

Monday, February 4

Clicker Questions

Clicker Question 1

Finding a coefficient

In the partial fraction decomposition

$$\frac{13 + 37x}{(x - 2)(x + 1)(x^2 + 3)} = \frac{A}{x - 2} + \frac{B}{x + 1} + \frac{Cx + D}{x^2 + 3},$$

what is the value of B ?

- A. $B = 0$
- B. $B = -\frac{25}{2}$
- C. B is undefined
- D. $B = 2$
- E. $B = 3$

The one-by-one approach

Multiply by the big denominator:

$$\begin{aligned} 13 + 37x &= A(x + 1)(x^2 + 3) \\ &\quad + B(x - 2)(x^2 + 3) \\ &\quad + (Cx + D)(x - 2)(x + 1) \end{aligned}$$

Then plug in $x = -1$ to get $-24 = -12B$.

Clicker Question 2

When the numerator has larger degree

What is the correct partial fraction expansion of

$$\frac{2x^3 - 7x^2 + 7x}{x^2 - 4x + 4} ?$$

- A. $2x + 1 + \frac{3x - 4}{(x - 2)^2}$
- B. $2x + \frac{3x - 4}{(x - 2)^2}$
- C. $2x + \frac{3}{x - 2} + \frac{2}{(x - 2)^2}$
- D. $2x + 1 - \frac{1}{x - 2} + \frac{2x - 2}{(x - 2)^2}$
- E. $2x + 1 + \frac{3}{x - 2} + \frac{2}{(x - 2)^2}$

A and E ...

... are both equal to

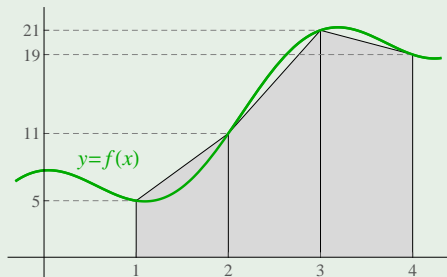
$$\frac{2x^3 - 7x^2 + 7x}{x^2 - 4x + 4},$$

but A is not in partial fraction form yet.

Clicker Question 3

The trapezoid rule

What is the **total area of the three pictured trapezoids**?



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

The calculation

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