

Some 8.1 and 8.2 AP Problems

1997 MC#8,9



A bug begins to crawl up a vertical wire at time $t = 0$. The velocity v of the bug at time t , $0 \leq t \leq 8$, is given by the function whose graph is shown above.

At what value of t does the bug change direction?

- A) 2 B) 4 C) 6 D) 7 E) 8

What is the total distance the bug traveled from $t = 0$ to $t = 8$?

- A) 14 B) 13 C) 11 D) 8 E) 6

1997 MC#16

The area of the region enclosed by the graph of $y = x^2 + 1$ and the line $y = 5$ is

- A) $\frac{14}{3}$ B) $\frac{16}{3}$ C) $\frac{28}{3}$ D) $\frac{32}{3}$ E) 8π

1997 MC#83

What is the area of the region in the first quadrant enclosed by the graphs of $y = \cos x$, $y = x$, and the y-axis?

- A) 0.127 B) 0.385 C) 0.400 D) 0.600 E) 0.947

1997 MC #87

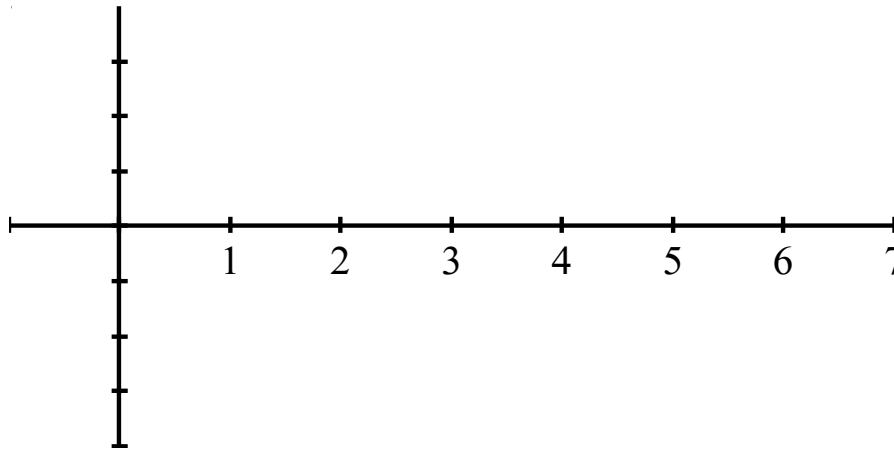
At time $t \geq 0$, the acceleration of a particle moving on the x-axis is $a(t) = t + \sin t$. At $t = 0$, the velocity of the particle is -2. For what value of t will the velocity of the particle be zero?

- A) 1.02 B) 1.48 C) 1.85 D) 2.81 E) 3.14

1997 FR#3

Let f be the function given by $f(x) = \sqrt{x-3}$.

- a) On the axes provided below, sketch the graph of f and shade the region R enclosed by the graph of f , the x -axis, and the vertical line $x = 6$.



- b) Find the area of the region R described in part a).

- c) Rather than using the line $x = 6$ as in part a), consider the line $x = w$, where w can be any number greater than 3. Let $A(w)$ be the area of the region enclosed by the graph of f , the x -axis, and the vertical line $x = w$. Write an integral expression for $A(w)$.

- d) Let $A(w)$ be described in part c). Find the rate of change of A with respect to w when $w = 6$.

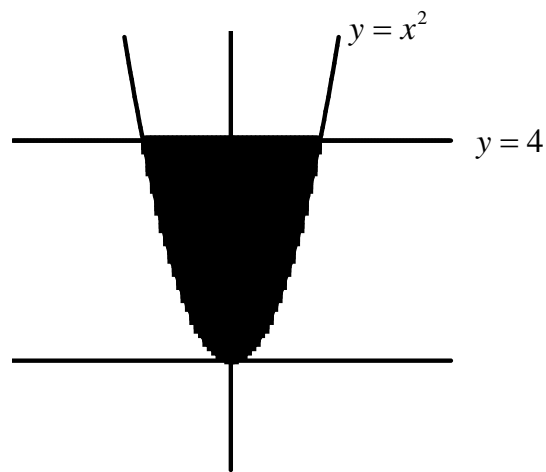
1998 FR#1a,b

Let R be the region bounded by the x -axis, the graph of $y = \sqrt{x}$, and the line $x = 4$.

a) Find the area of region R .

b) Find the value of h such that the vertical line $x = h$ divides the region R into two regions of equal area.

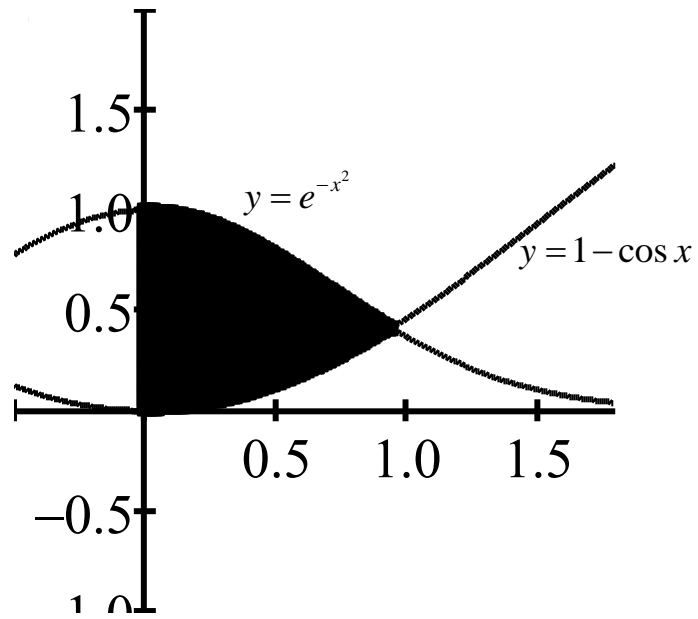
1999 FR #2a



The shaded region, R , is bounded by the graph of $y = x^2$ and the line $y = 4$, as shown in the figure above.

a) Find the area of R

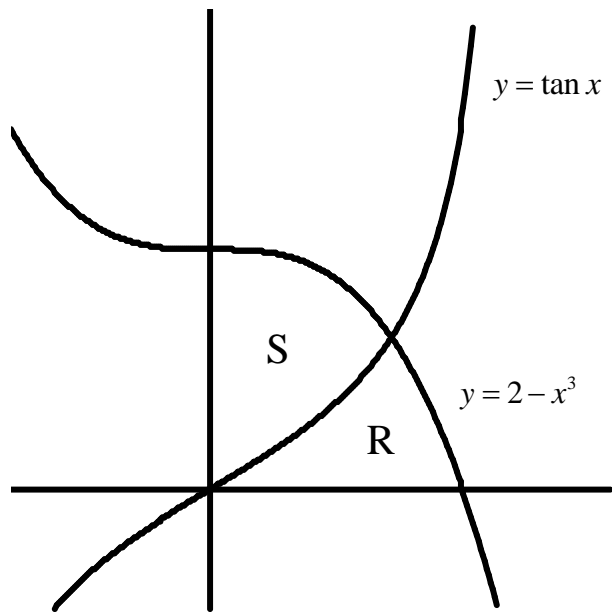
2000 FR #1a



Let R be the shaded region in the first quadrant enclosed by the graphs of $y = e^{-x^2}$, $y = 1 - \cos x$, and the y -axis, as shown in the figure above.

- a) Find the area of the region R .

2001 FR#1a,b



Let R and S be the regions in the first quadrant shown in the figure above. The region R is bounded by the x-axis and the graphs of $y = 2 - x^3$ and $y = \tan x$. The region S is bounded by the y-axis and the graphs of $y = 2 - x^3$ and $y = \tan x$.

a) Find the area of R .

b) Find the area of S .

2002 FR#1a

Let f and g be the functions given by $f(x) = e^x$ and $g(x) = \ln x$.

a) Find the area of the region enclosed by the graphs of f and g between $x = \frac{1}{2}$ and $x = 1$.