East Los Angeles College

Department of Mathematics

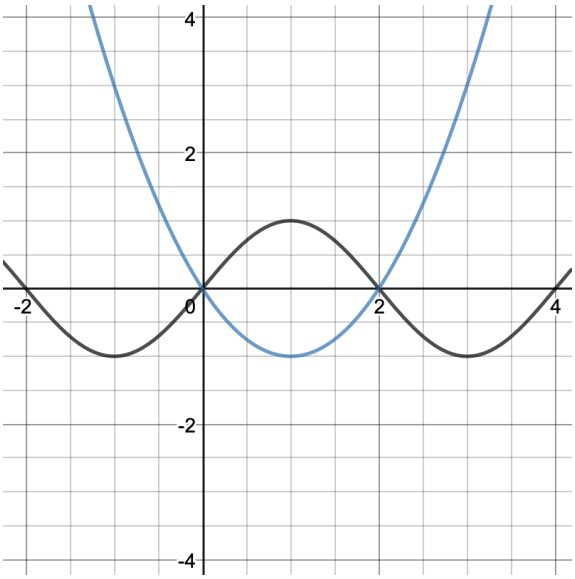
Math 261

Final Exam Study Guide

Your final exam will not be as long as this study guide. However, this will serve as a good tool to describe the topics to review for your final exam.

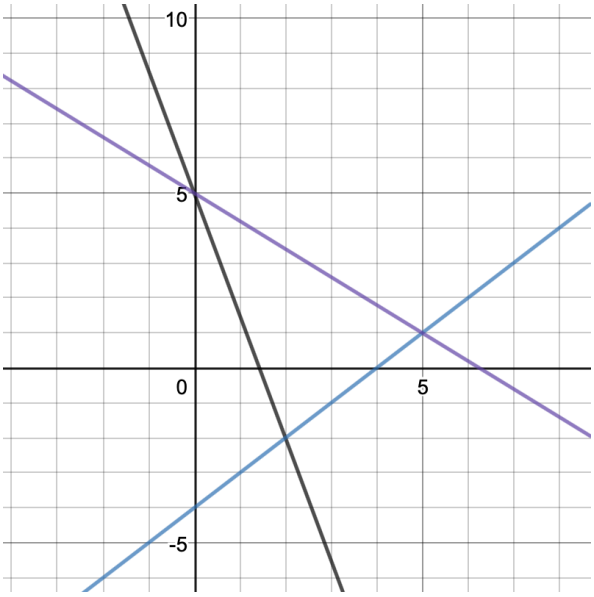
Determine the area between curves

1. $y = sin\left(\frac{\pi x}{2}\right)$ and $y = x^2 - 2x$



2. Use Calculus to find the area of the triangle with the given vertices.
(0,5) and (2,-2) and (5,1) whose lines are represented by the following equations.

$y = -\frac{7}{2}x + 5$ and $y = x - 4$ and $y = -\frac{4}{5}x + 5$



Integrate the following.

3. $\int_0^4 \left(x + 2|x-1| + 3\right)dx$

4. $\int_0^{\frac{\pi}{4}} \left(2\sin(x) - \cos(2x) + \sec^2(\pi x)\right)dx$

5. $\int sin^2(x)cos(x)dx$

6. $\int_0^2 4x^2\sqrt{1+x^3}dx$

Find the limit or show that it does not exist.

7. $\lim_{x\to 3} \frac{x^2-9}{|x-3|}$

8. $\lim_{x\to\infty} \left(x - \sqrt{x^2+2x}\right)$

9. $\lim_{x\to-\infty} \frac{x}{\sqrt{x^2+1}}$

10. $\lim_{x\to-\infty} \frac{2x^3+x^2-3x+4}{x^3-3x^2-2}$

11. $\lim_{x\to\infty} \frac{2x^2-5x+4}{x^2-x+6}$

12. $\lim_{x\to\infty} cos\left(\frac{1}{x}\right)$

13. $\lim_{x\to\infty} \left(\sqrt{4x^2+3x} - 2x\right)$

14. $\lim_{x\to\infty} tan\left(\frac{1}{x}\right)$

15. Find the point on the line $y = 2x - 3$ that is closest to the origin.

Let $f(x) = \dfrac{x}{x^2 + 1}$ and determine:

16. Critical values.
17. Intervals of increasing and decreasing.
18. Local Max/Min
19. Intervals of concave up and concave down.
20. Possible inflection points.

21. Determine the absolute max and absolute min for the function over the interval.

$$f(x) = 2\cos(x) + \sin(2x) \text{ over } \left[0, \pi/2\right]$$

22. Use implicit differentiation to find an equation of the line tangent to the curve at the indicated point.

$$x^2 + xy + y^2 = 3 \text{ at } P(1,1)$$

Differentiate the following functions using chain rule.

24. $f(x) = \frac{1}{\sqrt{2x-5}}$

25. $f(x) = (1 + x^2)^4$

26. $f(x) = sin(2x)cos(4x)$

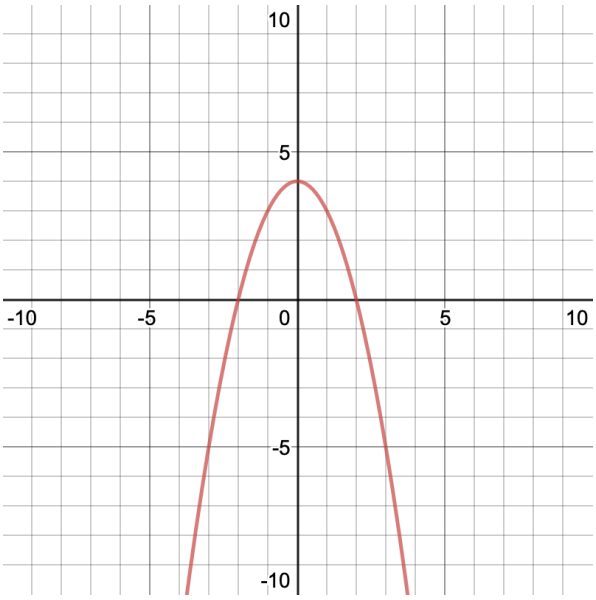
27. $f(x) = xtan(\pi x)$

28. $f(x) = \frac{4x-3}{\sqrt{x}}$

29. $f(x) = sec\big(cos(x)\big)$

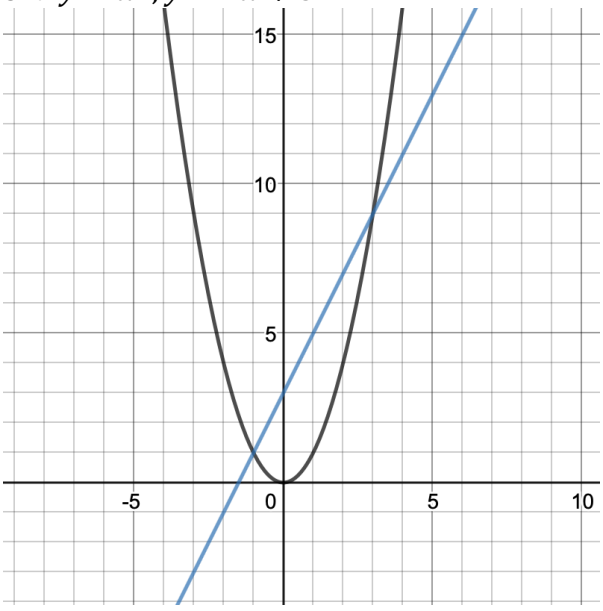
Determine the volume of revolution about the x-axis for the given function over the indicated interval.

30. $f(x) = 4 - x^2$ over $[0,2]$

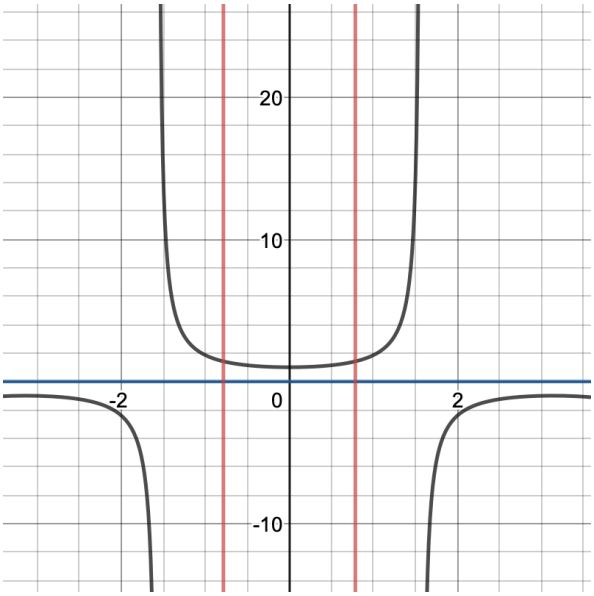


Determine the volume of the solid when revolving the bounded region about the x-axis.

31. $y = x^2, y = 2x + 3$

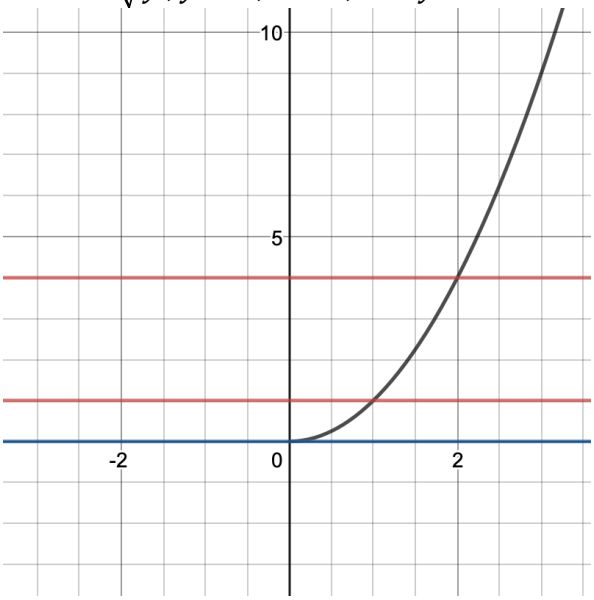


32. $y = \sec(x), y = 0, x = -\frac{\pi}{4}, x = \frac{\pi}{4}$

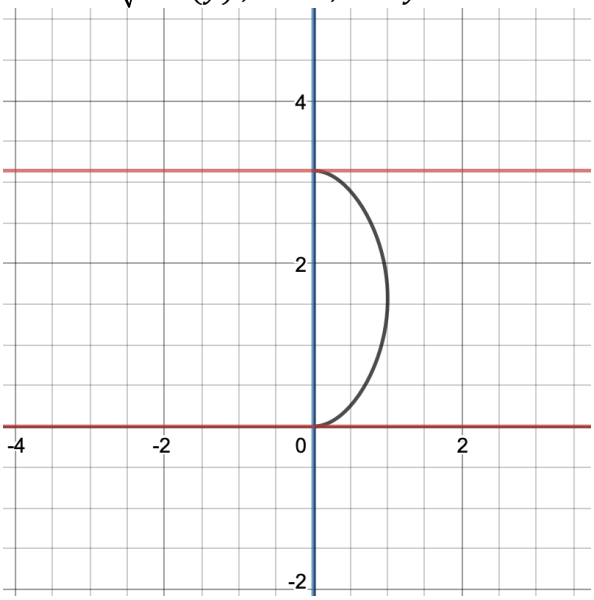


Determine the volume of the solid by rotating the region enclosed by the graphs about the y-axis over the given interval.

33. $x = \sqrt{y}, y = 0, x = 0, 1 \leq y \leq 4$

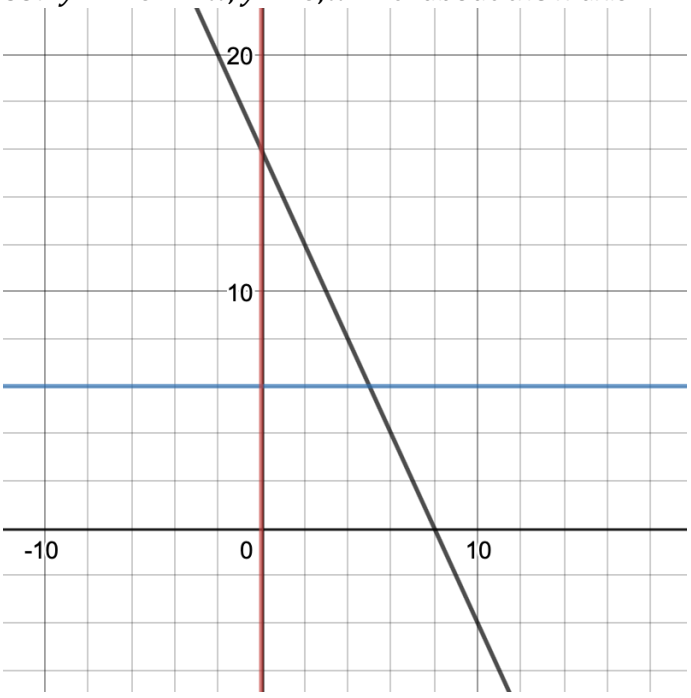


34. $x = \sqrt{\sin(y)}, x = 0, 0 \leq y \leq \pi$

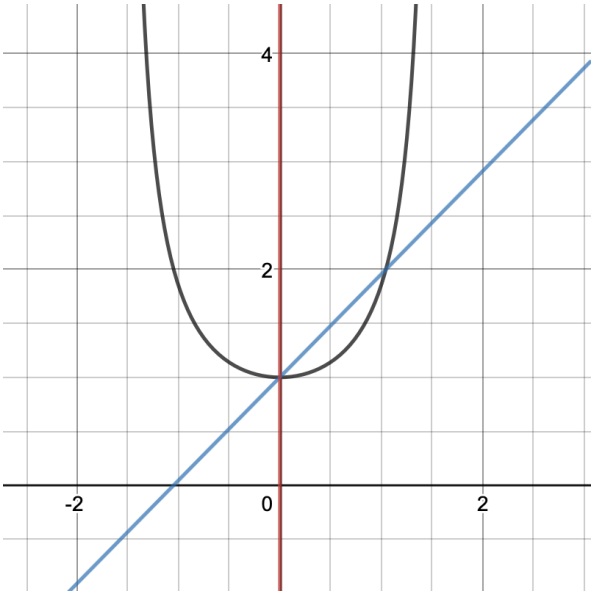


Find the volume of the solid obtained by rotating the region enclosed by the graphs about the given axis.

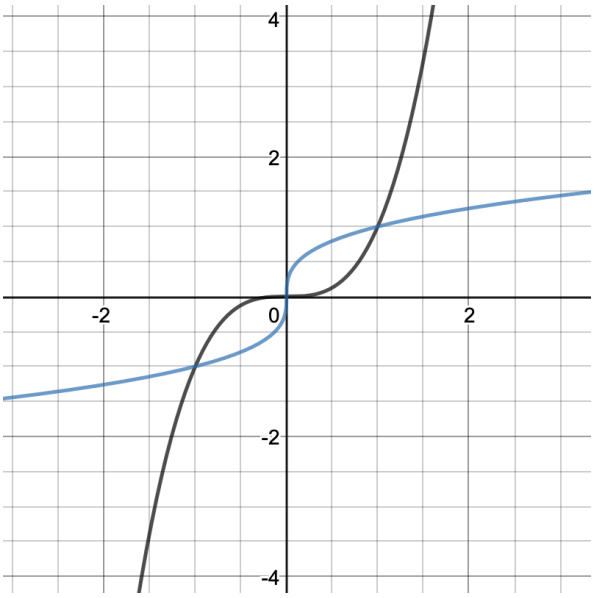
35. $y = 16 - 2x, y = 6, x = 0$ about the x-axis



36. $y = \sec(x), y = 1 + \frac{3}{\pi}x$ about the x-axis



37. $y = x^3, y = \sqrt[3]{x}$ $for\ x \geq 0$ about the y-axis



38. $y = \frac{1}{x}, y = \frac{5}{2} - x$, about the y-axis