1. Find the indicated areas
   (a) \[
   \int \frac{7.051}{0.7613} 3 \ln(2x) - (x + 0.5) \, dx = 8.5630
   \]
   (b) \[
   \int \frac{1.9855}{0} 5 \cos(x) - (x - 4) \, dx + \int \frac{3}{1.9855} (x - 4) - 5 \cos(x) \, dx = 12.8885
   \]

2. (a) \[
   \int_{0}^{2} r(t) \, dt = 1.0986 \text{ thousand antibodies}
   \]
   (b) \[
   \int_{0}^{7/2} r(t) \, dt = 2.1401 \text{ thousand antibodies}
   \]

3. (a) \[
   \int_{0}^{T} v(x) \, dx
   \]
   (b) distance fallen = \[
   \int_{0}^{20} v(x) \, dx = 739.5291 \text{ meters}
   \]
   height = 5000 - 739.5291 = 4260.4709 meters
   (c) engine hits the ground when \[
   \int_{0}^{T} v(x) \, dx = 5000.
   \]
   solve for T.
   Answer: 107.0399 seconds or 107.040 seconds

4. (a) \[
   \int_{0}^{12} f'(x) \, dx = f(12) - f(0)
   \]
   \[
   120 = 100 - f(0)
   \]
   \[
   f(0) = -20
   \]
   (b) \[
   \int_{12}^{32} f'(x) \, dx = f(32) - f(12)
   \]
   \[
   -80 = f(32) - 100
   \]
   \[
   f(32) = 20
   \]

5. (a) \[
   \int (6x^2 + 8x - 10) \, dx = 2x^3 + 4x^2 - 10x + c
   \]
   (b) \[
   \int (e^{3x} + \frac{5}{2}) \, dx = \frac{1}{3}e^{3x} + 5 \ln(x) + c
   \]

6. (a) \[
   \int (x^2 + 5)(x^2 + 4) \, dx = \int x^4 + 9x^2 + 20dx = \frac{x^5}{5} + 3x^3 + 20x + c
   \]
   (b) \[
   \int 8 \cos(2x) + 20 \sin(5x) \, dx = 4 \sin(2x) - 4 \cos(5x) + c
   \]