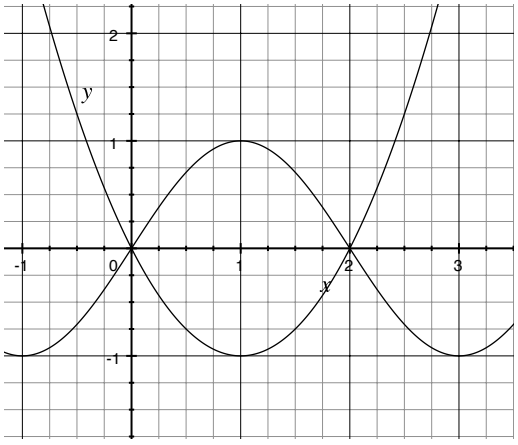
East Los Angeles College
Department of Mathematics
Math 261
Final Exam Study Guide

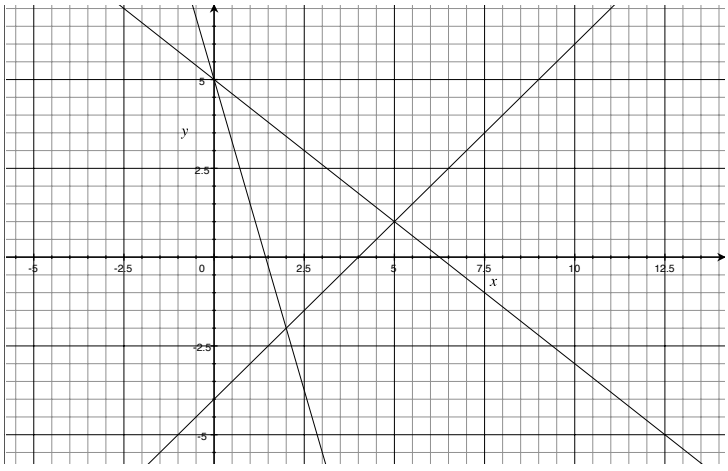
Determine the area between curves

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.

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



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 $f(x)=\frac{x}{x^2+1}$ 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.

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

Let $y=4sin^2(x)$ at $\left(\frac{\pi}{6},1\right)$

23. Determine the equation of the line tangent to the curve at the indicated point.

Differentiate the following functions.

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