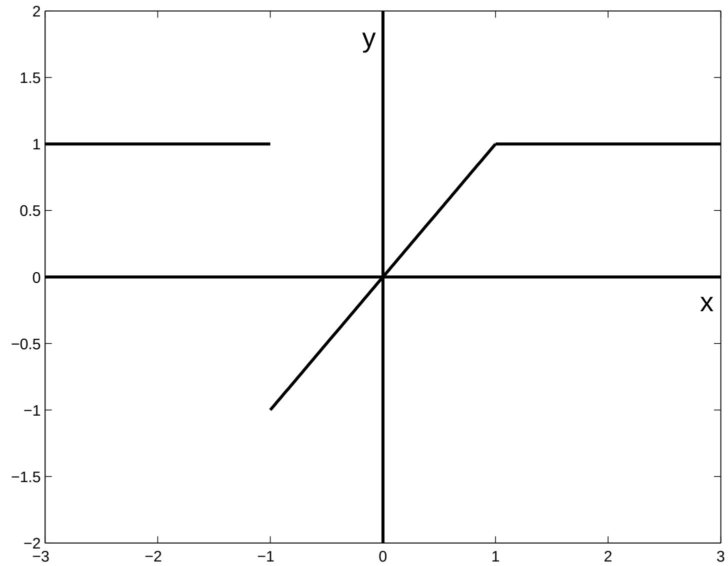
1. Given the graph of the funtion $f(x)$, determine the value of the following integrals:



$(a)\ \int_0^2 f(x)\,dx =$ $\quad$ $(b)\ \int_{-1}^{1} f(x)\,dx =$ $\quad$ $(c)\ \int_{-2}^{0} f(x)\,dx =$

2. Consider the definite integral $\int_0^1 \frac{1}{x^2+1}\,dx$. Approximately find its value using four rectangles and use the right endpoints for function evaluations.

3. Find the following anti-derivatives:

$(a)\ \int \frac{t^2-2}{t^4}\,dx =$ $\quad$ $(b)\ \int \cos^4(2x)\sin(2x)\,dx =$

4. Evaluate the following definite integrals:

$(a)\ \int_0^1 \left(t^3 - 5t^2 + 3\right)\,dx =$ $\quad$ $(b)\ \int_{\pi^2}^{4\pi^2} \frac{\sin\sqrt{x}}{\sqrt{x}}\,dx =$

5. Find the derivative of the following functions:

$(a)\ F(x) = \int_x^2 \sqrt{4-t^2}\,dt, \quad F'(x) =$ $\quad$ $(b)\ H(x) = \int_0^{x^4} \cos\left(\pi t^2/2\right)\,dt, \quad H'(x) =$

6. A Riemann sum (using the right endpoints) is used to approximate the area under a curve $y = f(x)$ and between the lines $x = a$ and $y = b$. This sum is

$$\frac{1}{n}\sum_{i=1}^{n}\sqrt{1-\left(\frac{i}{n}\right)^3}$$

What is the limit of this sum as n tends to ∞. Your answer should be a definite integral with a, b and $f(x)$ specified. Do not evaluate the integral.

7. Find the area of the region between the curves $y = x^2$, $y = \sqrt{x}$ and bounded on the right by the vertical line $x = 2$. (Sketch the region).