Calculus 1A

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Common Errors on Week 1 Homework

1. By virtue of mismatching the problem number with the chapter section, a few students submitted problems that were not assigned, and omitted problems that were assigned.

2. Graphs should be clearly labelled, and the coordinates of significant points like x and y intercepts, min and max, discontinuities, etc. should be identified.

3. (§1.1,#25) Domain$(\sqrt{t} + \sqrt[3]{t}) = [0, \infty)$ stated without explaining that $\sqrt{t}$ (unlike $\sqrt[3]{t}$) is undefined for $t < 0$.

4. (§1.2,#11) In the chirp rate problem, many created formulas for ChirpRate as a function of Temperature, rather than Temperature as a function of ChirpRate. This is another example of the importance of **labelling quantities with units and using variable names consistent with the quantities they represent.**

5. (§1.5,#17) No work was shown for $y = C \cdot a^x$.

6. (§1.5,#20) No work was shown. Quantities were not labelled as dollars or cents. Some stated that "exponentials grow more rapidly". The meaning of "exponentials grow more rapidly than any polynomial" is that *eventually - for some possibly very large* x the exponential will overtake the polynomial and the polynomial will never catch up (in this case the polynomial that will never catch up is the constant 1million). However, in order to do this problem, you need to quantify *eventually*. For example, if February could have 27 days (even if no accumulation were considered) then this option would pay out less than the $1million in part I.

7. (§1.6,#21) In the inverse function problems the technique of switching x with y is confusing and error-prone:

   (a) **write** $y = f(x) = ...$

   (b) **solve for** x **in terms of** y

   (c) **write** $f^{-1}(y) = ...$

   The conversion from Fahrenheit to Celsius was missed by many who started off swapping C and F in the formula $C = \frac{5}{9}(F - 32)$. Now if one is careful to **label the variables with the appropriate units** the following would have been written: $C = \left(\frac{5}{9}\frac{^oC}{^oF}\right)(F - 32^oF)$ from which you can see that swapping C and F creates the nonsensical term $(C - 32^oF)$ - you cannot subtract 32^oF from another quantity measuring ^oC.

   (a) $C = f(F) = \frac{5}{9}(F - 32)$ ...really... $= \left(\frac{5}{9}\frac{^oC}{^oF}\right)(F - 32^oF)$

   (b) $F - 32 = \frac{9}{5}C$ ...really... $F - 32^oF = \left(\frac{9}{5}\frac{^oF}{^oC}\right)C$

   (c) $F = f^{-1}(C) = \frac{9}{5}C + 32$ ...really... $= \left(\frac{9}{5}\frac{^oF}{^oC}\right)C + 32^oF$