The four numbered problems have equal credit. Notice that problems 1 and 2 both have 
TWO parts. Show your work!

\[(\text{ANSWER}) + (\text{NO WORK}) = (\text{ZERO CREDIT})\].

Work that doesn’t make any sense counts as ‘no work’.

1a) Find the derivative of \((2x^2 - 5x + 11)^7\).
1b) Find the derivative of \(\sqrt{x^4 + 2x^2 + 6}\).

\textbf{Solutions.} a) Using the generalized power rule, it’s

\[7(2x^2 - 5x + 11)'(2x^2 - 5x + 11)^6 = 7(4x - 5)(2x^2 - 5x + 11)^6.\]

b) Using the same rule (applied to \((x^4 + 2x^2 + 6)^{1/2}\)), we get

\[(1/2)(4x^3 + 4x)(x^4 + 2x^2 + 6)^{-1/2} = \frac{2x^3 + 2x}{\sqrt{x^4 + 2x^2 + 6}}.\]

2a) Find the derivative of \(e^{13x}\).
2b) Find the derivative of \(e^{x^2 + \sqrt{x}}\).

\textbf{Solutions.} Both use the chain rule and the fact that \((e^x)' = e^x\). a) \(13e^{13x}\). b) \((2x + (1/2)x^{-1/2})e^{x^2 + \sqrt{x}}\).

3. Find the derivative of \(\frac{e^{3x}}{5x + 3}\).

For full credit, simplify the numerator (top) by collecting like terms.

\textbf{Solution.} By the quotient rule, it’s:

\[\frac{3e^{3x}(5x + 3) - e^{3x}5}{(5x + 3)^2} = \frac{e^{3x}(15x + 4)}{(5x + 3)^2}.\]

4. Find the derivative of \((e^x + \ln x)^4\).

\textbf{Solution.} We use the generalized power rule to get \(4(e^x + (1/x))(e^x + \ln x)^3\).