Calculus Homework Guidelines:

- ✓ All exercises are to be solved algebraically/analytically unless otherwise stated in the directions. If directions state to use your calculator, you must write the calculus that needs to be set up, however from there you can just state your results.

- ✓ All work is to be done in pencil. Your paper can have at most two vertical columns of exercises on each side of the sheet. ***Your work must be done neatly and be easily legible.*** Your work will be penalized if your work is faint, very small, or crammed to avoid using more paper.

- ✓ If multiple sections are assigned in one assignment, they must be stapled together. The sections must be stapled in order.

	Name Date Period
Section 1-3 # 1-5, 6,18, 24-33(3n)	
1. 2. 3.	4. 5. 6.

- ✓ Solutions should have work shown that demonstrates all the key steps/ideas needed to solve an exercise. Use your best judgment on what a reasonable amount of work is. When in doubt, show more work.

  "Show all of your work. Clearly label any functions, graphs, tables, or other objects that you use. Your work will be scored on the correctness and completeness of your methods as well as your answers. Answers without supporting work will usually not receive credit. Justifications require that you give mathematical (non-calculator) reasons."

- ✓ Solutions must be labeled with proper units. Answers to word problems must be written in complete sentences.

- ✓ Work must be done vertically, aligned at the equals sign. See the next page for examples.

- ✓ If you use a theorem [i.e. Intermediate Value Theorem, Mean Value Theorem, etc.] in your solution, you must
  - o demonstrate that the conditions of the hypothesis are met
  - o state the theorem
  - o write the conclusion of the theorem based on the context to which it is being applied

- ✓ Numerical answers must be exact, or accurate to three decimal places, rounded or truncated.
  - o Suppose the answer is $\sqrt{7}$. Then $\sqrt{7}$, 2.645, or 2.646 are acceptable.

- ✓ If an exercise requires you to sketch a graph, your sketch must demonstrate all key information about the graph clearly labeled. If an exercise requires you to graph, your work must be done on graph paper, graphed accurately, axes labeled with units, and axes scaled.

- ✓ All work to a solution must be done in one location. If you do not have sufficient space to solve an exercise where it would normally be done, write a note where that exercise would have normally been completed stating where the work will be found.

- ✓ Solutions need not be simplified. If your answer is an expression/value or a function, the solution does not need to be simplified, or the function does not have to be expanded and simplified.

Not adhering to all of the above guidelines will result in a deduction of points in addition to accuracy errors or incompleteness.

- Find the derivative of $y = x^2 - 3x - 1$ at $x = 0$ using the difference quotient:

$$\lim_{h\to 0}\frac{f(0+h)-f(0)}{h} = \lim_{x\to 0}\frac{\left[(0+h)^2-3(0+h)-1\right]-[-1]}{h}$$
$$= \lim_{h\to 0}\frac{\left(h^2-3h-1\right)-[-1]}{h}$$
$$= \lim_{h\to 0}\frac{h^2-3h}{h}$$
$$= \lim_{h\to 0} h-3$$
$$= -3$$

- Example: Find the derivative of

$$f(x) = x^2\cdot\tan(x)$$
$$\downarrow$$
$$f'(x) = 2x\cdot\tan(x)+x^2\cdot\sec^2(x)$$

* Evaluate $f'(x)$ at $x = \frac{\pi}{3}$

$$f'\left(\frac{\pi}{3}\right) = 2\left(\frac{\pi}{3}\right)\cdot\tan\left(\frac{\pi}{3}\right)+\left(\frac{\pi}{3}\right)^2\cdot\sec^2\left(\frac{\pi}{3}\right)$$

- Let R be the region in the first quadrant under the graph of $y = \frac{x}{(x^2+2)^2}$ for $0 \le x \le \sqrt{6}$. Find the area of R.

$$\int_0^{\sqrt{6}}\frac{x}{(x^2+2)^2}\,dx = \frac{1}{2}\int_0^{\sqrt{6}}\frac{2x}{(x^2+2)^2}\,dx$$
$$= \frac{1}{2}\left[-(x^2+2)^{-1}\right]_0^{\sqrt{6}}$$
$$= \frac{1}{2}\left(\left[-\left(\left(\sqrt{6}\right)^2+2\right)^{-1}\right]-\left[-\left((0)^2+2\right)^{-1}\right]\right)$$
$$= \frac{3}{16}\text{ units}^2$$
$$= 0.1875\text{ units}^2$$
$$= 0.187\text{ units}^2$$
$$= 0.188\text{ units}^2$$

Let $u = x^2+2$
$du = 2x\,dx$
$u(0) = 2$
$u\left(\sqrt{6}\right) = 8$

$$\int_0^{\sqrt{6}}\frac{x}{\left(x^2+2\right)^2}\,dx = \frac{1}{2}\int_0^{\sqrt{6}}\frac{2x}{\left(x^2+2\right)^2}\,dx$$
$$= \frac{1}{2}\int_2^8 u^{-2}\,du$$
$$= \frac{1}{2}\left[-u^{-1}\right]_2^8$$
$$= \frac{1}{2}\left[-\frac{1}{8}-\left(-\frac{1}{2}\right)\right]$$
$$= \frac{3}{16}$$
$$= 0.1875\text{ units}^2$$
$$= 0.187\text{ units}^2$$
$$= 0.188\text{ units}^2$$