## Worksheet # 23: Antiderivatives

- 1. Find the most general antiderivative for each of the following functions.
  - (a) x 3
  - (b)  $\frac{1}{4}x^6 5x^3 + 9x$
  - (c) (x+1)(9x-8)
  - (d)  $\sqrt{x} \frac{2}{\sqrt{x}}$
  - (e)  $\frac{5}{x}$
  - (f)  $\sqrt{x^5} 40$
  - (g)  $\frac{x^3 8x^2 + 5}{x^2}$
  - (h)  $\frac{5}{x^6}$
  - (i)  $\frac{\sqrt{x}}{x^2} + \frac{3}{4}x^3$
  - (j)  $\frac{2}{5}x^e$
  - $(k) \ \frac{1}{x-3}$
  - (1)  $\sin(\theta) \sec^2(\theta)$
- 2. Find the values of the parameter A and B so that
  - (a)  $F(x) = (Ax + B)e^x$  is an antiderivative of  $f(x) = xe^x$ .
  - (b)  $H(x) = e^{2x}(A\cos x + B\sin x)$  is an antiderivative of  $h(x) = e^{2x}\sin x$ .
- 3. A particle moves along a straight line so that its velocity is given by  $v(t) = t^2$ . What is the net change in the particle's position between t = 1 and t = 3?
- 4. Suppose an object travels in a straight line with constant acceleration a, initial velocity  $v_0$ , and initial displacement  $x_0$ . Find a formula for the position function of the object.
- 5. A car brakes with constant deceleration of  $5 \text{ m/s}^2$  produceing skid marks measuring 75 meters long before coming to a stop. How fast was the car traveling when the brakes were first applied?
- 6. True or false?
  - (a) The antiderivative of function is unique.
  - (b) If F is the antiderivative of f then f is differentiable.
  - (c) If F is the antiderivative of f then F + c where c is a constant is also an antiderivative.