Name_____ Date_____ Period_____

Worksheet 000A.02—Calculator Basics Day 2

You will need a calculator for this worksheet (duh!)

Nearly half of the AP Calculus exam involves the use of a calculator. You will eventually be expected to use your calculator to do the following:

1. Find points of intersection of two or more graphs in an appropriate window and store these values.
2. Find solutions to equations $f(x)=0$ and store these values.
3. Evaluate a stored function at a stored value.
4. Find derivatives at a specific value.
5. Find integrals over a specific interval.

Today, we will review how to do the first three of these. The last two will come. Oh, YES, they will!

1. Graph $f(x)=-0.2(x+1)^2+50$ and $g(x)=e^x+5$ in an appropriate window so that you see both points of intersection. **ZOOM, (6) ZSTANDARD is a good window to start in anytime you don't know what the graph will look like!**
2.
   (a) Give the dimensions of your viewing window as $X:[X_{\min},X_{\max}]$, $Y:[Y_{\min},Y_{\max}]$, for example: $X:[-5,4]$, $Y:[2,11]$.

   (b) Using calculator commands **2ND, TRACE, (5) INTERSECT**, find both points of intersection (to 3 decimals), store them, and report them as $(A,B)=(x_1,y_1)$ and $(C,D)=(x_2,y_2)$.

   (c) Evaluate: $f(A)$ and $g(C)$. Are these values surprising to you?

   (d) In Y_3 on your calculator, enter Y_1-Y_2. In Y_4, enter 0 (zero). Now turn off Y_1 and Y_2 off by un-highlighting the equal sign (go to it and press **ENTER**.) Graph these two new graphs in the same window and find the two points of intersection. Are THESE values surprising to you?

   (e) Smile ☺

3. Often, we will want to find intersection points for two functions we have not already graphed. Rather that search for a window containing them, like on Example 1 (a), we simply get both functions on one side and find the roots/zeros of the new equation, like Example 1(d).

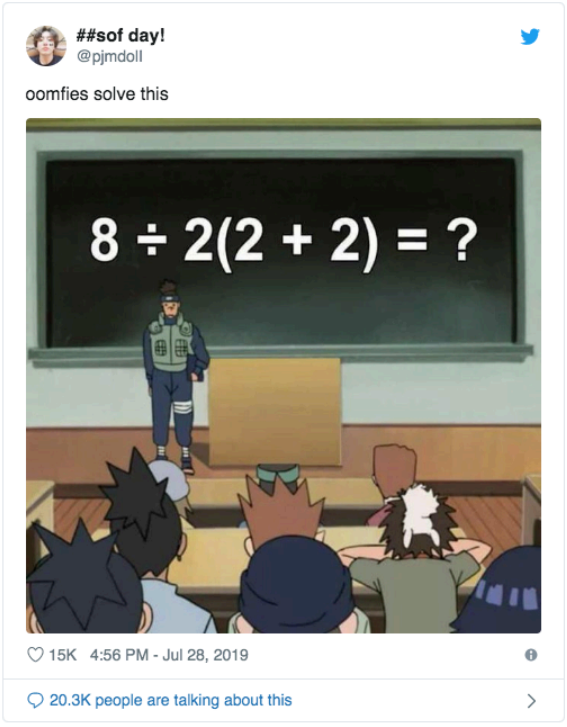
   Find the largest positive solution to the equation $\sqrt[3]{x^2} = 3\ln t$ by setting up an equation equal to zero then finding the smallest positive root/zero/x-intercept of the new equation. Show your equation and write your answer to 3 decimals. Store your answer as W, and report it as so.

4. Find the roots/zeros of the following polynomial. Show the equation you are solving, report all roots to 3 decimals, and store & label each one.

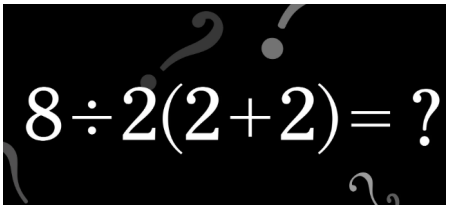
$$B(t) = t^4 + 0.008t^3 - 50t^2 + 0.004t + 626$$

5. When it comes to parenthesis (or other grouping symbols like **beefy brackets**), it's better to have them and not need them than to need them and not have them. Case in point:

   (from Steven Strogatz) *Mathematical Twitter is normally a quiet, well-ordered place, a refuge from the aggravations of the internet. But on July 28, 2019, someone who must have been a troll off-duty decided to upset the stillness, and did so with a surefire provocation.*



What is the answer to this expression? Is it 1? Or 16? Or 1? Or 16? Or 1? Or "peaches" …



(a) Do this without a calculator. Write your answer down.

(b) Type it into your calculator exactly as you see it above.
What did your calculator get?
Is it the same as your answer? Which is correct? Why?!
What could we do to clarify how to get the correct answer?
What would we need to do to the expression to get the OTHER answer?

6. Evaluate the following on your calculator (without doing mental math) to three decimals

(a) $-2-5=$

(b) $\dfrac{4+8}{2-6}-3^{5-1}=$

(c) $\sin 3^2=$

(d) $\sin(3)^2=$

(e) $\sin^2 3=$

(f) $(\sin 3)^2=$

(g) $\sqrt{6}-3\arcsin\left(\dfrac{3}{4\pi}\right)+1=$

(h) $\sqrt[4]{\cos^3\left(e^{2+1}-\sqrt{2}\right)+1}-1/2=$

(i) $\left(10^{17}+4.2-10^{17}\right)\cdot 10=$

(j) $\left(10^{17}-10^{17}+4.2\right)\cdot 10=$