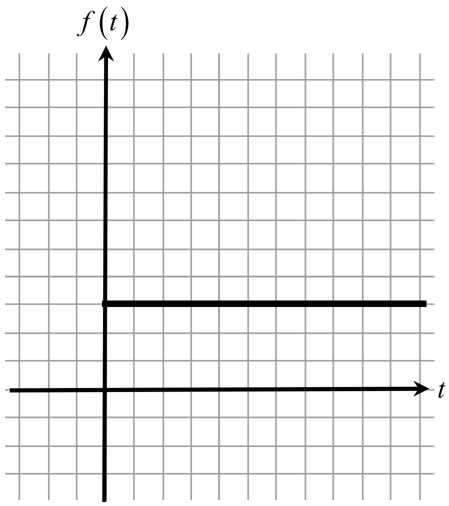
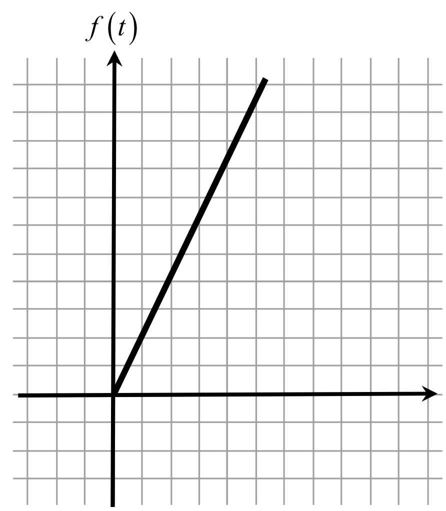
**Accumulation Activity**

1. Let $[0, x]$, be an interval on the $t$-axis. Write the equation of the functions $A_1(x)$, $A_2(x)$, and $A_3(x)$ that gives the area of the regions in the first quadrant under the graph of $y = f(t)$, above the $t$-axis, between $t = 0$ and $t = x$. Indicate where this region appears on the graph by shading a typical region and indicating where $x$ is.



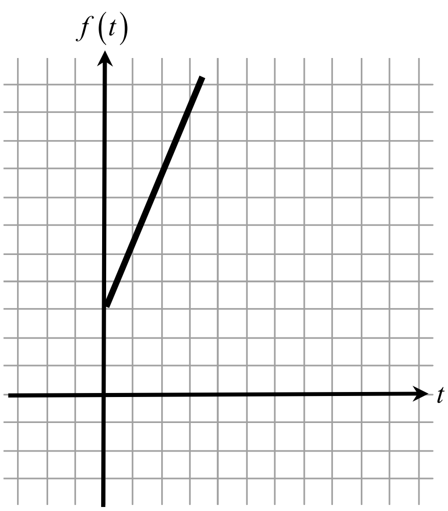

$f(t) = 3$

$A_1(t) =$ ______________________




$f(t) = 2t$

$A_2(t) =$ ______________________




$f(t) = 3 + 2t$

$A_3(x) =$ ______________________

2. Calculate the values in the table below:

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $A_1(x)$ | | | | | | |
| $A_2(x)$ | | | | | | |
| $A_3(x)$ | | | | | | |

Do these numbers agree with your idea of area? Why does $A_3 = A_1 + A_2$? Show graphically why this is true.

3. Allow $x$ to be negative. Calculate the values *from your equations* and fill in the table for these values:

| $x$ | –1 | –2 | –3 | –4 |
|---|---|---|---|---|
| $A_1(x)$ | | | | |
| $A_2(x)$ | | | | |
| $A_3(x)$ | | | | |

Explain your reasoning; specifically tell how does this relates to the area?

4. Calculate:

$$\frac{d}{dx}A_1(x) =$$

$$\frac{d}{dx}A_2(x) =$$

$$\frac{d}{dx}A_3(x) =$$

How does this relate to the original functions?