

## Recitation # 2 Regions Between Curves

### Group work:

**Problem 1** Consider the region bounded by the curves  $y = 2x^2 - 7x + 8$  and  $y = x^2 - 4x + 18$ .

- (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  $x = 2y^2 - 7y + 8$  and  $x = y^2 - 4y + 18$ .
- (d) Find the area of the region bounded by the curves
  - (i)  $y = 2x^2 - 7x$  and  $y = x^2 - 4x + 10$ .
  - (ii)  $y = 2x^2 - 7x - 30$  and  $y = x^2 - 4x - 20$ .
- (e) Find the area of the region bounded by the curves  $y = 2x^2 - 7x + 8$ ,  $y = x^2 - 4x + 18$ ,  $x = 1$ , and  $x = 6$ .

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**Problem 2** Set up a single integral that computes the area of the region bounded by the curves (and be sure to draw a sketch of the graphs).

- (a)  $x = y^2$  and  $y = 6 - x$
- (b)  $y = x^2 + 6$  and  $y = 3x + 10$

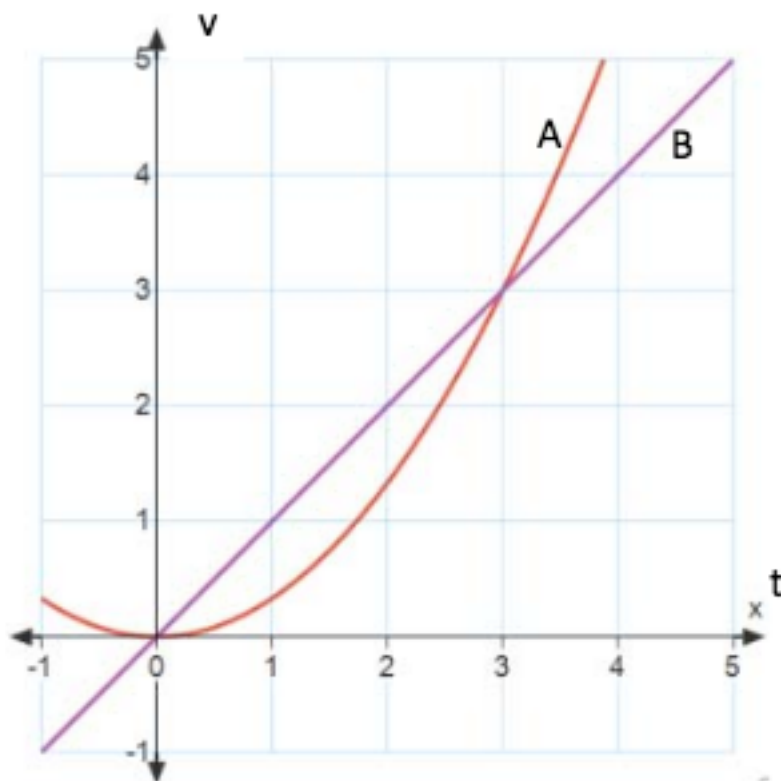
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**Problem 3** Two runners (A and B) run in a race in which the winner runs the farthest in 4 minutes. The runners' respective velocities are

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

The graphs of the runners' velocities is given below.

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