MA114 Worksheet for Section 5.5

Skills

1. Sketch the region bounded by the given curves (or use Maple), and find the area of that region exactly.

   (a) $y = \sin x, \ y = \cos x, \ x = 0, \ x = \pi$

   (b) $y = 9(4x+5)^{-1}, \ y = 2 - x$

2. Find the area of the indicated regions by integrating along the y-axis.

   (a) The area between $y^2 = x, y = x + 5, y = -1$, and $y = 2$.

   (b) The area between $x + 1 = 2(y-2)^2$ and $x + 6y = 7$.

   (c) The area between $y = \sqrt{x}$ and $x = 4y$.

Concepts

1. Find the area between the curve $y = \cos x$ and the line segment that joins the points $(0, 1)$ and $(\frac{\pi}{2}, 0)$ on the curve. (You may wish to sketch the area, or plot it using Maple, first).

2. Let $A(b)$ be the area enclosed by $y = \dfrac{1}{x^2}$, $y = 0$, $x = 1$ and $x = b$.

(a) Find $A(b)$.

(b) Find $\lim_{b\to\infty} A(b)$.

(c) Explain this limit geometrically. What does it represent?

3. Consider the area between $y = 1 - x^2$, $y = 0$ and $x = 0$.

(a) Find a number a so that the line $x = a$ bisects the area.

(b) Find a number b so that the line $y = b$ bisects the area.

(c) Find a number m so that the line $y = mx$ bisects the area.

4. Find the area enclosed between the curve $x^{\frac{1}{2}} + y^{\frac{1}{2}} = a^{\frac{1}{2}}$ and the coordinate axis.