MA1125 – Calculus
Tutorial problems #8

1. Compute each of the following indefinite integrals.
$$\int \frac{x^2}{x^3+1}\,dx, \qquad \int \frac{x^2}{x+1}\,dx.$$

2. Compute each of the following indefinite integrals.
$$\int \sin^2 x \cdot \cos^3 x \,dx, \qquad \int \sec^5 x \cdot \tan x \,dx.$$

3. Compute each of the following indefinite integrals.
$$\int \sin^{-1} x \,dx, \qquad \int e^{\sqrt{x}} \,dx.$$

4. Find the area of the region enclosed by the graphs of $f(x) = e^{2x}$ and $g(x) = 4e^x - 3$.

5. Find the volume of the solid that is obtained by rotating the graph of $f(x) = \tan x$ around the x-axis over the interval $[0, \pi/4]$.

6. Compute each of the following indefinite integrals.
$$\int \frac{dx}{(1+x)\sqrt{x}}, \qquad \int x(\ln x)^2 \,dx.$$

7. Compute each of the following indefinite integrals.
$$\int \frac{dx}{(x^2+4)^2}, \qquad \int x^2\sqrt{1-x^2}\,dx.$$

8. Compute the length of the graph of $f(x) = \frac{1}{2}x^2$ over the interval $[0, 1]$.

9. Let $a > 0$ be given. Use integration by parts to find a reduction formula for
$$I_n = \int \frac{dx}{(x^2+a^2)^n}.$$

10. Use integration by parts to compute the indefinite integral
$$\int \sin(\ln x)\,dx.$$