1. (Review) Two people are in an elevator. One person steps out and begins to walk away from the elevator at a rate of $2 \mathrm{ft} / \mathrm{sec}$. At the same time, the elevator takes the other person up at a rate of $7 \mathrm{ft} / \mathrm{sec}$. How quickly is the distance between the two increasing?
2. (Review) Consider $f(x)=x^{3}+3 x^{2}-9 x+1$.
(a) On what intervals is $f$ increasing and decreasing?
(b) At what values does $f$ attain a local maximum and minimum?
(c) On what intervals is $f$ concave up and down?
(d) The zeroes of $f(x)$ are approximately $x=-4.9, x=0.1$, and $x=1.8$. Use this information, as well as the answers to the above, to sketch the graph of $f(x)$.
3. What are the definitions of even and odd functions? Give an example of a function that is even, a function that is odd, and a function that is neither.
4. Using symmetry, evaluate the following integrals:
(a) $\int_{-2}^{2} \sin (x)+x^{3} d x$
(b) $\int_{-3}^{3} 3 x^{4}+\cos (2 x) d x$
5. What is the average value of $f(x)=3 x^{2}+6 x-9$ on the interval $[-1,2]$ ?
6. (Sneak Peek) We know what the integral $\int_{a}^{b} f(x) d x$ means when $a$ and $b$ are real numbers.

How would you interpret the expression $\int_{a}^{\infty} f(x) d x$ ? Can you think of a good definition for such a thing?

