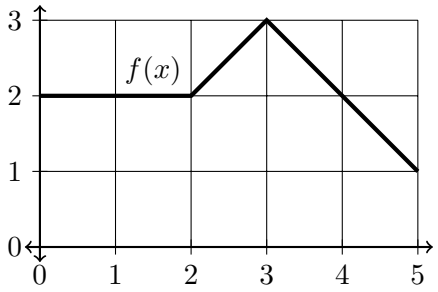
"Area So Far" functions

1. Let $f(x)$ be given by the graph below and define $A(x) = \int_0^x f(t)dt$.



Compute the following using the graph. Hint: $A(1) = \int_0^1 f(x)\,dx$, which calculates the area accumulated under the graph from $x = 0$ to $x = 1$.

$A(1) =$ _____ $f(1) =$ _____

$A(2) =$ _____ $f(2) =$ _____

$A(3) =$ _____ $f(3) =$ _____

$A(4) =$ _____ $f(4) =$ _____

$A(5) =$ _____ $f(5) =$ _____

The x-value in the interval $[0, 5]$ at which $A(x)$ attains its maximum is _____

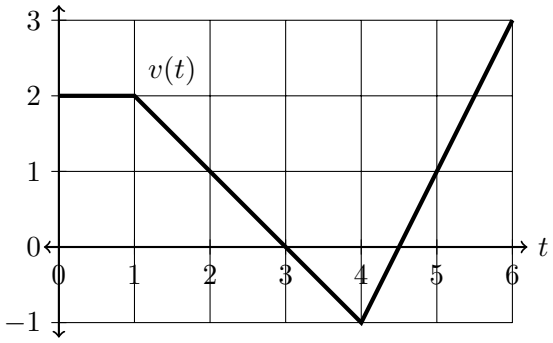
The maximum value of $A(x)$ on $[0, 5]$ is _____

The x-value in the interval $[0, 5]$ at which $f(x)$ attains its maximum is _____

The maximum value of $f(x)$ on $[0, 5]$ is _____

What can you say about the **rate of change** of $A(x)$?

2. A toy car is travelling on a straight track. Its velocity $v(t)$, in meters per second, is given by the graph below. Define $s(t)$ to be the position of the car in meters, and suppose that $s(0) = 0$. Note that $s(t) = \int_0^t v(x)\,dx$. (Here, x is called the "dummy variable of integration".)



Compute the following:

$s(2) =$ _____ $s(4) =$ _____ $s(6) =$ _____

$v(2) =$ _____ $v(4) =$ _____ $v(6) =$ _____

The t-value in the interval $[0, 6]$ at which $s(t)$ attains its maximum is _____

The maximum value of $s(t)$ on $[0, 6]$ is _____

The t-value in the interval $[0, 6]$ at which $s(t)$ attains its minimum is _____

The minimum value of $s(t)$ on $[0, 6]$ is _____

The t-value in the interval $[0, 6]$ at which $v(t)$ attains its maximum is _____

The maximum value of $v(t)$ on $[0, 6]$ is _____

The t-value in the interval $[0, 6]$ at which $v(t)$ attains its minimum is _____

The minimum value of $v(t)$ on $[0, 6]$ is _____

Describe the position of the car over the 6 seconds. _____

_____

_____

Describe the velocity of the car over the 6 seconds. _____

_____

_____