Section 1: Volumes of revolution

Exercise level 1

1. Find the volume of the solid formed when each of the following curves are rotated through 360° about the *x*-axis.

   (i) The curve $y = x^3$ between $x = 0$ and $x = 1$

   (ii) The curve $y = \sqrt{x}$ between $x = 0$ and $x = 4$

   (iii) The curve $y = 1 - x^2$ between $x = -1$ and $x = 1$

   (iv) The curve $y = 1 - \frac{1}{x^2}$ between $x = 1$ and $x = 2$

   (v) The curve $y = x^2 + 1$ between $x = -1$ and $x = 2$

2. Find the volume of the solid formed when each of the following curves are rotated through 360° about the *y*-axis.

   (i) The curve $y = x^3$ between $y = 0$ and $y = 1$

   (ii) The curve $y = \sqrt{x}$ between $y = 0$ and $y = 2$

   (iii) The curve $y = 1 - x^2$ between $y = 0$ and $y = 1$

   (iv) The curve $y = \frac{1}{\sqrt{1 + x^2}}$ between $y = \frac{1}{2}$ and $y = 1$

   (v) The curve $y = \sqrt{x + 1}$ between $y = 1$ and $y = 2$