CfE AH Homework 2: Integration.

① Use standard integrals to find the following

(a) $\int \frac{(x-3)^2}{\sqrt{x}}\,dx$ (b) $\int 3\sin\left(2x-\frac{\pi}{4}\right)dx$

(c) $\int \frac{dx}{\sqrt{(3x-5)^3}}$ (d) $\int e^{-2x}\,dx$

(e) $\int \frac{3+e^x}{e^x}\,dx$ (f) $\int \left(\frac{4}{x} - \frac{2}{2x+3}\right)dx$

(g) $\int \sec^2(2x+1)\,dx$

② Using the given substitution, integrate the following

(a) $\int x^2(2x^3+3)^5\,dx$, $u = 2x^3+3$

(b) $\int 6x\sin(x^2-4)\,dx$, $u = x^2-4$

(c) $\int 3x\sqrt{(1+x^2)}\,dx$, $u = 1+x^2$

(d) $\int \frac{3x}{\sqrt{(2x+3)}}\,dx$, $u = 2x+3$

(e) $\int \frac{1}{\sqrt{(1-x^2)}}\,dx$, $x = \sin u$

(f) $\int \frac{1}{4+9x^2}\,dx$, $x = \frac{2}{3}\tan u$

(g) $\int \frac{1}{\sqrt{(25-4x^2)}}\,dx$, $x = \frac{5}{2}\sin u$

③ Using a suitable substitution integrate

(a) $\int 3x(x^2+6)^5\,dx$ (b) $\int 5x\cos(5-x^2)\,dx$

④ Find $\int x\sqrt{(3x-2)}\,dx$ using the substitution $u = 3x-2$