5.3 DEFINITE INTEGRAL RULES p.2[illegible]

$$\boxed{\int_a^a f(x)\,dx = 0} \qquad \boxed{\int_b^a f(x)\,dx = -\int_a^b f(x)\,dx}$$

$$\boxed{\int_a^b k\,f(x)\,dx = k\int_a^b f(x)\,dx}$$

$$\boxed{\int_a^b [f(x) \pm g(x)]\,dx = \int_a^b f(x)\,dx \pm \int_a^b g(x)\,dx}$$

$$\boxed{\int_a^b f(x)\,dx + \int_b^c f(x)\,dx = \int_a^c f(x)\,dx}$$ etc. . . . . .

EXAMPLE

$$\int_{-1}^{1} f(x)\,dx = 5 \qquad \int_{1}^{4} f(x)\,dx = -2 \qquad \int_{-1}^{1} h(x)\,dx = 7$$

A. $\displaystyle\int_4^1 f(x)\,dx = -\int_1^4 f(x)\,dx = -(-2) = \underline{\underline{2}}$

B. $\displaystyle\int_{-1}^{1} [2f(x) + 3h(x)]\,dx = 2\int_{-1}^{1} f(x)\,dx + 3\int_{-1}^{1} h(x)\,dx$

$$= 2(5) + 3(7) = \underline{\underline{31}}$$

C. $\displaystyle\int_{-1}^{4} f(x)\,dx = \int_{-1}^{1} f(x)\,dx + \int_{1}^{4} f(x)\,dx$

$$= 5 + (-2) = \underline{\underline{3}}$$

p. 267 → 28

HWORK
p.274-[illegible]
1-6

ANTIDERIVATIVE IS UNDOING THE DERIVATIVE

$\frac{d}{dx}(x^2) = 2x \qquad \frac{d}{dx}(x^2+5) = 2x$

ANTIDERIVATIVE $(2x) = x^2 + C$

ANTIDERIVATIVE $(x^n) = \frac{x^{n+1}}{n+1} + C$

LET $f(x)$ BE A FUNCTION

$f'(x)$ IS THE DERIVATIVE

$F(x)$ IS THE ANTIDERIVATIVE OF $f(x)$

$\int_a^b f(x)\,dx = F(b) - F(a)$ FTC II

EXAMPLE: $\int_{-2}^{3} (8x+2)\,dx$

$F(x) = 8 \cdot \frac{x^2}{2} + 2x + C = 4x^2 + 2x + C$

$F(b) - F(a) = (4 \cdot 3^2 + 2 \cdot 3 + C) - (4(-2)^2 + 2(-2) + C)$

$= 42 + C - (12 + C) = \boxed{30}$

CHECK ON TI-89

$\int(8x+2, x, -2, 3)$

$\boxed{\text{HWORK p. 275} \to 7\text{-}15}$

REFER TO OLD $\frac{d}{dx}$ FORMULAS FOR 13-15