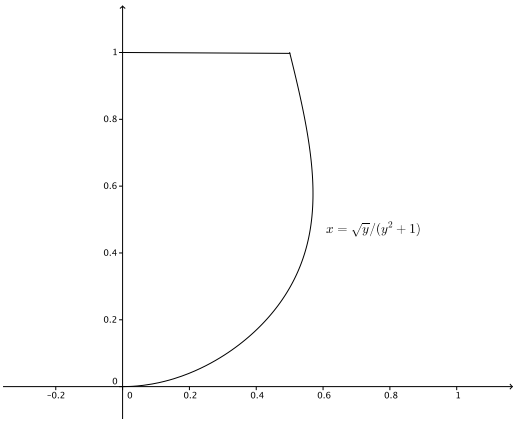
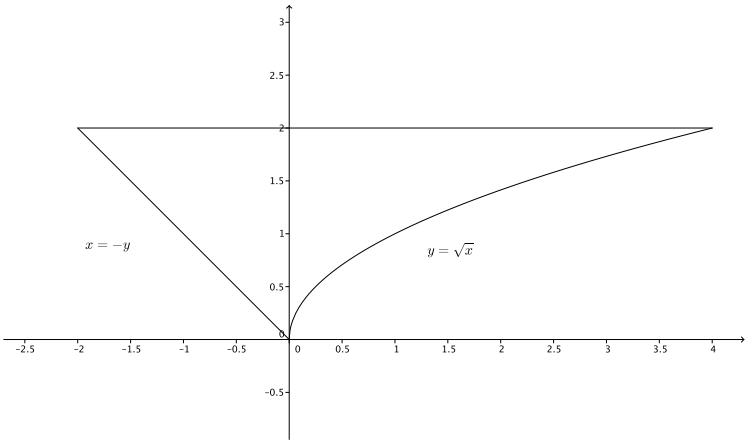
Math 1860-021, Summer 2014

Quiz 1

1. Find the volume of the solid obtained by revolving about the y-axis the region bounded by the curve $x = \sqrt{y}/(y^2 + 1)$ and the lines $x = 0$ and $y = 1$.

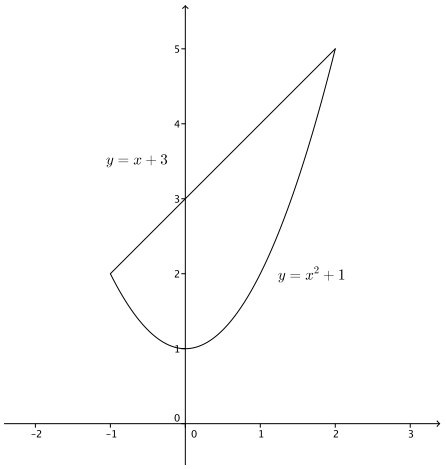


2. Find the volume of the solid obtained by revolving about the x-axis the region bounded by the curve $y = \sqrt{x}$ and the lines $x = -y$ and $y = 2$.



Quiz 2

1. Find the volume of the solid obtained by revolving about the x-axis the region bounded by the curves $y = x^2 + 1$ and $y = x + 3$.



2. Find the length of the curve $y = x^{3/2}$ between $x = 0$ and $x = 4$.

Quiz 3

1. Evaluate $\displaystyle\int_1^e x^3 \ln(x)\, dx$.

2. Evaluate $\displaystyle\int_0^{\pi/2} \cos^5(x)\, dx$.

Quiz 4

1. Evaluate $\displaystyle\int_0^{1/2} \frac{dx}{(1+4x^2)^{3/2}}$.

2. Evaluate $\displaystyle\int_3^5 \frac{(x+1)\, dx}{x^2-4}$.

Quiz 5

1. Evaluate the improper integral $\displaystyle\int_2^\infty \frac{2\,dx}{x^2+4}$, or else determine that it does not converge.
2. Evaluate the improper integral $\displaystyle\int_{-1}^1 \frac{dx}{x^2}$, or else determine that it does not converge.

Quiz 6

1. Find the limit of the sequence $a_n = 1 + (-1)^n$ or else determine that it does not converge.
2. Find the sum of the series $2 + \dfrac{2}{5} + \dfrac{2}{25} + \cdots + \dfrac{2}{5^n} + \cdots$ or else determine that it does not converge.

Quiz 7

1. Find the interval of convergence of the series $\displaystyle\sum_{n=0}^{\infty} \frac{(x+1)^n}{3^n}$.
2. Find sum of the series $\displaystyle\sum_{n=0}^{\infty} \frac{(x+1)^n}{3^n}$ as a function of x.

Quiz 8

1. Find the Maclaurin series of $e^{-x/2}$.
2. Find the Maclaurin series of $\dfrac{2+x}{1-x}$.

Quiz 9

1. What is the Maclaurin series of $\dfrac{x}{\sqrt[3]{1+2x}}$?
2. What is the radius of convergence of the series in problem 1?

Quiz 10

1. What is the behavior of the series $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^2}$?
2. What is the behavior of the series $\displaystyle\sum_{n=2}^{\infty} \frac{(n!)^2}{(2n)!}$?

Quiz 11

1. What is the behavior of the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{2n+3}}$?

2. What is the behavior of the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1} n^3}{2^n}$?

Quiz 12

1. Find the Maclaurin series for $-\frac{1}{2}\ln(1-2x)$.

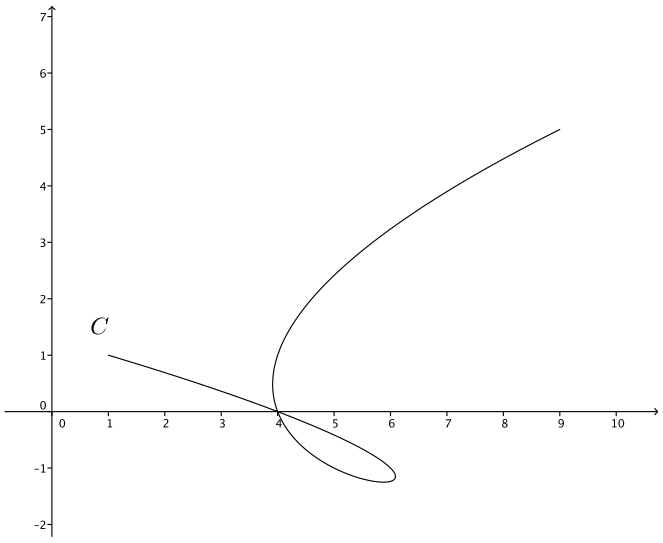
2. What is the interval of convergence for the series in problem 1?

Quiz 13

1. Find the equation of the tangent line to the parametric curve $x = t^3 - 2t + 5$, $y = t^2 + t - 1$ when $t = 0$.

2. For the curve above find d^2y/dx^2 when $t = 0$.

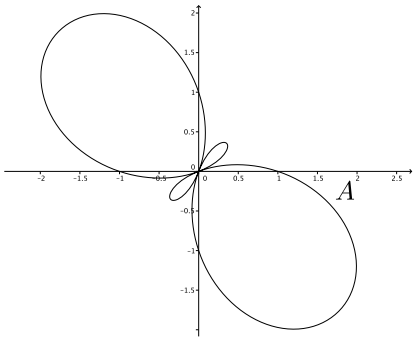
3. *Extra credit:* find the area enclosed in the loop.

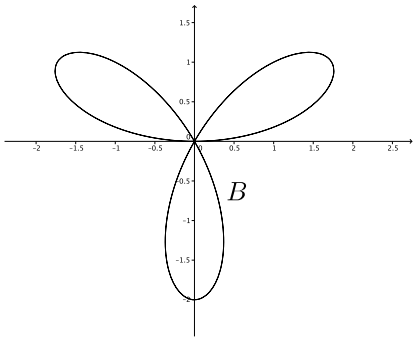


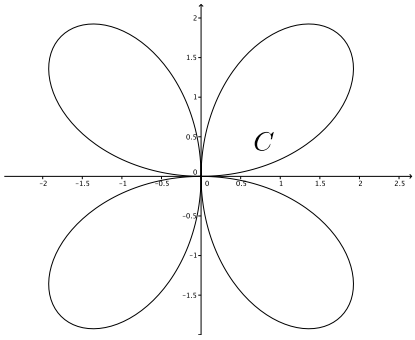
Quiz 14

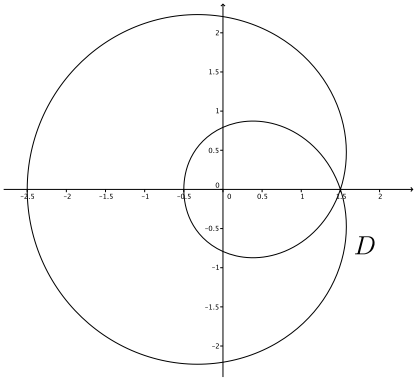
Match the polar graphs below to the following equations. Justify your answers!

1. $r = \frac{5}{2}\sin(2\theta)$
2. $r = 2\sin(3\theta)$
3. $r = 1 - \frac{3}{2}\sin(2\theta)$
4. $r = \frac{3}{2} + \sin(\frac{1}{2}\theta)$









Quiz 15

1. Find the area inside one loop of the polar graph $r = 2\sin(3\theta)$.
2. What is the distance between $(1, -1, 3)$ and $(2, 2, 5)$?

Quiz 16

1. Let $\mathbf{u} = \langle 6, -3, 2\rangle$ and $\mathbf{v} = \langle 2, 2, -1\rangle$. Find $\cos\theta$, where θ is the angle between $\mathbf{u}$ and $\mathbf{v}$.
2. Let $\mathbf{v}$ and $\mathbf{u}$ be as above. Compute $\text{proj}_{\mathbf{u}}\,\mathbf{v}$.