Advanced Higher Unit 1 Homework Exercise Outcome 3

1. Find the following integrals :-

(a) $\int \frac{dx}{x^5}$ (b) $\int_0^a (ax^2 - x^3)dx$ (c) $\int_1^2 \left(\frac{2}{x^2} - \frac{3}{x} + 4 \right) dx$

(d) $\int \left(e^{-x} + e^{4x} \right) dx$ (e) $\int_0^{\pi/3} \left(\sec^2 x + \cos x \right) dx$ (f) $\int \frac{4}{3x+1} dx$

2. Integrate :-

(a) $\int \frac{dx}{x^2 - 3x + 2}$ (b) $\int_2^3 \frac{(3x^2 + x)}{(x-1)(x+1)^2} dx$ (c) $\int \frac{x^2}{x-1} dx$

3. By making suitable substitutions, or otherwise, find the following integrals :-

(a) $\int e^{-(4x+3)} dx$ (b) $\int \frac{(x-1)}{\sqrt{(x^2 - 2x + 3)}} dx$

(c) Let u=cos$x$ to find $\int 3\cos^3 x \sin x dx$.

4. Find the area enclosed by the curve $y = \frac{4}{x}$, the lines $y = 2$ and $y = 3$, and the y-axis.