

Section 6.2: Regions Between Curves

Group work:

Problem 1 Consider the region bounded by the curves $y = 7x^2 - 12$ and $y = x^2 - 6x$.

- (a) Draw a sketch of the graphs.
- (b) Find the area between these curves.
- (c) Find the area of the region bounded by the curves $x = 7y^2 - 12$ and $x = y^2 - 6y$.
- (d) Find the area of the region bounded by the curves $y = 7x^2$ and $y = x^2 - 6x + 12$.
- (e) Find the area of the region bounded by the curves $y = 7x^2 - 12$, $y = x^2 - 6x$, $x = 0$, and $x = 3$.

Problem 2 Set up two different integrals that compute the area of the region bounded by the curves $x = y^2$ and $y = 6 - x$ (and be sure to draw a sketch of the graphs).

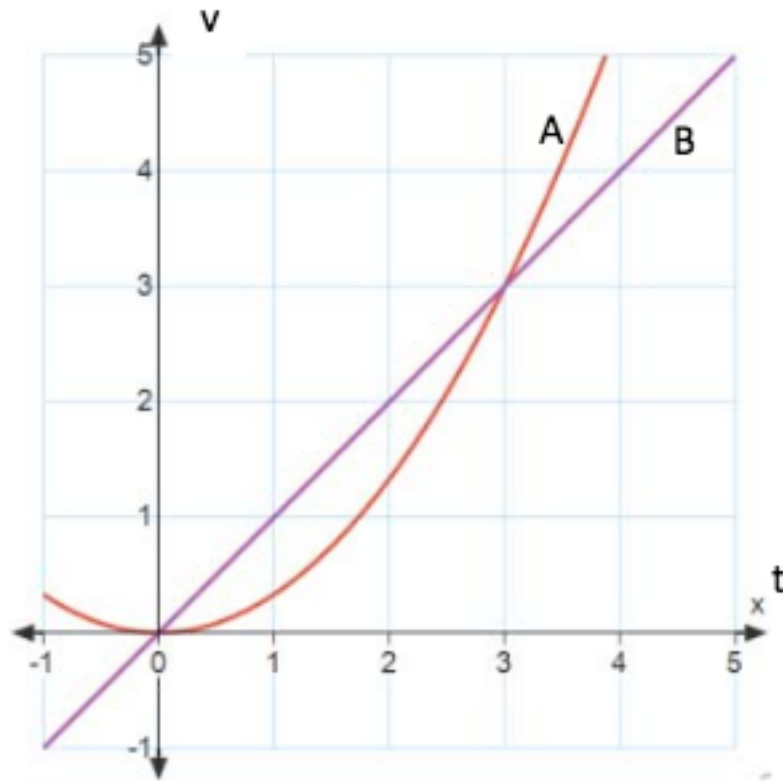
Problem 3 Two runners (A and B) run in a race in which the winner runs the greater distance after 4 minutes. The runners' respective velocities are

$$v_A(t) = \frac{1}{3}t^2 \quad v_B(t) = t$$

The graphs of the runners' velocities is given below.

Learning outcomes:

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- (a) Who is running faster 2 minutes into the race?
- (b) What special event occurs 3 minutes into the race?
- (c) Who wins the race (and by how much)?