AMS/ECON 11B **Quiz 1 Solutions** **October 5, 2015**

1. Compute the indefinite integrals.

a. (3 pts) $\int 2x^4 + 6x^2 - \frac{3}{x^2}\,dx = \int 2x^4 + 6x^2 - 3x^{-2}\,dx$

$$= 2\cdot\frac{x^5}{5} + 6\cdot\frac{x^3}{3} - 3\cdot\frac{x^{-1}}{-1} + C$$

$$= \boxed{\frac{2}{5}x^5 + 2x^3 + 3x^{-1} + C}$$

b. (3 pts) $\int \frac{5t^3+1}{4t^2}\,dt = \int \frac{5}{4}t + \frac{1}{4}t^{-2}\,dt = \frac{5}{4}\cdot\frac{t^2}{2} + \frac{1}{4}\cdot\frac{t^{-1}}{-1} + C = \boxed{\frac{5}{8}t^2 - \frac{1}{4}t^{-1} + C}$

2. (4 pts) Find the function $y = h(x)$ that satisfies

(i) $y' = 3x^2 - \frac{2}{\sqrt{x}}$, and

(ii) $y(1) = 2$.

(i) ***Integrate:*** $\int 3x^2 - \frac{2}{\sqrt{x}}\,dx = \int 3x^2 - 2x^{-1/2}\,dx = x^3 - 4x^{1/2} + C$.

So $y = x^3 - 4x^{1/2} + C$

(ii) ***Solve for*** C: $2 = y(1) = 1^3 - 4\cdot 1^{1/2} + C = -3 + C \implies C = 5$

and the function is $\boxed{y = x^3 - 4x^{1/2} + 5}$