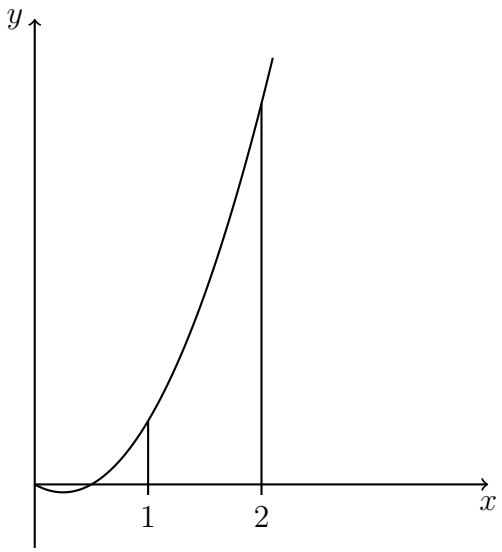
Homework: 6-4+5 P1 (No Calculator) Calculus Integration

1. 18M.1.sl.TZ2.2
   Let $f(x) = 6x^2 - 3x$. The graph of f is shown in the following diagram.



   (a) Find $f'(x)$. [2 marks]

   (b) Find the area of the region enclosed by the graph of f, the x-axis and the lines $x = 1$ and $x = 2$. [4 marks]

2. 16M.2.sl.TZ1.2
   Let $f(x) = x^2$ and $g(x) = 3\ln(x + 1)$, for $x > -1$.

   (a) Solve $f(x) = g(x)$ [3 marks]

   (b) Find the area of the region enclosed by the graphs of f and g. [3 marks]

3. 15N.1.sl.TZ0.3
   Let $f'(x) = 6x^2 - 5$. and $f(2) = -3$, find $f(x)$. [6 marks]

4. 13N.1.sl.TZ0.4a
   Consider a function $f(x)$ such that $\int_1^6 f(x)\,\mathrm{d}x = 8$.

   (a) Find $\int_1^6 2f(x)\,\mathrm{d}x$. [2 marks]

   (b) Find $\int_1^6 (f(x) + 2)\,\mathrm{d}x$. [4 marks]

5. 16N.2.sl.TZ0.4
   Let $f(x) = xe^{-x}$ and $g(x) = -3f(x) + 1$.
   The graphs of f and g intersect at $x = p$ and $x = q$, where $p < q$.

   (a) Find the values of f and q. [3 marks]

   (b) Hence, find the area of the region enclosed by the graphs of f and g. [3 marks]