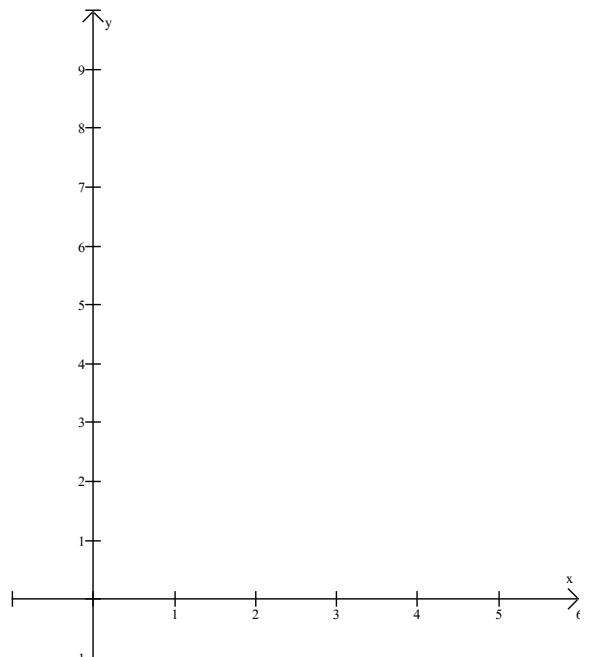
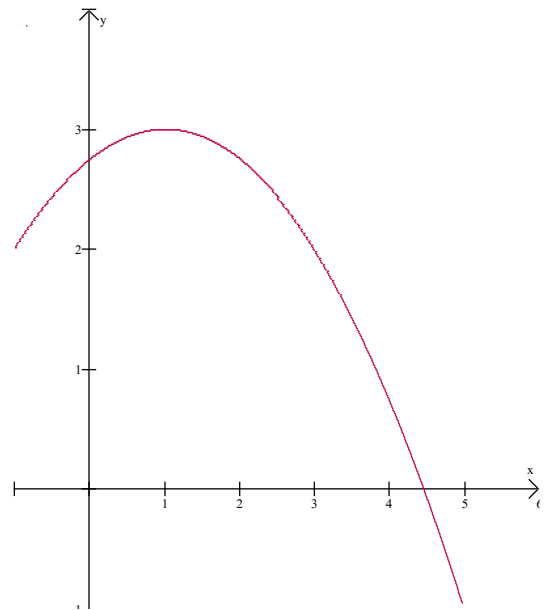


Integrals as Area Accumulators Graphical Approach

Let $A(x) = \int_0^x f(t)dt$ be a function that accumulates the area under the curve of $f(x)$ as you move away from 0.

Answer the following questions:

1. Which is larger $A(1)$ or $A(3)$? Justify your answer.
2. Which is larger $A(2)$ or $A(4)$? Justify your answer.
3. Which is larger $A(0)$ or $A(2)$? Justify your answer.
4. Where is $A(x)$ increasing? Why?
5. Where is $A(x)$ decreasing? Why?
6. When is $A(x)$ stationary? Why?
7. Sketch an approximate graph of $A(x)$



Let $A(x) = \int_0^x f(t)dt$ be a function that accumulates the area under the curve of $f(x)$ as you move away from 0.

Answer the following questions:

8. Which is larger $A(0)$ or $A(1)$? Justify your answer.

9. Which is larger $A(1)$ or $A(3)$? Justify your answer.

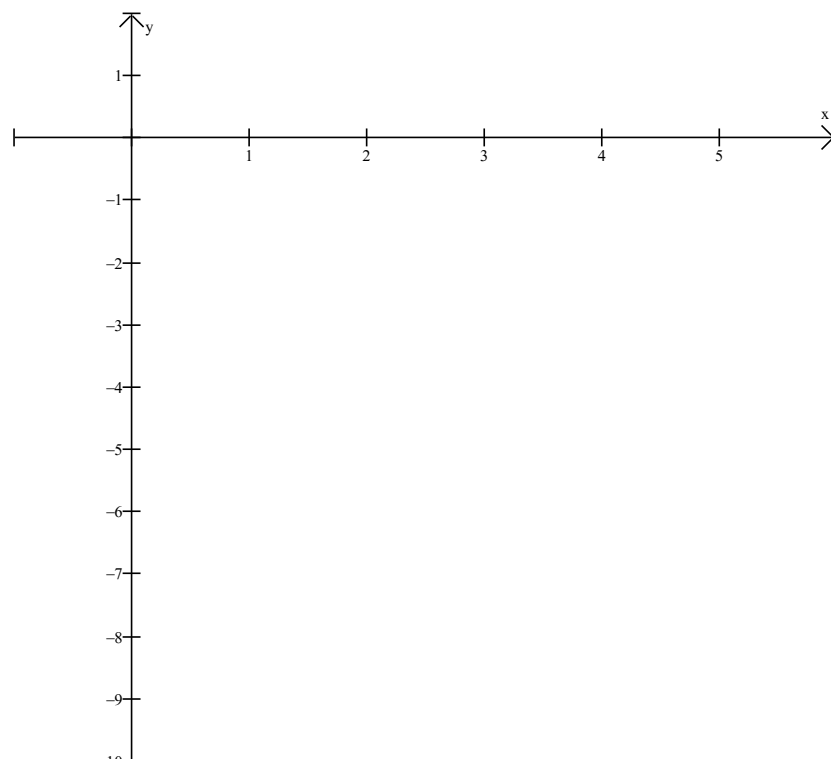
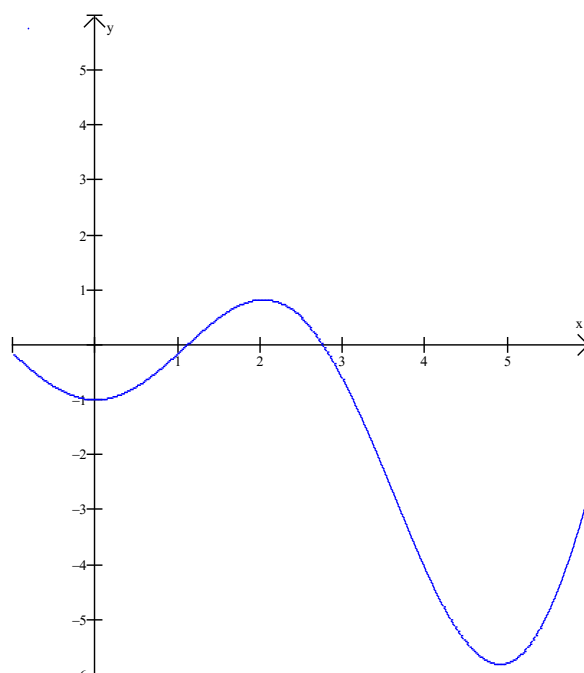
10. Which is larger $A(2)$ or $A(4)$? Justify your answer.

11. Where is $A(x)$ increasing? Why?

12. Where is $A(x)$ decreasing? Why?

13. When is $A(x)$ stationary? Why?

14. Sketch an approximate graph of $A(x)$



15. Graph $f(x) = 3x$ on the window $x\text{-min} = -5$, $x\text{-max} = 5$, $y\text{-min} = -15$, and $y\text{-max} = 15$.

16. Use the graphing calculator to sketch the graph of $A(x) = \int_0^x 3t dt$.

a.) At what point has the area accumulator accumulated no area yet? Why?

b.) When does the area accumulator accumulate positive area? Why?

c.) When does the area accumulator accumulate negative area? Why?

17. Use the graphing calculator to sketch the graph of $A(x) = \int_{-2}^x 3t dt$. Explain and discuss the area accumulator graph.

a.) At what point has the area accumulator accumulated no area yet? Why?

b.) When does the area accumulator accumulate positive area? Why?

c.) When does the area accumulator accumulate negative area? Why?

18. Use the graphing calculator to sketch the graph of $A(x) = \int_3^x 3t dt$. Explain and discuss the area accumulator graph.

a.) At what point has the area accumulator accumulated no area yet? Why?

b.) When does the area accumulator accumulate positive area? Why?

c.) When does the area accumulator accumulate negative area? Why?

19. What is the relationship between the lower limit 0 on the integrand and the graph of the accumulator function?

20. Graph $f(x) = 3x\sin(x)$ on the window $x\text{-min} = -5$, $x\text{-max} = 5$, $y\text{-min} = -10$, and $y\text{-max} = 10$.
21. Use the graphing calculator to sketch the graph of $A(x) = \int_0^x 3t \sin(t) dt$. Explain and discuss the area accumulator graph.
- At what point has the area accumulator accumulated no area yet? Why?
 - When does the area accumulator accumulate positive area? Why?
 - When does the area accumulator accumulate negative area? Why?
22. Use the graphing calculator to sketch the graph of $A(x) = \int_{-3}^x 3t \sin(t) dt$. Explain and discuss the area accumulator graph.
- At what point has the area accumulator accumulated no area yet? Why?
 - When does the area accumulator accumulate positive area? Why?
 - When does the area accumulator accumulate negative area? Why?
23. Use the graphing calculator to sketch the graph of $A(x) = \int_2^x 3t \sin(t) dt$. Explain and discuss the area accumulator graph.
- At what point has the area accumulator accumulated no area yet? Why?
 - When does the area accumulator accumulate positive area? Why?
 - When does the area accumulator accumulate negative area? Why?
24. What is the relationship between the lower limit 0 on the integrand and the graph of the accumulator function?