**Section 4.1** (Antiderivatives and Indefinite Integration)

One goal in antiderivatives is to find a function F(x) that has a given derivative. Consider the function whose derivative is 4x3. The function with this derivative is …

F(x) = \_\_\_\_\_\_\_\_\_ because [\_\_\_\_\_\_\_\_]=4x3

A function F is an ***antiderivative*** of f on an interval I when F`(x) = f(x) for all x in I

Example: Find the general solution to the *differential equation* (definition before example 1 in book) y` = 3.

(Hint: Find a function whose derivative is 3. The operation of finding all solutions of this equation is called antidifferentiation)

Integration is the inverse of differentiation (and vice versa): and

Examples: Review basic integration rules in the book (p. 246) and find the following antiderivatives

(Hint: rewrite -> integrate -> simplify)

Other homework examples as time allows

We’ve seen how to find the general solutions for antiderivatives, but if given an initial condition, we can find a particular solution.

Example: Find the general solution to F`(x) = , x > 0 and then find the particular solution that satisfies f(1) = 2.



Example: Virginia Tech pitcher Aaron McGarity is near the top of beautiful Lane Stadium at an initial height of 96 feet when he throws a ball upward with an initial velocity of ~55 mph (80 feet per second). (a) Find the position function giving the height s as a function of time t. (b) When does the ball hit the ground?