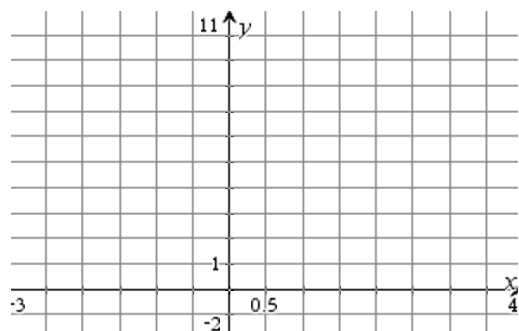


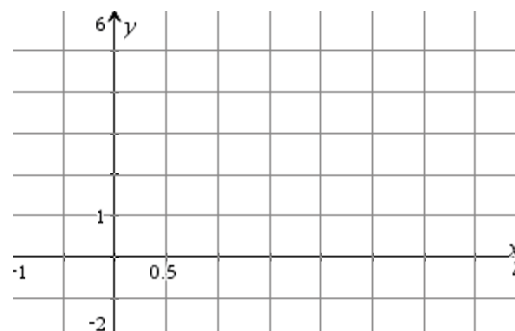
### Skill Builder: Topics 8.4-8.6 – Area Between Curves

For each problem, sketch the region bounded by the graphs of the functions and find the area of the region. Problems marked a calculator icon indicate that you can use your calculator to evaluate the definite integral.

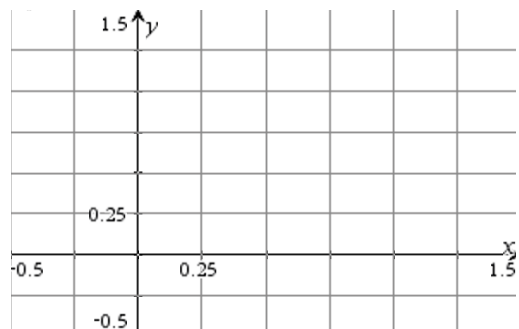
1.)  $y = x^2 + 2x + 1, y = 2x + 5$



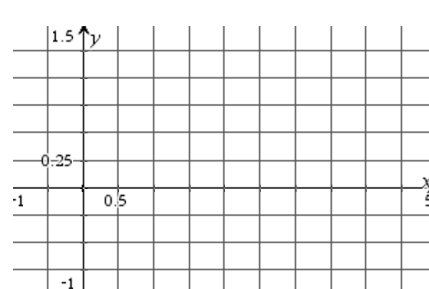
2.)  $y = x^2 - 4x + 3, y = -x^2 + 2x + 3$



3.)  $y = x^2, y = x^3$

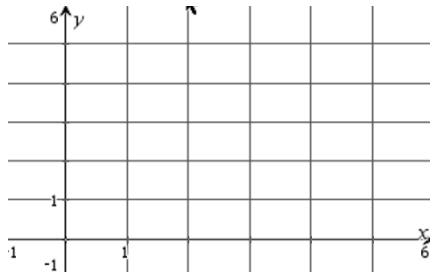


4.)  $y = \frac{1}{x^2}, y = 0, x = 1, x = 5$

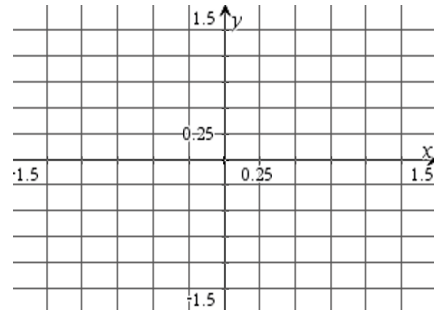




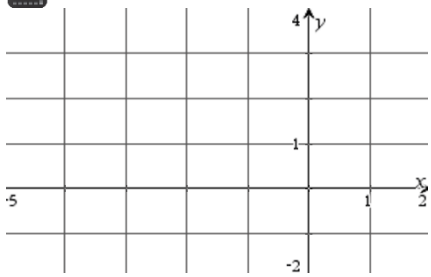
5.)  $y = \sqrt{3x} + 1, y = x, x = 0$



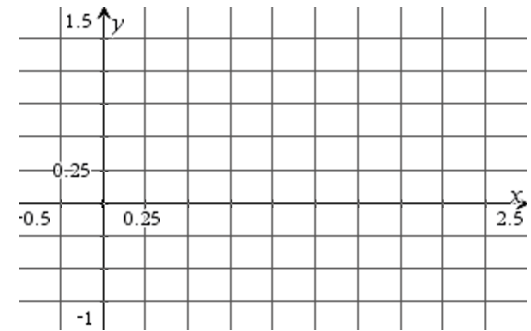
6.)  $y = \sqrt[3]{x}, y = x$



7.)  $x = 2y - y^2, x = -y$

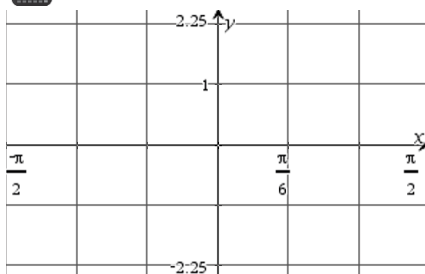


8.)  $y = (x - 1)^3, y = x - 1$

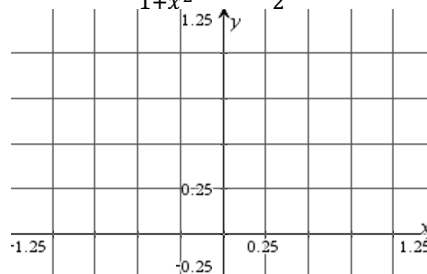




9.)  $y = 2 \sin x, y = \tan x$

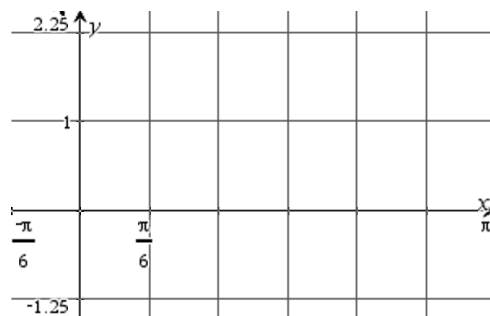


10.)  $y = \frac{1}{1+x^2}, y = \frac{1}{2}x^2$

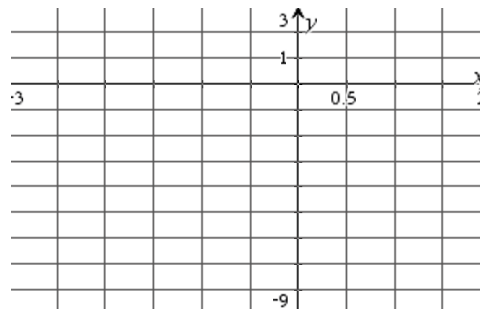


11.)  $y = 2 \sin x, y = \cos 2x$

Use your calculator to find intersection points as well.



12.)  $y = x^3$  and the tangent to  $y$  at  $(1, 1)$

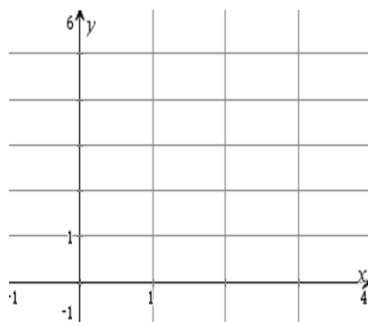


13.) Find the value(s) of  $b$  if the vertical line  $x = b$  divides the region between  $y = 16 - 2x$  and the  $x$ -axis and  $y$ -axis into 2 equal regions.

### Skill Builder: Topics 8.7-8.8 – Volumes with Cross Sections

For each problem, sketch the region bounded by the graphs of the functions and find the area of the region. Be sure to draw in the representative rectangle. Only use a calculator for problems marked with the calculator icon.

**14.)** Find the volume of the solid whose base is the region bounded between the curve  $y = x^2$  and the  $x$ -axis from  $x = 0$  to  $x = 2$  and whose cross sections taken perpendicular to the  $x$ -axis are depicted by each of the following shapes.



**a.)** squares

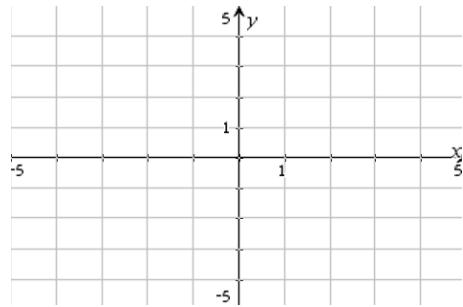
**b.)** semicircles

**c.)** rectangles whose heights are 3 times the base width

**d.)** equilateral triangles

**e.)** isosceles right triangles where the base is the hypotenuse

**15.)** Find the volume of the solid whose base is bounded by the circle whose center is the origin, whose radius is 3 and whose cross sections taken perpendicular to the  $x$ -axis are depicted by each of the following shapes.



**a.)** squares

**b.)** semicircles

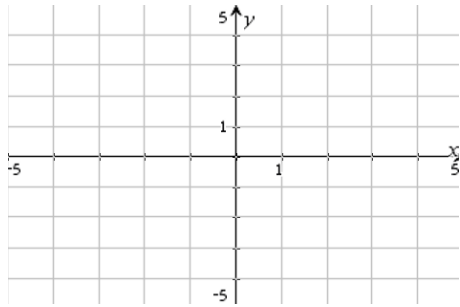
**c.)** rectangles whose heights are twice the base width

**d.)** equilateral triangles

**e.)** isosceles right triangles where the base is the hypotenuse



**16.)** Find the volume of the solid whose base is the region bounded between the curve  $y = x^2 - x - 3$  and  $y = x$  and whose cross sections taken perpendicular to the  $x$ -axis are depicted by each of the following shapes.



**a.)** squares

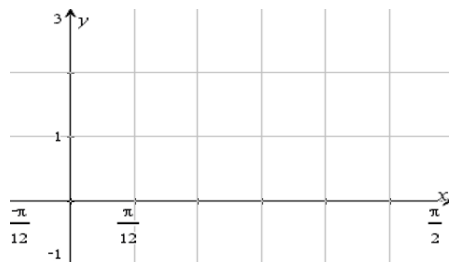
**b.)** semicircles

**c.)** rectangles whose heights are half the base width

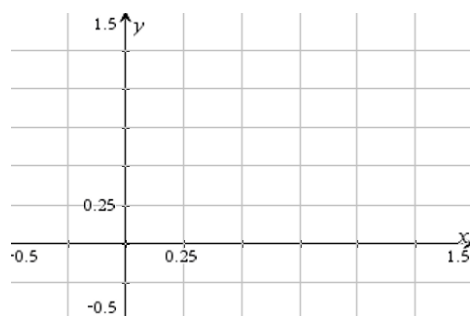
**d.)** equilateral triangles

**e.)** isosceles right triangles where the base is the hypotenuse

- 17.) Find the volume of the solid whose base is the region bounded between the curve  $y = \sec x$  and the  $x$ -axis from  $x = \pi/4$  to  $x = \pi/3$  and whose cross sections taken perpendicular to the  $x$ -axis are squares.



- 18.) Find the volume of the solid whose base is the region bounded between the curve  $y = x^3$  and the  $y$ -axis from  $y = 0$  to  $y = 1$  and whose cross sections taken perpendicular to the  $y$ -axis are squares.



- 19.) Find the volume of the solid whose base is the region bounded between the curve  $x = 1 - y^2$  and the  $y$ -axis and whose cross sections taken perpendicular to the  $y$ -axis are squares.

