Your Name: _____

1. Use integration by substitution to show that $\int (t-2)\sqrt{t^2 - 4t}\ dt = \dfrac{1}{3}\left(t^2 - 4t\right)^{3/2} + C.$

2. Solve the initial value problem: $y'(t) = 4y + 10$ with $y(0) = 3.5.$

3. Consider $v(t) = 0.1t^3 - 4t^2 + 1200$.

   (a) Compute $\displaystyle\int_2^{14} v(t)\, dt$.

   (b) If $v(t)$ represents the rate of change in daily securities traded (thousands of shares per day), t days from now, then what does the value of the calculation from part (a) represent in context?

4. An account increases in value at a rate of $A'(x)$ dollars per month, x months from now. Find the net change over the next year if $A'(x) = 300xe^{-0.05x^2}$.