1. Express $9x^2 + 12x + 10$ in the form $a(x+b)^2 + c$, where a, b and c are not functions of x.

2. Express the following expressions in terms of $\log(x)$ and $\log(y)$:

   (a) $\log(x^3)$ (b) $\log(1/x^2)$ (c) $\log(x/y)$ (d) $\log(xy)$

3. Evaluate

   (a) $\sum_{k=0}^{10} \frac{1}{4^k}$

   (b) $\frac{1}{3} + \frac{1}{6} + \frac{1}{12} + \frac{1}{24} + \frac{1}{48} + \cdots$

4. Use integration by parts to evaluate $\int_0^1 x\exp(x)dx$.

5. Differentiate

   (a) $\exp(-x^2)$ (b) $\log(x)$ (c) $\log(x^3)$ (d) $x^3\exp(-x)$

   (e) $\frac{x}{\exp(x)}$

6. Use integration by substitution so show that $\int_0^1 \frac{1}{\sqrt{z}(1+\sqrt{z})}dz = 2\log(2)$

7. Sketch rough plots of the following functions, indicating at least the point of intersection with the y axis

   (a) $f(x) = \exp(-x)$, $-\infty < x < \infty$

   (b) $f(x) = x^2$, $-\infty < x < \infty$

   (c) $f(x) = \exp(-x^2)$, $-\infty < x < \infty$