St. Andrew's and St. Bride's High School

Advanced Higher Homework 12

1. Find the following indefinite integrals, in terms of x, simplifying your answers as far as possible:

(a) $\int \cos^2 x \, dx$ (b) $\int \sin^2 x \, dx$ (c) $\int \tan 3x \, dx$

(d) $\int 25x(5x-6)^8 dx$ using $u = 5x - 6$ (e) $\int x\sqrt{(5x-2)}\, dx$ using $u = 5x - 2$

(f) $\int \sqrt{(36 - x^2)}\, dx$ using $x = 6\sin\theta$

2. Evaluate:

(a) $\int_{-1}^{0} x^2 (x+1)^7 \, dx$ using $u = x + 1$

(b) $\int_{\sqrt{5}}^{\sqrt{13}} \frac{2x^3}{\sqrt{(x^2 - 4)}} \, dx$ using $u = x^2 - 4$

(c) $\int_{0}^{4} \frac{x^2}{\sqrt{(16 - x^2)}} \, dx$ using $x = 4\sin\theta$