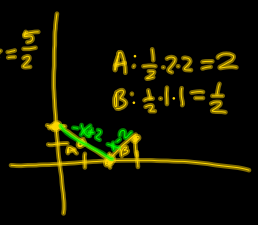
AP Calculus AB
Thursday, February 13, 2014

Please check HW answers with someone(s).

$\int_a^b f(x)\,dx$ → area under $f(x)$ between $x=a$ & $x=b$.

(10) $\int_0^3 |x-2|\,dx = \frac{5}{2}$



$A: \frac{1}{2}\cdot 2\cdot 2 = 2$

$B: \frac{1}{2}\cdot 1\cdot 1 = \frac{1}{2}$

w/ algebra

$$\int_0^3 |x-2|\,dx = \int_0^2 (-x+2)\,dx + \int_2^3 (x-2)\,dx$$

$$|x-2| = \begin{cases} -x+2, & x \le 2 \\ x-2, & x > 2 \end{cases}$$

$$= -\frac{x^2}{2}+2x\Big|_0^2 + \left(\frac{x^2}{2}-2x\right)\Big|_2^3$$

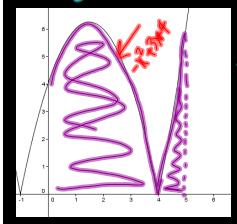
$$= -\frac{2^2}{2}+4-0+\frac{3^2}{2}-6-\left(\frac{2^2}{2}-4\right)$$

$$= -2+4+\frac{9}{2}-6-2+4$$

$$= -\frac{4}{2}+\frac{9}{2}$$

$$= \frac{5}{2}$$

$$\int_0^5 |x^2-3x-4|\,dx = \int_0^4 (-x^2+3x+4)\,dx + \int_4^5 (x^2-3x-4)\,dx$$



$$= \left(-\frac{x^3}{3}+\frac{3x^2}{2}+4x\right)\Big|_0^4 + \left(\frac{x^3}{3}-\frac{3x^2}{2}-4x\right)\Big|_4^5$$

$$= -\frac{4^3}{3}+\frac{3\cdot 4^2}{2}+4\cdot 4-0+\left(\frac{5^3}{3}-\frac{3\cdot 5^2}{2}-20\right)-\left(\frac{4^3}{3}-\frac{3\cdot 4^2}{2}-16\right)$$

$$= -2\cdot\frac{4^3}{3}+3\cdot 4^2+\frac{5^3}{3}-\frac{3\cdot 5^2}{2}-20$$

$$= \frac{-128}{3}+60+\frac{125}{3}-\frac{75}{2}$$

$$= \frac{118}{2}-\frac{75}{2}$$

$$= \frac{43}{2}$$

p.155 packet

do on own paper