Math 2423-010
In-Class Quiz 2-12

Determine if each statement is TRUE or FALSE:

PROBLEM 1. If f is continuous on the interval $[a, b]$ and c is a number between a and b then

$$\int_a^b f(x)\,dx \;=\; \int_a^c f(x)\,dx \;+\; \int_c^b f(x)\,dx$$

ANSWER: TRUE. (For example see page 315 in Stewart.)

PROBLEM 2. $\displaystyle\int_{-2}^{2} 7 - 3x\,dx = 28$

ANSWER: TRUE, because

$$\int_{-2}^{2} 7 - 3x\,dx \;=\; 7x - \frac{3}{2}x^2\Big|_{-2}^{2} \;=\; (7(2) - \frac{3}{2}(2)^2) - (7(-2) - \frac{3}{2}(-2)^2) \;=\; 8 + 20 \;=\; 28$$

PROBLEM 3. $\displaystyle\int_{2}^{5} 2x - 3\,dx = 12$

ANSWER: TRUE, because

$$\int_{2}^{5} 2x - 3\,dx \;=\; x^2 - 3x\Big|_{2}^{5} \;=\; 10 - (-2) \;=\; 12$$

PROBLEM 4.

If $f(x) = \begin{cases} 7 - 3x & \text{if } -2 \le x < 2 \\ 2x - 3 & \text{if } 2 \le x \le 5 \end{cases}$ then $\displaystyle\int_{-2}^{5} f(x)\,dx \;=\; 60.$

ANSWER: FALSE, because

$$\int_{-2}^{5} f(x)\,dx = \int_{-2}^{2} f(x)\,dx + \int_{2}^{5} f(x)\,dx = \int_{-2}^{2} 7 - 3x\,dx + \int_{2}^{5} 2x - 3\,dx$$

which equals $28 + 12 = 40$ by the results of the previous problems.