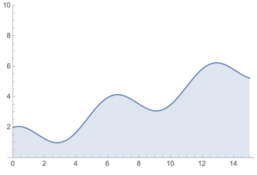
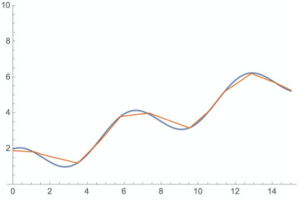
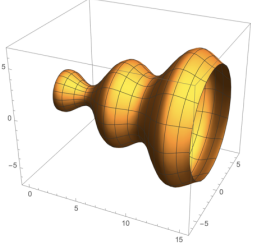
What is Calc II all about? Part 1: Applications of the Integral

Anything you can approximate by accumulation, you can calculate by an integral

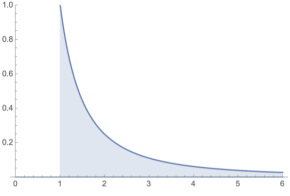






What is Calc II all about? Part 2: Infinite series

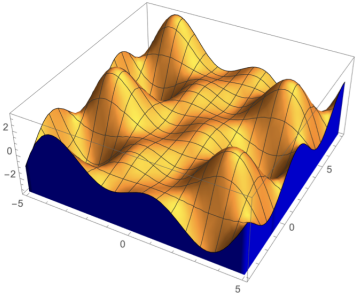
"Infinite" integrals and sums are really powerful tools!

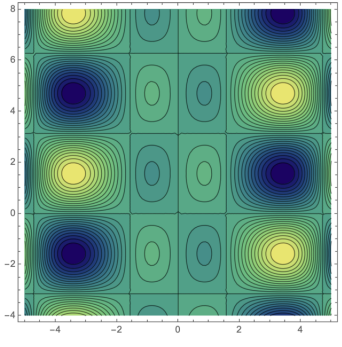


$$\sum_{k=0}^{\infty} \frac{1}{2^k} = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots$$

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots$$

We live in a multivariable world





Work on these with your partner(s) at the board

1. Find the derivative of each function

   (a) $f(x) = x^3 + 7x + 1$

   (b) $f(x) = \sin(x^2)$

   (c) $f(x) = \sqrt{x + e^x}$

   (d) $f(x) = (3x^2 + 7x)\ln(x)$

2. Evaluate the following integrals

   (a) $\int 5x^4 - x^3 + \pi \; dx$

   (b) $\int_0^{\pi/2} -\sin(2x) \; dx$

   (c) $\int e^x + \frac{1}{x} \; dx$

   (d) $\int \sec(2x)^2 \; dx$