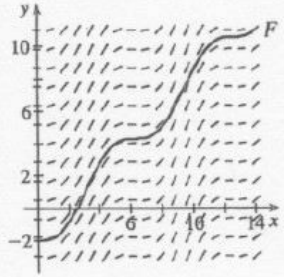
# Math 1a Homework Solutions
## Section 4.9

**22.** $f''(x) = x + x^{1/2} \Rightarrow f'(x) = \frac{1}{2}x^2 + \frac{2}{3}x^{3/2} + C$. $f'(1) = 2 \Rightarrow \frac{1}{2} + \frac{2}{3} + C = 2 \Rightarrow C = \frac{5}{6}$, so $f'(x) = \frac{1}{2}x^2 + \frac{2}{3}x^{3/2} + \frac{5}{6} \Rightarrow f(x) = \frac{1}{6}x^3 + \frac{4}{15}x^{5/2} + \frac{5}{6}x + D$. $f(1) = 1 \Rightarrow \frac{1}{6} + \frac{4}{15} + \frac{5}{6} + D = 1 \Rightarrow D = -\frac{4}{15}$, so $f(x) = \frac{1}{6}x^3 + \frac{4}{15}x^{5/2} + \frac{5}{6}x - \frac{4}{15}$.

**30.**




**38.** $v'(t) = a(t) = a \Rightarrow v(t) = at + C$ and $v_0 = v(0) = C \Rightarrow v(t) = at + v_0 \Rightarrow s(t) = \frac{1}{2}at^2 + v_0t + D \Rightarrow s_0 = s(0) = D \Rightarrow s(t) = \frac{1}{2}at^2 + v_0t + s_0$

**42.** Let the mass, measured from one end, be $m(x)$. Then $m(0) = 0$ and $\rho = \dfrac{dm}{dx} = x^{-1/2} \Rightarrow m(x) = 2x^{1/2} + C$ and $m(0) = C = 0$, so $m(x) = 2\sqrt{x}$. Thus, the mass of the 100-centimeter rod is $m(100) = 2\sqrt{100} = 20$ g.