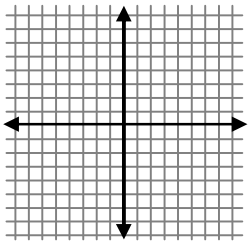
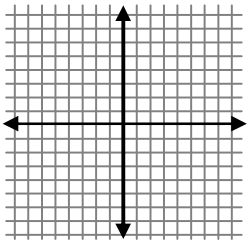
Area Under a Curve

Finding Areas Under a Curve

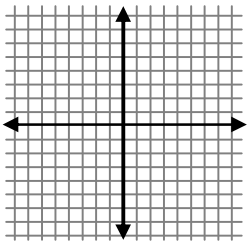
Example 1: Find the area *A(x)* between the graph of *f* and the interval [-1, *x*]. Then find the derivative *A'(x)*. Given: $f(x) = 2$. Graph the function, shade in the area to be found and use elementary geometry to find the area.



Example 2: Find the area *A(x)* between the graph of *f* and the interval [-1, *x*]. Then find the derivative *A'(x)*. Given: $f(x) = x + 1$. Graph the function, shade in the area to be found and use elementary geometry to find the area.



Example 3: Find the area *A(x)* between the graph of *f* and the interval [-1, *x*]. Then find the derivative *A'(x)*. Given: $f(x) = 2x + 3$. Graph the function, shade in the area to be found and use elementary geometry to find the area.



What is the relationship between the function and the area?

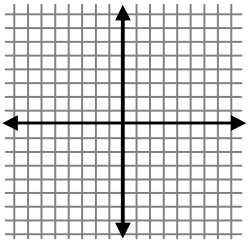
If you are given the function, how could you calculate the area from it?

Area Under a Curve

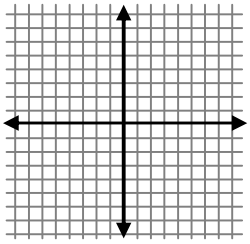
Class Work

Graph each function over the specified interval. Then use simple area formulas from geometry to find the area function *A(x)* that gives the area between the graph of the specified function f and the interval. Confirm that $A'(x) = f(x)$ in every case.

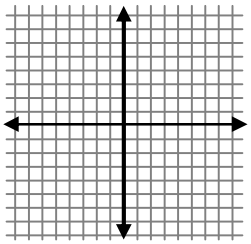
1. $f(x) = 3$; $[1, x]$



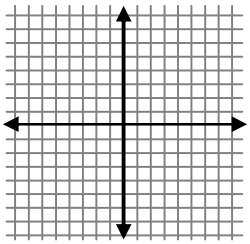
2. $f(x) = 5$; $[2, x]$



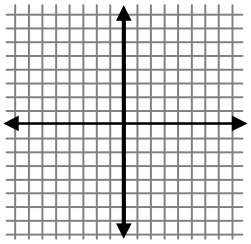
3. $f(x) = 2x + 2$; $[0,x]$



4. $f(x) = 3x - 3$; $[1, x]$



5. $f(x) = 2x + 2$; $[1, x]$



6. $f(x) = 3x - 3$; $[2, x]$