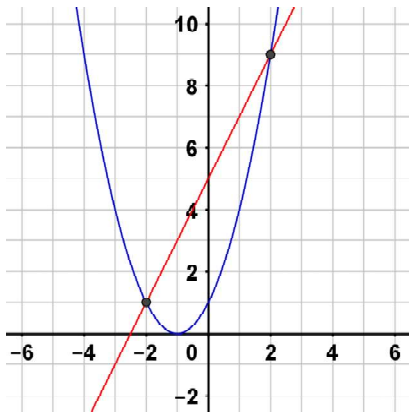




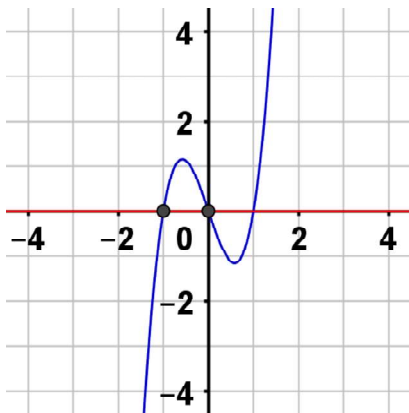
Summer Assignment for Calc III (M215)

Set up the definite integral that gives the area of the region between the curves.

1. $y_1 = x^2 + 2x + 1$, $y_2 = 2x + 5$



2. $y_1 = 3(x^3 - x)$, $y_2 = 0$



Find a set of parametric equations for the line or conic.

3. Line passes through $(1, 4)$ and $(5, -2)$

4. Circle: center $(-6, 2)$; radius: 4.

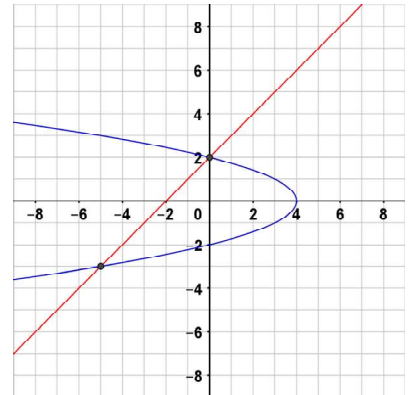
Find the area of the region between the two functions by integrating

(a) with respect to x and

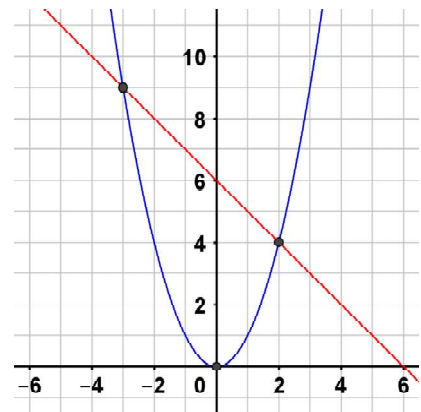
(b) with respect to y .

(c) Compare your results. Which method is simpler?

5. $x = 4 - y^2$, $x = y - 2$



6. $y = x^2$, $y = 6 - x$



Find the volumes of the solids generated by revolving the region bounded by the graphs of the equations about the given lines.

7. $y = 2x^2$, $y = 0$, $x = 2$

- (a) the y -axis
- (b) the x -axis
- (a) the line $y = 8$
- (a) the line $x = 2$

Sketch the region bounded by the graphs of the algebraic functions and find the area of the region.

8. $y = -x^3 + 3$, $y = x$, $x = -1$, $x = 1$

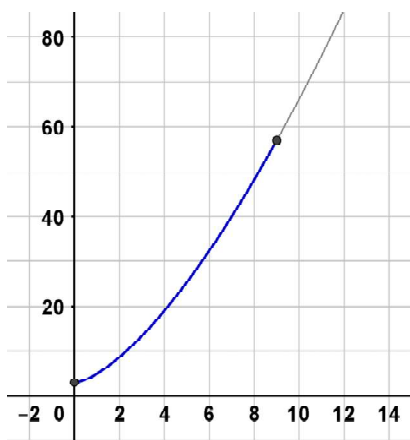
9. $f(x) = -x^2 + 4x + 1$, $g(x) = x + 1$

Set up an integral for the length of the curve.

10. $y = x^4$, $0 \leq x \leq 1$

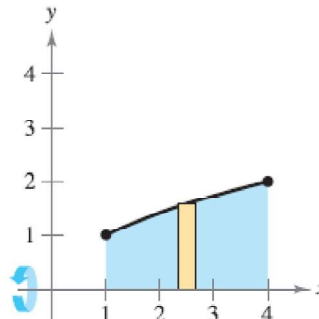
Find the arc length of the graph of the function over the indicated interval. You can use a calculator to calculate the final value - but you need to show all your work (i.e. don't evaluate the integral using the calculator)

11. $y = 2x^{\frac{3}{2}} + 3$ $0 \leq x \leq 9$



Set up and evaluate the integral that gives the volume of the solid formed by revolving the region about the x -axis.

12. $y = \sqrt{x}$



Plot the point in polar coordinates and find the corresponding rectangular coordinates for the point.

13. $\left(8, \frac{\pi}{2} \right)$

14. $\left(-4, \frac{-3\pi}{4} \right)$

Convert the rectangular equation to polar form and sketch its graph.

15. $x^2 - y^2 = 9$

16. $3x - y + 2 = 0$

Convert the polar equation to rectangular form and sketch its graph.

17. $r = 3 \sin \theta$

18. $\theta = \frac{5\pi}{6}$

19. Find the area of the region shared by the circle $r = 5$ and the cardioid $r = 5(1 + \sin \theta)$