq 0.$$

(A) Find the velocity at time $t$.

$v(t)$ = _____

(B) What is the velocity after 3 seconds?

Velocity after 3 seconds = _____

(C) Find all values of $t$ for which the particle is at rest. (If there are no such values, enter 0. If there are more than one value, list them separated by commas.)

$t$ = _____

(D) Use interval notation to indicate when the particle is moving in the positive direction. (If the particle is never moving in the positive direction, enter (0,0).)

Answer = _____

**9.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S03-RatesofChange/3-3-16.pg

If a tank holds 4000 gallons of water, which drains from the bottom of the tank in 44 minutes, then Torricelli's Law gives the volume $V$ of water remaining in the tank after $t$ minutes as

$$V = 4000\left(1 - \frac{t}{44}\right)^2, \qquad 0 \le t \le 44.$$

Find the rate at which the water is draining from the tank after:

(A) 4 minutes → Rate of change = _____

(B) 9 minutes → Rate of change = _____

(C) 16 minutes → Rate of change = _____

---

**10.** (1 pt) Library/ma122DB/set4/s3_3_27.pg

Suppose that the cost, in dollars, for a company to produce $x$ pairs of a new line of jeans is

$$C(x) = 7100 + 6x + 0.01x^2 + 0.0002x^3.$$

(a) Find the marginal cost function.

Answer: _____

(b) Find the marginal cost at $x = 100$.

Answer: _____

(c) Find the cost at $x = 100$.

Answer: _____

---

**11.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S02-ProdQuotRules/3-2-06a.pg

Suppose that

$$f(x) = \frac{e^x}{x^2 + 18}.$$

Find $f'(1)$.

$f'(1) =$ _____

---

**12.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S02-ProdQuotRules/3-2-25.pg

Find an equation for the line tangent to the graph of

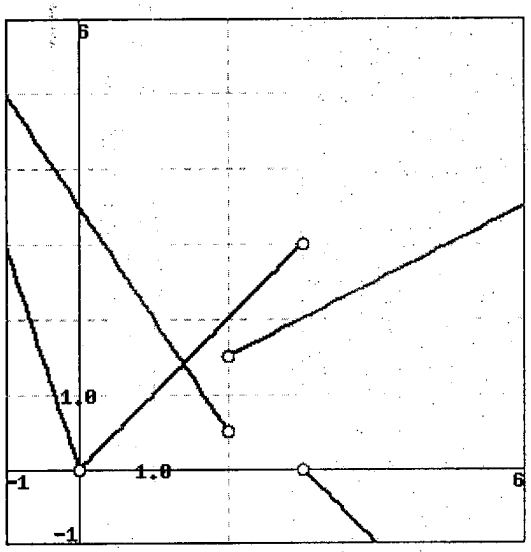
$$f(x) = 4xe^x$$

at the point $(a, f(a))$ for $a = 1$.

$y =$ _____

---

**13.** (1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S02-ProdQuotRules/3-2-35.pg




**Note: Click on graph for larger version in new browser window.**

The graphs of the function $f$ (given in blue) and $g$ (given in red) are plotted above. Suppose that $u(x) = f(x)g(x)$ and $v(x) = f(x)/g(x)$. Find each of the following:

$u'(1) =$ _____

$v'(1) =$ _____

---

**14.** (1 pt) Library/Rochester/setDerivatives2Formulas/s2_2_12.pg

If

$$f(x) = \frac{3 - x^2}{5 + x^2}$$

find $f'(x)$.

_____

Find $f'(1)$.

_____

---

**15.** (1 pt) Rogawski-ET/3_Differentiation/3.4_Rates_of_Change-/3.4.31.pg

From Rogawski ET section 3.4, exercise 31.

What is the velocity of an object dropped from a height of 320 m when it hits the ground?

_____

---

**16.** (1 pt) Library/ASU-topics/setProductQuotientRule/3-5-39.pg

Let

$$f(x) = \frac{x}{x^2 + 1}.$$

Find all the values of x for which $f'(x) = 0$. What is the product of all these values?

(For example, if $f'(x)$ was equal to zero at the points 1, 2, and 3, then the answer would be 1*2*3 = 6.)

Product = _____