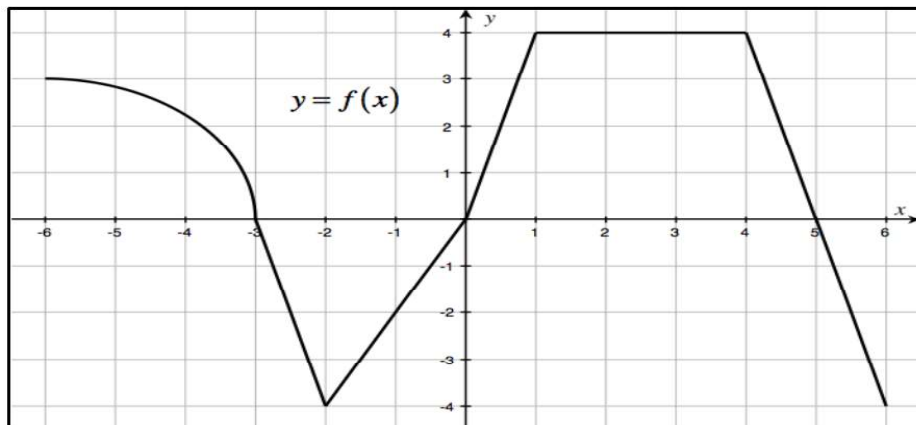


### Skill Builder: Topic 6.3B – The Definite Integral as Area

No calculators should be used on this HW. Given the graph of  $f(x)$  below which is made up of a quarter circle and line segments, evaluate each of the following definite integrals.

1.) $\int_0^1 f(x) dx = \frac{1}{2}(1)(4) = 2$
2.) $\int_2^4 f(x) dx = (2)(4) = 8$
3.) $\int_1^4 f(x) dx = (3)(4) = 12$



4.) $\int_5^5 f(x) dx = 0$	5.) $\int_4^5 f(x) dx = \frac{1}{2}(1)(4) = 2$	6.) $\int_5^6 f(x) dx = -\frac{1}{2}(1)(4) = -2$
7.) $\int_4^6 f(x) dx =$ $\frac{1}{2}(1)(4) - \frac{1}{2}(1)(4) = 0$	8.) $\int_0^6 f(x) dx =$ $\frac{1}{2}(1)(4) + (3)(4) + \frac{1}{2}(1)(4) - \frac{1}{2}(1)(4) = 14$	9.) $\int_{-1}^2 f(-x) dx =$ $\frac{1}{2}(1)(4) - \frac{1}{2}(2)(4) = -2$
10.) $\left  \int_{-2}^1 f(x) dx \right  =$ $\left  -\frac{1}{2}(2)(4) + \frac{1}{2}(1)(4) \right  =  -4 + 2  = 2$	11.) $\int_6^0 f(x) dx = -14$ <i>* We will discuss this special case in Topic 6.6</i>	12.) $\int_{-3}^0 f(x) dx = -\frac{1}{2}(3)(4) = -6$
13.) $\int_{-1}^1  f(x)  dx =$ $\frac{1}{2}(1)(2) + \frac{1}{2}(1)(4) = 3$	14.) $\int_{-3}^2 -3f(x) dx =$ $-3\left(-\frac{1}{2}(3)(4) + \frac{1}{2}(1)(4) + (1)(4)\right) = 0$	15.) $\int_0^3 f(x-2) dx =$ $\int_{-2}^1 f(x) dx = -\frac{1}{2}(2)(4) + \frac{1}{2}(1)(4) = -2$
16.) $\int_0^5 f(x+1) dx =$ $\int_1^6 f(x) dx = 12$	17.) $\int_{-3}^{-6} f(x) dx =$ $-\frac{1}{4}\pi(3)^2 = -\frac{9\pi}{4}$	18.) $\int_{-2}^1 f( x ) dx =$ $(1)(4) + \frac{1}{2}(1)(4) + \frac{1}{2}(1)(4) = 8$
19.) $\int_{-6}^{-1} f( x ) dx =$ $-\frac{1}{2}(1)(4) + \frac{1}{2}(1)(4) + (4)(3) = 12$	20.) $\int_{-1}^2 (f(x) + 2) dx =$ $-\frac{1}{2}(1)(2) + \frac{1}{2}(2+1)(4) + (3)(2) = 11$	21.) $\int_{-2}^3 (f(x) - 3) dx =$ $-\frac{1}{2}(2)(4) + \frac{1}{2}(3+2)(4) - (3)(5) = -9$

