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Rules for Definite Integrals: Extra Practice

1. Let $\int_1^2 f(x)dx = -3$, $\int_1^5 f(x)dx = 5$, and $\int_1^5 g(x)dx = 9$. Find:

a) $\int_2^2 g(x)dx$ = 0

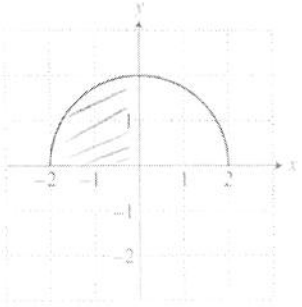
b) $\int_1^2 (3f(x)+1)dx = 3\int_1^2 f(x)\,dx + \int_1^2 1\,dx = 3(-3) + (1) = -8$

c) $\int_2^5 f(x)dx = \int_1^5 f(x)dx - \int_1^2 f(x)dx$
$= 5 - (-3) = 8$

2. If $f(x)$ is continuous on [1,3] and $2 \le f(x) \le 4$, what is the greatest possible value of $\int_1^3 f(x)dx$?

$2(4) = 8$

3. The graph of f is the semicircle shown below. Let g be the function given by $\int_0^x f(t)dt$.
What is the value of $g(-2)$?



$g(x) = \int_0^x f(t)\,dt$

$g(-2) = \int_0^{-2} f(t)\,dt$

$= -\int_{-2}^0 f(t)\,dt$

$= -\frac{\pi(2)^2}{4} = -\pi$

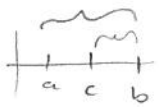
4. Suppose that h is continuous and that $\int_{-1}^1 h(r)dr = 0$ and $\int_{-1}^3 h(r)dr = 7$. Find:

a) $\int_1^3 h(r)dr \Rightarrow \int_{-1}^1 h(r)\,dr + \int_1^3 h(r)dr = \int_{-1}^3 h(r)\,dr$
$0 + \int_1^3 h(r)dr = 7$

b) $-\int_3^1 h(r)dr$ = 7

MULTIPLE CHOICE

5. If $f(x)$ is continuous on lthe interval $a \le x \le b$ and $a < c < b$, then $\int_c^b f(x)dx$ is equal to



(A) $\int_a^c f(x)dx + \int_c^b f(x)dx$

(B) $\int_a^c f(x)dx - \int_a^b f(x)dx$

(C) $\int_c^a f(x)dx + \int_b^a f(x)dx$

(D) $\int_a^b f(x)dx - \int_a^c f(x)dx$

(E) $\int_a^c f(x)dx - \int_b^c f(x)dx$

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

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