Section 4.9 Practice Problems: Antiderivatives

1. Find the antiderivative of the following functions

   (a) $f'(x) = \dfrac{3}{8}x^{1/3} + \dfrac{7}{11}x^{-1/7}$

   (b) $f'(x) = \dfrac{1}{\sqrt{x}} + \sqrt{x} + \dfrac{1}{2\sqrt{x}} + \dfrac{1}{2}\sqrt{x}$

   (c) $f'(x) = 6\cos x - 3\sin x$

   (d) $f'(x) = 5\sec^2 x + 2\sec x \tan x$

   (e) $f'(x) = 3\csc^2 x + 4\csc x \cot x$

   (f) $f'(x) = 2\sinh x + 7\cosh x$

   (g) $f'(x) = \dfrac{1}{x} + \dfrac{1}{x^2} + e^x + \dfrac{1}{3x} - 2e^x$

   (h) $f'(x) = \dfrac{6}{1+x^2} + \dfrac{2}{\sqrt{1-x^2}} + \dfrac{1}{\sqrt{4-4x^2}}$

2. Use the indicated initial condition to find the value of c

   (a) $f'(x) = 3x^4 - 2x + e^x$, $f(0) = 3$

   (b) $f'(x) = \cos x + \sin x$, $f(0) = 8$

   (c) $f'(x) = \dfrac{6}{1+x^2}$, $f\left(\dfrac{\pi}{4}\right) = 2$

3. A model rocket is launched from a 5 m platform with an upward initial velocity of 75 m/s. Find the equation of motion of the rocket using $g = 10$.

4. A frustrated student throws her textbook out of her apartment window (which is 50 ft above the ground) with an initial downward velocity of 10 ft/s. How long does it take for the textbook to hit the ground? This one is harder; start by finding the equation of motion for $s(t)$. The book hits the ground when $s(t) = 0$, so solve for t.