

For problems 1-12, use the above graph for $y = f(x)$. Assume this is a series of lines and a quarter circle. Find the following:

1. $\int_0^2 f(x) dx$

2. $\int_3^4 f(x) dx$

3. $\int_2^5 f(x) dx$

4. $\int_4^5 f(x) dx$

5. $\int_5^6 f(x) dx$

6. $\int_2^6 f(x) dx$

7. $\int_6^0 f(x) dx$

8. $\int_{-2}^2 f(x) dx$

9. $\int_{-3}^0 f(x) dx$

10. $\int_4^{-1} f(x) dx$

11. $\left| \int_{-3}^2 f(x) dx \right|$

12. $\int_6^0 |f(x)| dx$

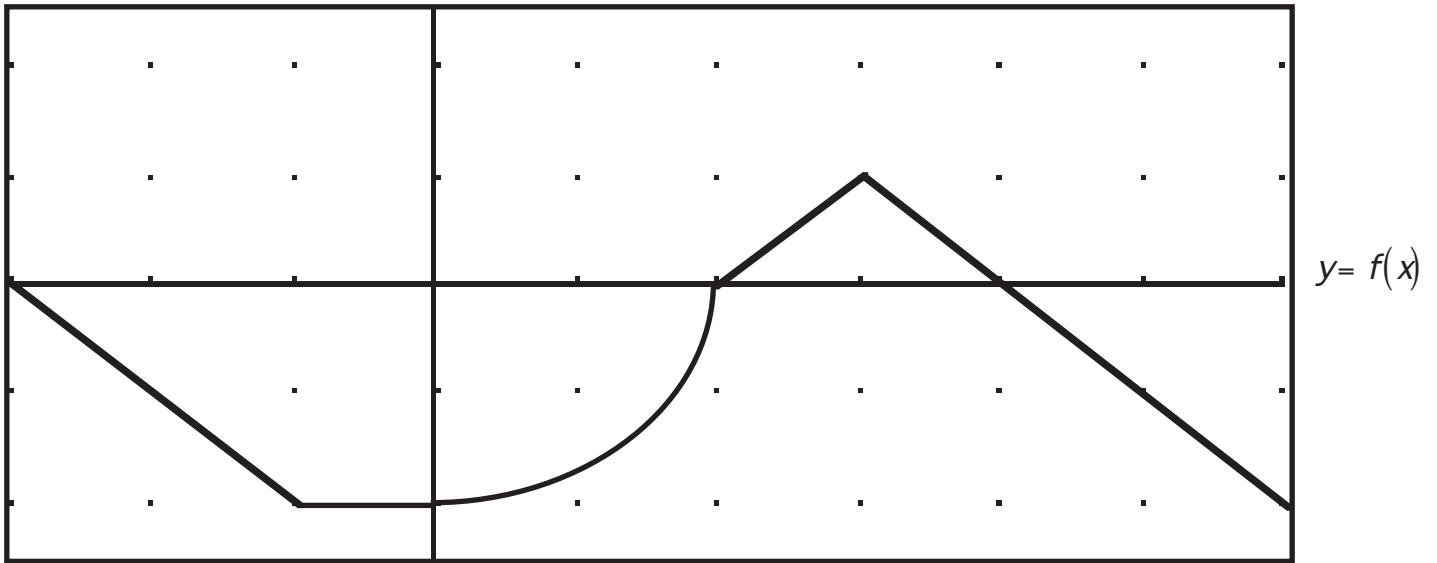
If $\int_{-4}^{-1} f(x) dx = -7$, $\int_{-1}^6 f(x) dx = 3$ and $\int_4^6 f(x) dx = 6$, find the following:

13. $\int_6^{-4} f(x) dx$

14. $\int_{-1}^4 f(x) dx$

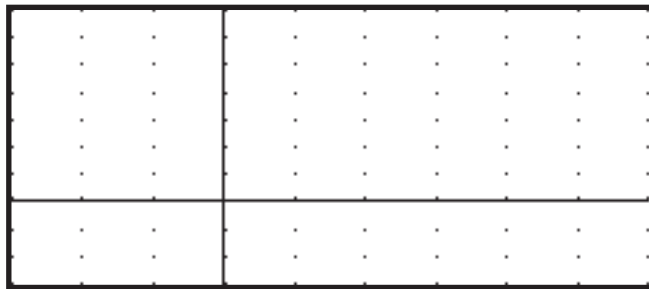
15. $\int_{-1}^6 (-4f(x) + 5) dx$

- Answers: 1) $-\pi$ 2) 0.5 3) 0.5 4) -0.5 5) -1.5 6) -1 7) $\pi + 1$ 8) $-3.5 - \pi$
 9) -4 10) $\pi + 1$ 11) $4 + \pi$ 12) $-\pi - 3$ 13) 4 14) -3 15) 23



Let $F(x) = \int_0^x f(t) dt$ where f is the graph above. (quarter circle and lines)

16. Find
- a. $F(0)$ b. $F(2)$ c. $F(4)$ d. $F(-3)$
17. On what subintervals of $[-3, 6]$ is F decreasing? Justify your answer.
18. Where in the interval $[-3, 6]$ does F achieve its minimum value? What is the minimum value?
19. Where in the interval $[-3, 6]$ does F achieve its maximum value? What is the maximum value?
20. On what subintervals of $[-3, 6]$ is F concave up? Justify your answer.
21. Where does F have points of inflection?
22. Sketch a rough graph of F .



- 16a) 0 16b) $-\pi$ 16c) $-\pi + 1$ 16d) 4 17) $(-3, 2) \cup (4, 6]$ - F' is negative on these intervals. 18) $-\pi - 1$ at $x = 6$
 19) 4 at $x = -3$ 20) $(0, 3)$ - F'' is positive on this interval 21) $x = 3$

