

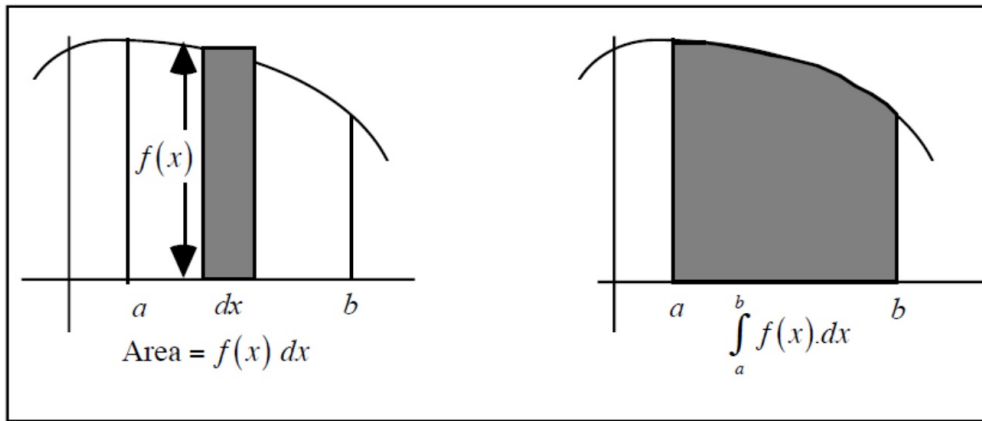
WARM UP

1. $\int \frac{x + 1}{\sqrt{x}} dx =$

2. Find the particular solution with the given point.

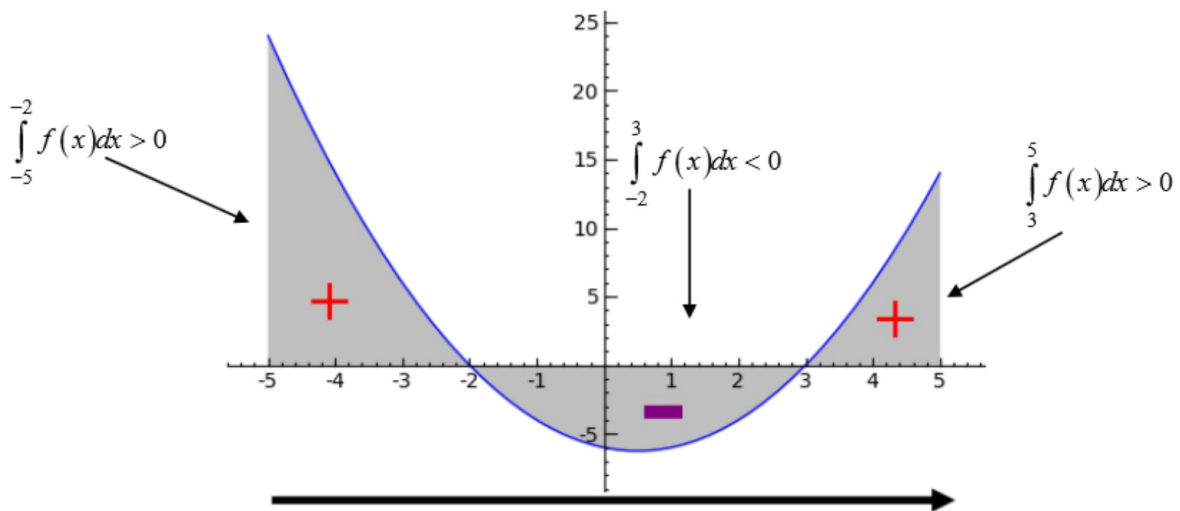
$$\frac{dy}{dx} = 2\sqrt{x}, (4, 12)$$

Definite Integral as Area and Net Accumulation

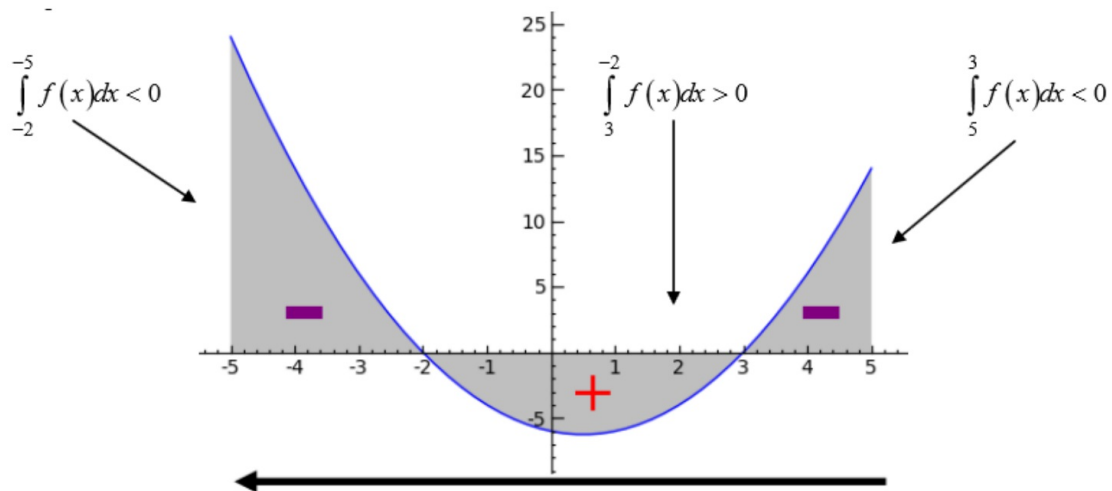


The area of one rectangle = $f(x) dx$

The sum of an infinite number of rectangle areas. Each rectangle is infinitely thin.



When integrating from left to right, the regions above the x-axis are positive and below are negative.



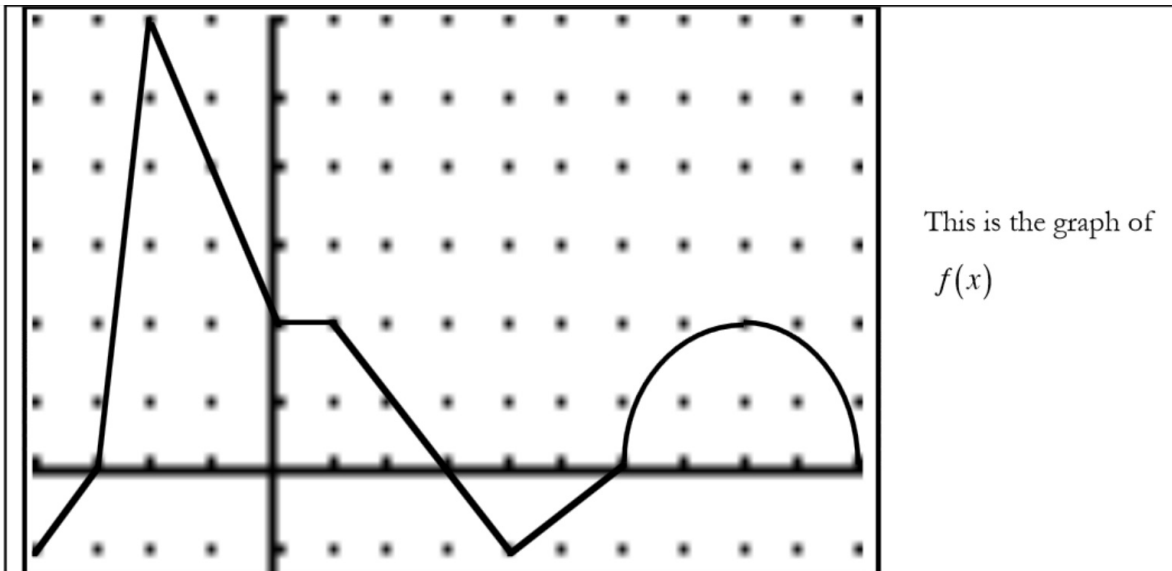
When integrating from right to left, the regions above the x-axis are negative and below are positive.

Three important rules:

$$1. \int_a^a f(x) dx = 0$$

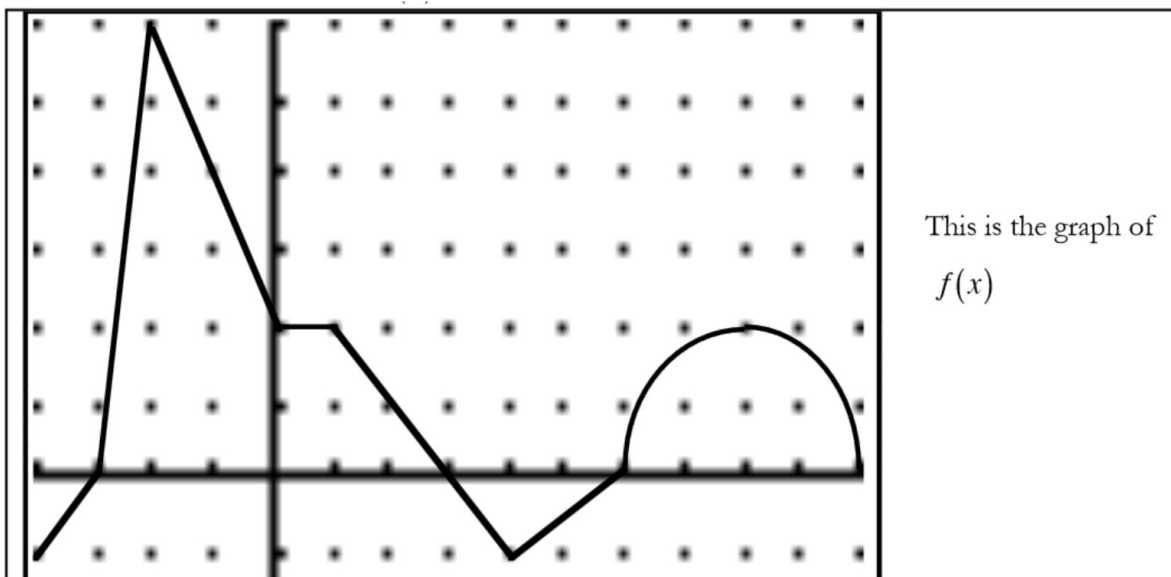
$$2. \int_a^b f(x) dx = -\int_b^a f(x) dx$$

$$3. \int_a^b f(x) dx + \int_b^c f(x) dx = \int_a^c f(x) dx$$



$$3. \int_1^3 f(t) dt$$

$$5. \int_3^6 f(t) dt$$



$$\int_4^8 f(x) dx$$

$$14. \int_0^{-3} f(t) dt$$

Suppose $\int_{-2}^5 f(x) dx = 18$, $\int_{-2}^5 g(x) dx = 5$, $\int_{-2}^5 h(x) dx = -11$ and $\int_{-2}^8 f(x) dx = 0$, find

22. $\int_{-2}^5 (f(x) + g(x)) dx$

23. $\int_{-2}^5 [f(x) + g(x) - h(x)] dx$

24. $\int_5^{-2} 4g(x) dx$

25. $\int_{-2}^5 (g(x) + 2) dx$

26. $\int_{-2}^5 (f(x) - 6) dx$

27. $\int_0^7 h(x - 2) dx$

28. $\int_{-4}^3 g(x + 2) dx$

29. $\int_5^8 f(x) dx$

30. $\int_1^8 [f(x - 3) + 3] dx$

$$\int_{-3}^3 |x + 2| dx$$

