Name ______________________________________ Per. ____ Date_________ Score _____

Notes 72: Applications of the Definite Integral

Integral Properties

If $f(x)$ and $g(x)$ are continuous on open interval $[a,b]$; then:

i) $\int_a^b cf(x)dx = c\int_a^b f(x)dx$; where c is an integer.

ii) $\int_a^b f(x)dx = -\int_b^a f(x)dx$

iii) $\int_a^a f(x)dx = 0$

iv) $\int_a^b \left(f(x) \pm g(x)\right)dx = \int_a^b f(x)dx \pm \int_a^b g(x)dx$

v) $\int_a^b f(x) = \int_a^c f(x)dx + \int_c^b f(x)dx$; where c is in the interval $[a,b]$

Evaluating Using Definite Integral Properties *Evaluate the following, given that:*

$\int_0^1 f(x)dx = 6$; $\int_0^2 f(x)dx = 4$; and $\int_2^5 f(x)dx = -2$.

1) $\int_0^5 f(x)dx =$

2) $\int_1^2 f(x)dx =$

3) $\int_1^5 f(x)dx =$

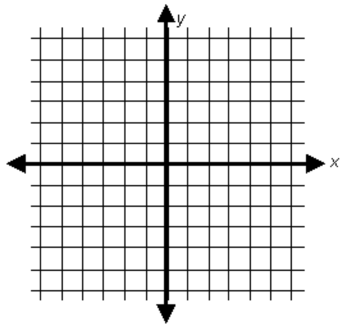
4) $\int_0^0 f(x)dx =$

5) $\int_2^0 f(x)dx =$

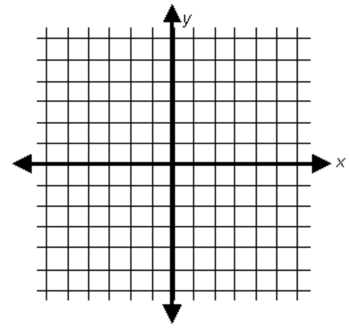
6) $\int_5^1 f(x)dx =$

<u>Area Under the Curce</u> *Graph the function over the given interval. Then (a) integrate the function over the interval and (b) find the area of the region between the graph and the x-axis.*

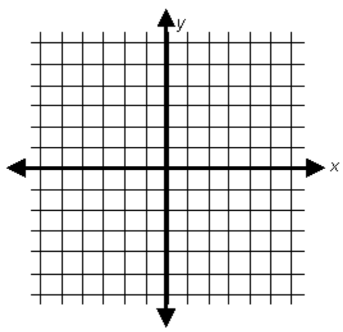
7) $f(x) = x^2 + 2$ over $[1, 2]$



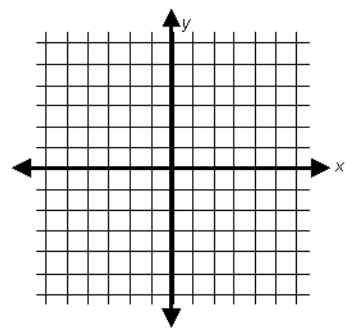
8) $f(x) = x^2 - 4$ over $[-1, 3]$



9) $f(x) = -2x^2 - 6x + 8$ over $[-1, 4]$



10) $f(x) = 2x - \frac{1}{3}x^2$ over $[0, 9]$



11) Evaluate $\int_{-5}^{4} f(x)dx$, if $f(x) = \begin{cases} -4 & , x \le -3 \\ 2 & , -3 < x < 0 \\ 1 & , x \ge 0 \end{cases}$

12) If $f(x)$ has the graph to the right, find $\int_{-5}^{5} f(x)dx$