Math 16B: Short Calculus II
Spring 2017, Section 1
Homework Sheet 3
Due: Wednesday, April 26, 2017

Submit your solutions to the following problems in lecture on the due date above. Present your work in a clean and organized fashion, either on a printed copy of this document (preferred) or a separate sheet of paper. As stated in the syllabus, late submissions will **not** be accepted.

1. Evaluate the following indefinite integrals.

(a) $\int 4(3x+2)^6\,dx = \boxed{\frac{4}{3\cdot 7}(3x+2)^7 + C}$

Check: $\frac{d}{dx}\left(\frac{4}{3\cdot 7}(3x+2)^7\right) = \frac{4}{3\cdot 7}\cdot 7(3x+2)^6\cdot 3 = 4(3x+2)^6$ ✓

(b) $\int 4xe^{9x^2}\,dx = \boxed{\frac{4}{18}e^{9x^2} + C}$

check: $\frac{d}{dx}\left(\frac{4}{18}e^{9x^2}\right) = \frac{4}{18}e^{9x^2}\cdot 18x = 4xe^{9x^2}$ ✓

2. Solve the following initial value problem.

$f''(x) = 2x+3, \quad f'(1) = 5, \quad f(0) = 3$

$\int(2x+3)\,dx = x^2+3x+C$

$f'(x) = x^2+3x+C$

$5 = (1)^2+3(1)+C$

$C = 1$

$f'(x) = x^2+3x+1$

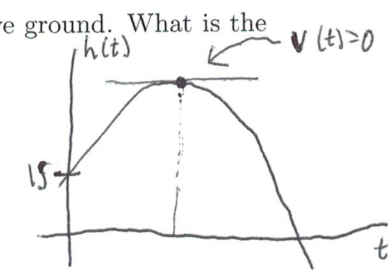
$\int(x^2+3x+1)\,dx = \frac{1}{3}x^3+\frac{3}{2}x^2+x+C$

$f(x) = \frac{1}{3}x^3+\frac{3}{2}x^2+x+C$

$3 = \frac{1}{3}(0)^3+\frac{3}{2}(0)^2+(0)+C \qquad C=3$

$\boxed{f(x) = \frac{1}{3}x^3+\frac{3}{2}x^2+x+3}$

3. Suppose a ball is thrown upward at 48ft/s starting from 15ft above ground. What is the largest height the ball will achieve?



$a(t) = -32$ ft/sec^2

$v(t) = -32t + C$

$48 = -32(0)+C$

$C = 48$

$v(t) = -32t + 48$

$h(t) = -16t^2+48t+C$

$15 = -16(0)^2+48(0)+C$

$C = 15$

$h(t) = -16t^2+48t+15$

$v(t) = -32t+48 = 0$

$t = 3/2$

$h(\frac{3}{2}) = \boxed{-16(\frac{3}{2})^2+48(\frac{3}{2})+15}$