

AP Calculus – Area and Volume Practice (Washer & Shell)

1. Let R be the region defined in the first quadrant by the curves  $y = 8 - x^3$  and  $y = 8 - 4x$ .

- (a) Find the area of R.
- (b) Find the volume obtained by rotating R around the vertical line  $x = 4$ .
- (c) Find the volume obtained by rotating R around the  $x$ -axis.

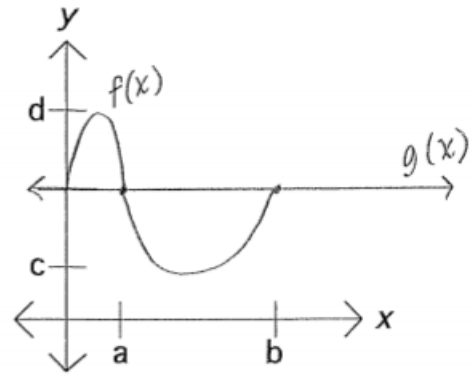
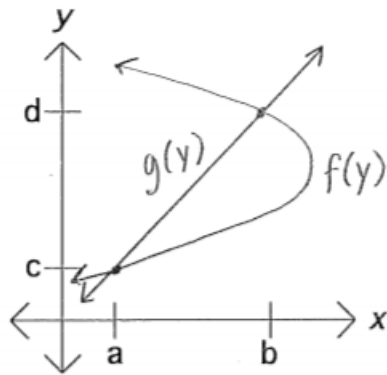
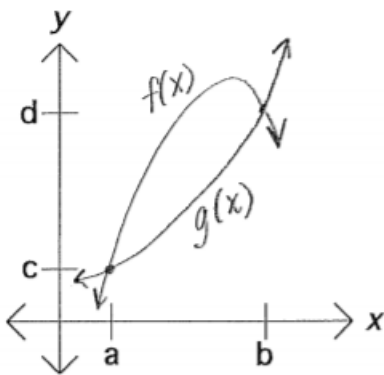
2. Let R be the region in the first quadrant bounded by the graph of  $y = 3x - x^2$  and the  $x$ -axis.

- (a) Find the area of R
- (b) A solid is generated when R is revolved around the line  $y = 6$ . Find the volume of this solid.
- (c) A solid is generated when R is revolved around the line  $x = -2$ . Find the volume of this solid.

3. Let R be the region bounded by the curves  $y = x^2 + 1$  and  $y = x$  for  $0 \leq x \leq 1$ . Find the volume of the solid obtained by rotating the region R about the

- (a)  $x$ -axis
- (b)  $y$ -axis
- (c) the line  $x = 2$
- (d) the line  $x = -1$
- (e) the line  $y = -1$

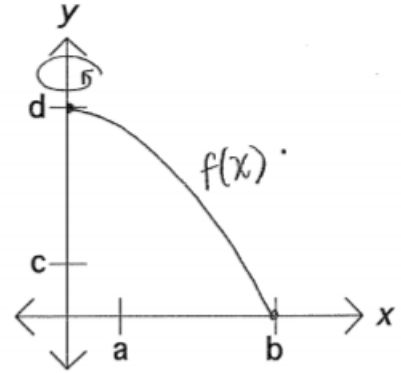
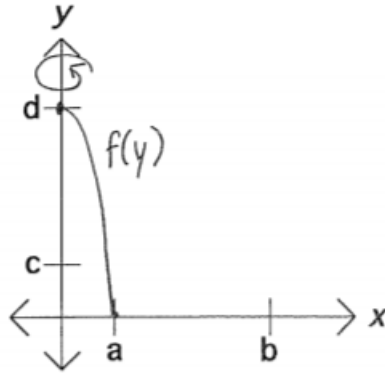
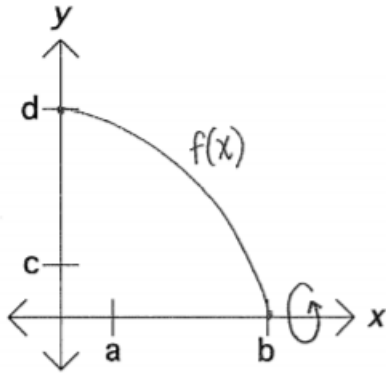
4. Set up an integral to determine the area bounded by the two curves.



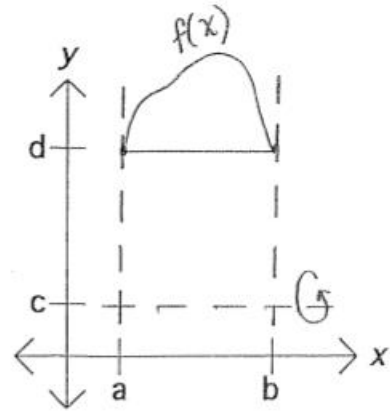
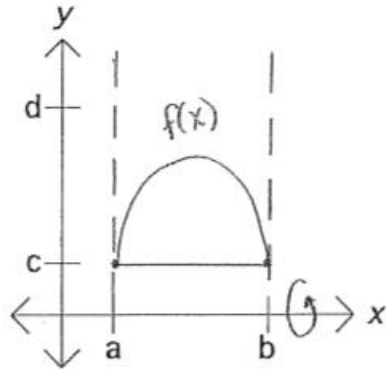
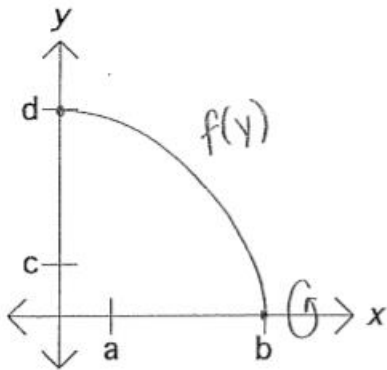
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For questions #5 – 10: Set up an integral to determine the volume of the solid obtained by the rotating the enclosed area around the indicated axis (or line). Indicate whether you are using washer or shell. Draw the cross section (rectangle) on the graph. If the graph is labeled  $f(x)$  and  $g(x)$ , use the method that will allow you to integrate with respect to  $x$ . If the graph is labeled  $f(y)$  and  $g(y)$  use the method that will allow you to integrate with respect to  $y$ .

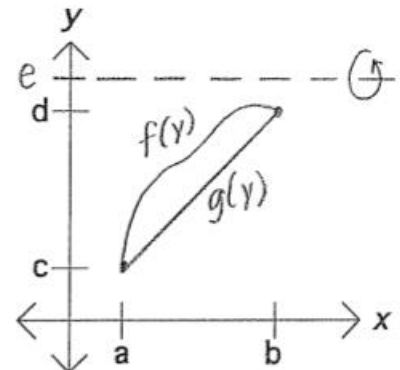
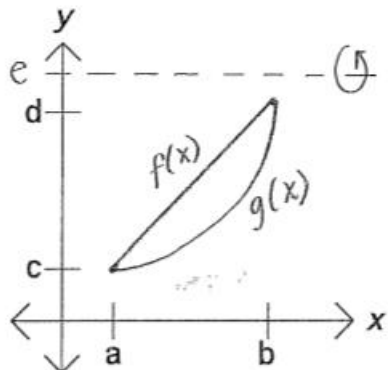
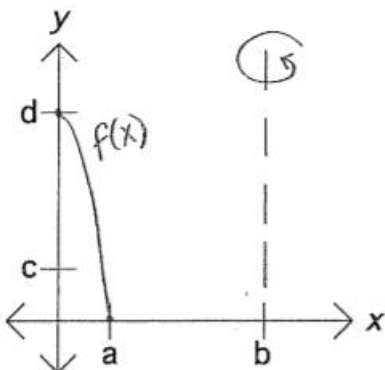
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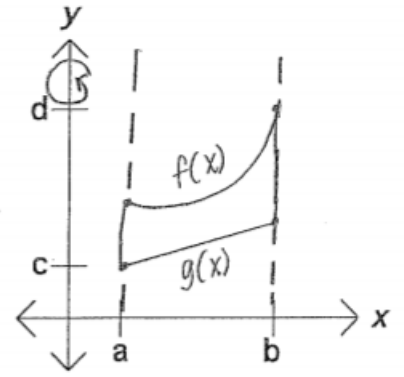
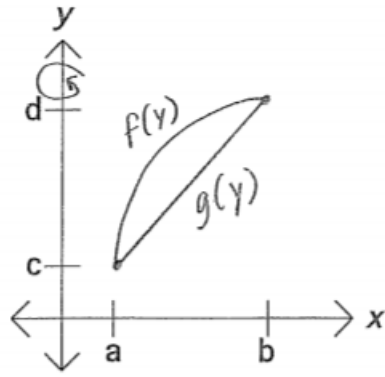
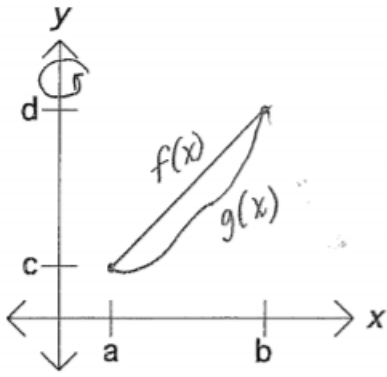
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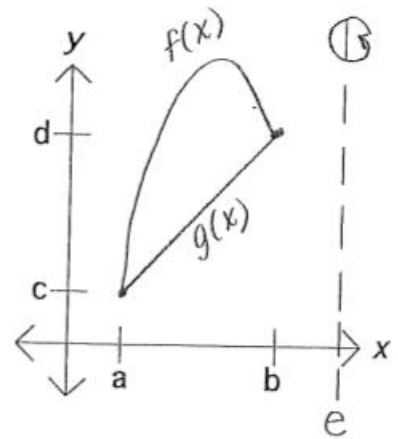
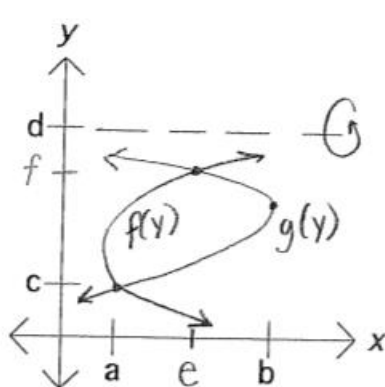
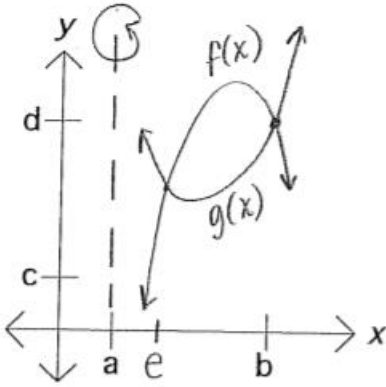
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