Remember that final answers are not as important as how you get there. Show all your steps clearly so you will be eligible for the most partial credit. Simplify arithmetic quantities completely. Good luck!

1.) (10 pts.) Find the derivative function $g'(x)$ algebraically for $g(x) = \sqrt{x}$. Check your answer using the Power Rule.
2.) (10 pts.) Solve for $x$ using logs: $3^{x^3 + 3} = e^{7x}$.

3.) (10 pts.) Is $f(x) = x^3 + x^2 + x$ even, odd, or neither? Prove your answer.
4.) (10 pts.) Find the derivative of $h(x) = \frac{1}{x}$ at $x = 2$ \textit{algebraically}.

5.) (10 pts.) Use your answer to question (4.) to write the equation of the tangent line to $h(x) = \frac{1}{x}$ at $x = 2$. 
6.) (10 pts.) Compute the limits

a.) \( \lim_{x \to \infty} \frac{x + 3}{2 - x} \)

b.) \( \lim_{x \to 10} (x^2 - 1) \)

7.) (10 pts.) Each of the following represents either exponential growth or exponential decay. Label the equations accordingly: “growth” or “decay”.

a.) \( P = 2e^{-0.5t} \)

b.) \( P = P_0e^{\pi t} \)

c.) \( P = 13(0.97)^t \)

8.) (10 pts.) Sketch the graph of the derivative of the function shown below.
9.) (10 pts.) What is the difference between $\sin x^2$, $\sin^2 x$, and $\sin(\sin x)$? Express each as the appropriate composition of the functions $f(x) = \sin x$ and $g(x) = x^2$.

10.) (10 pts.) Each of the graphs below is a polynomial. The windows are large enough to show global behavior.

   a.) What is the minimum possible degree of each polynomial?
   b.) Is the leading coefficient of the polynomial positive or negative?