WORKSHEET 27

WORKING WITH INTEGRALS

30 April 2020

- 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 ft/sec. At the same time, the elevator takes the other person up at a rate of 7 ft/sec. How quickly is the distance between the two increasing?
- 2. (**Review**) Consider $f(x) = x^3 + 3x^2 9x + 1$.
 - (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)
$$\int_{-2}^{2} \sin(x) + x^{3} dx$$

(b) $\int_{-3}^{3} 3x^{4} + \cos(2x) dx$

thing?

- 5. What is the average value of $f(x) = 3x^2 + 6x 9$ on the interval [-1, 2]?
- 6. (Sneak Peek) We know what the integral $\int_{a}^{b} f(x) dx$ means when a and b are real numbers. How would you interpret the expression $\int_{a}^{\infty} f(x) dx$? Can you think of a good definition for such a