

§5.1 Area Between Curves

For each of the two regions described below, sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y . Draw a typical approximating rectangle and label its height and width. Then find the area.

$$y = 2x + 3 \quad y = 13 - x^2 \quad x = -1 \quad x = 2$$

$$x = 45 - 5y^2 \quad x = 5y^2 - 45$$

Sketch the region enclosed by the given curves. Then find the area.

a) $x = 6y^2$ $x = 4 + 5y^2$

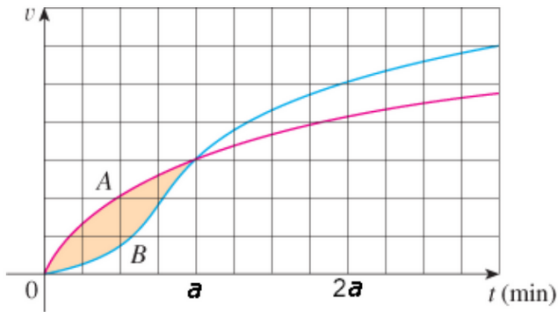
b) $y = 6 \cos(\pi x)$ $y = 12x^2 - 3$

c) $y = 4 \cos(6x)$ $y = 4 \sin(12x)$ $x = 0$ $x = \pi/12$

d) $y = \sqrt{x}$ $y = \frac{1}{2}x$ $x = 25$

e) $y = |3x|$ $y = x^2 - 4$

Two cars, A and B, start side by side and accelerate from rest. The graphs of their velocity functions are given below.



- Which car is ahead at time a ? Explain.
- Interpret the area of the shaded region in physical terms.
- Which car is ahead after $1.5a$ minutes? Explain.

Find the number b such that the line $y = b$ divides the region bounded by the curves $y = 4x^2$ and $y = 16$ into two regions with equal area.