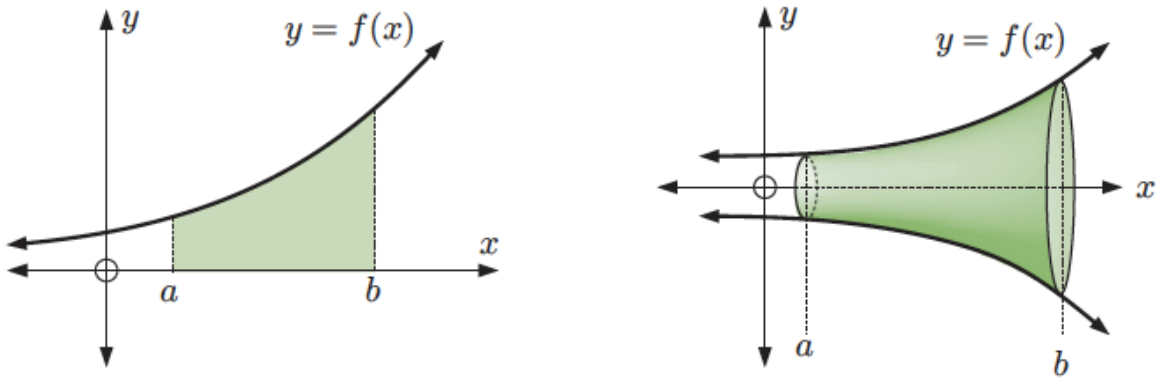
Volume

$$\pi \int_a^b (f(x))^2 dx$$

The shaded area below the curve is rotated 360° about the x-axis, find the volume of the solid formed.



1. Find the volume of the solid formed when the area of the followings are revolved through 360° about the x-axis.

(a) $y = 3x \; for \; 0 \leq x \leq 4$

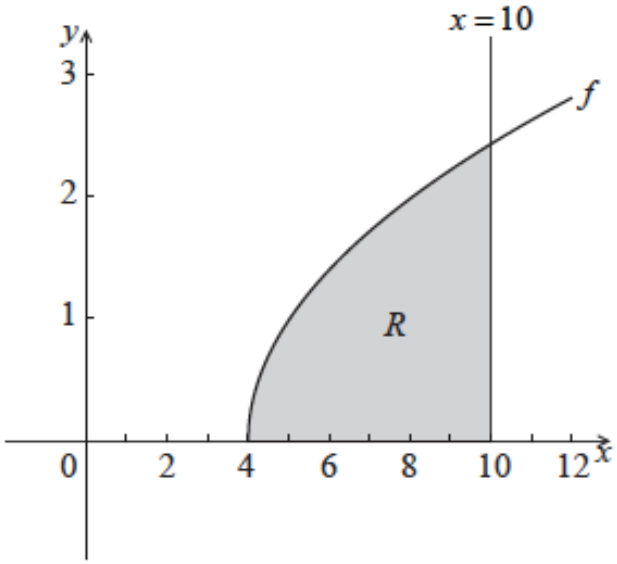
(b) $y = \frac{1}{x-1}$ for $1 \leq x \leq 4$

Paper 1

1. The graph of $y = \sqrt{x}$ between $x = 0$ and $x = a$ is rotated 360° about the x-axis. The volume of the solid formed is 32π. Find the value of a.

2. (a) Find $\int_4^{10}(x-4)dx$.

(b) Part of the graph of $f(x) = \sqrt{x-4}$, for $x \geq 4$, is shown below. The shaded region R is enclosed by the graph of f, the line $x = 10$, and the x-axis.



The region R is rotated 360° about the x-axis. Find the volume of the solid formed.

Paper 2

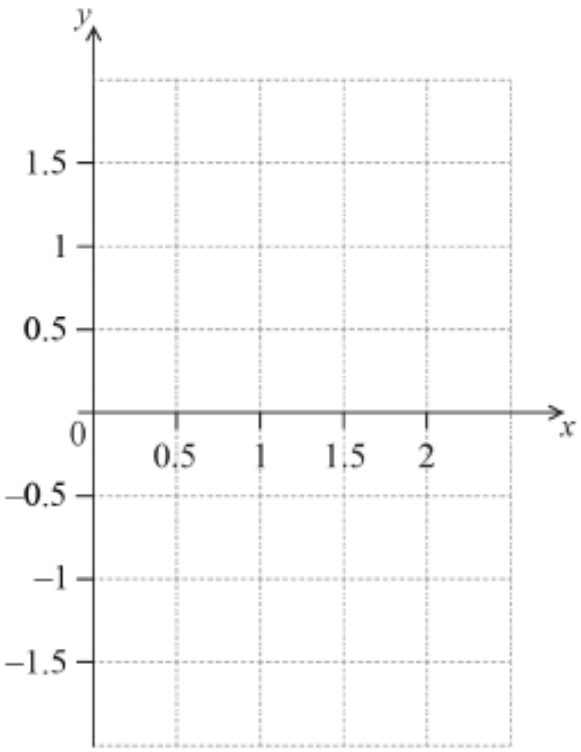
1. Let $f(x) = (x-1)(x-4)$.

(a) Find the x-intercepts of the graph of f.

(b) The region enclosed by the graph of f and the x-axis is rotated 360° about the x-axis. Find the volume of the solid formed.

2. Let $f(x) = -x^4 + 2x^3 - 1$, for $0 \leq x \leq 2$.

(a) Sketch the graph of f on the following grid.

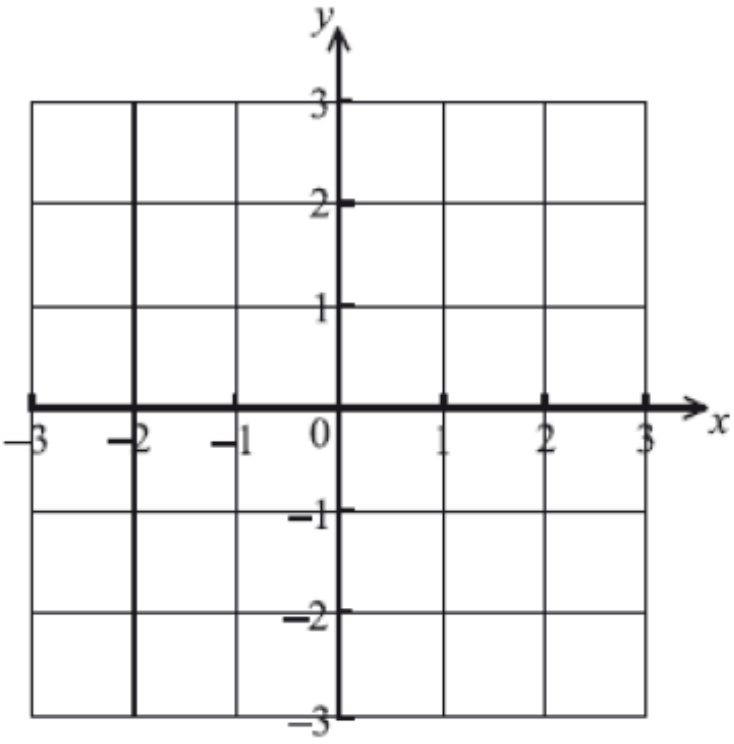


(b) Solve $f(x) = 0$.

(c) The region enclosed by the graph of f and the x-axis is rotated 360° about the x-axis. Find the volume of the solid formed.

3. Let $f(x) = x\cos(x - \sin x)$, $0 \le x \le 3$.

(a) Sketch the graph of f on the following set of axes.



(b) The graph of f intersects the x-axis when $x = a, a \neq 0$. Write down the value of a.

(c) The graph of f is revolved 360° about the x-axis from $x = 0\ to\ x = a$. Find the volume of the solid formed.