3. A quantity of gas with an initial volume of 1 cubic foot and a pressure of 500 pounds per square foot expands to a volume of 2 cubic feet. Find the work done by the gas. (Assume that the pressure is inversely proportional to the volume; that is, the gas obeys the ideal gas law such that PV = constant.)

2. Find the indefinite integral and check the result by differentiation: 

7. Find 

9. Find the partial fraction expansion:  (not sure how to handle the exponent of 3 in the denominator.)