Friday, February 13

Clicker Questions

Clicker Question 1

Fraction with a fancy numerator

Find constants A, B such that $\dfrac{16x^3+35}{2x^2+5x+3} = \dfrac{A}{x+1} + \dfrac{B}{2x+3}$.

A. $A = 19, B = 38$

B. $A = 8, B = -\frac{5}{2}$

C. $A = 8, B = -20$

D. $A = 19, B = -22$

E. no such constants exist

Why don't they exist?

We're being asked to find constants that satisfy

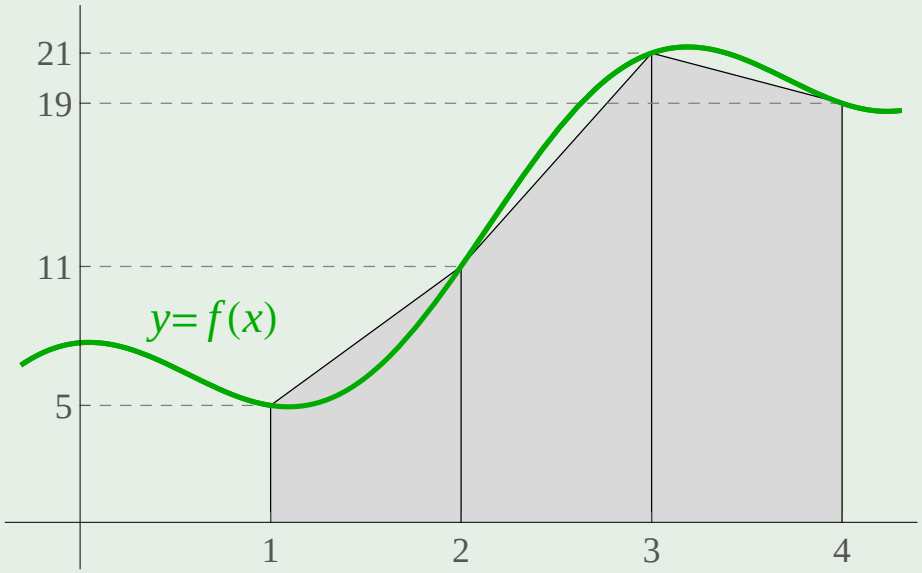
$$16x^3 + 35 = A(2x+3) + B(x+1);$$

but the degree of the left-hand side is too large for that to happen.

Clicker Question 2

The Trapezoid Rule

What is the total area of the three pictured trapezoids?



A. 56
B. 43
C. 35
D. 44
E. 51

The calculation

The trapezoids have area $\frac{1}{2}\big(f(1)+f(2)\big)$, $\frac{1}{2}\big(f(2)+f(3)\big)$, and $\frac{1}{2}\big(f(3)+f(4)\big)$, for a total area of $\frac{1}{2}\big(f(1)+2f(2)+2f(3)+f(4)\big)$.

Clicker Question 3

How big does a function get?

Define $h(x) = x + 4 - e^x$. Find the maximum value, K, of $h(x)$ on the interval $[-1, 1]$.

A. $K = 1 - \frac{1}{e}$

B. $K = 3 = h(0)$

C. $K = 5 - e = h(1)$

D. $K = e - 1$

E. $K = 3 - \frac{1}{e} = h(-1)$

Flashback to differential calculus

The maximum is at a critical point or an endpoint;

$$h'(x) = 1 - e^x,$$

so the only critical point is $x = 0$.