

Mathematics 3010, Summer 2009: Chapter 15 Problems

History

1. How did Hudde and Sluse improve calculation methods for finding tangents?
2. Who first discovered a surface with infinite surface area but finite volume? Which?
3. Who derived formulas for sums of powers of consecutive whole numbers?
4. Who realized that the area under the curve $y=1/x$ behaved like a logarithm?
5. Give Wallis' infinite sum formula for $\pi/4$.
6. Who was the first to find the length of a curve? Which curve?
7. What functions are missing in l'Hospital, Hayes, and Ditton's treatments of calculus?
8. What assumption about gravity allows Newton to conclude that orbits of planets are ellipses?

Mathematics - do all of these and turn in on Wednesday

1. Use Fermat's method that starts with setting $p(x_1)=p(x_2)$ to find a maximum or minimum value for the function $p(x)=x^3+2x+1$.
2. Repeat problem 1 using the method that starts with setting $p(x+e)=p(x)$.
3. Find the subtangent to the curve $x=y^2-2y+2$ at the point (1,1) using Fermat's method.
4. Find the normal to the curve $x=y^2-2y+2$ at the point (1,1) using Descartes' method.