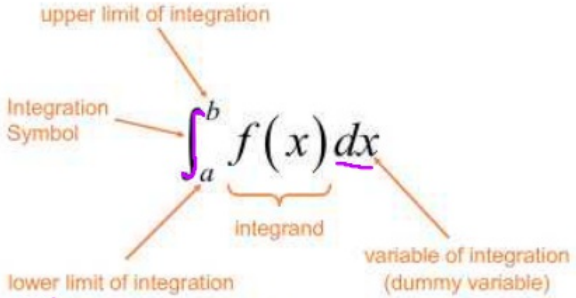
What you'll Learn About

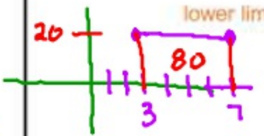
- Terminology and Notation of Integration
- The Definite Integral
- Area under a curve using geometry
- Properties of Definite Integrals

Evaluate the definite integral using geometry



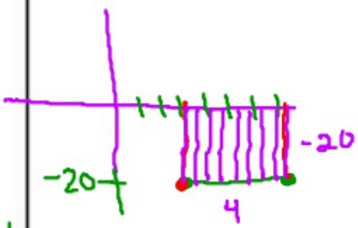
It is called a dummy variable because the answer does not depend on the variable chosen.

$-\int_3^7 20\,dx$

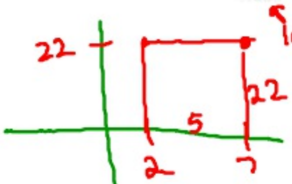


$f(x) = -20$

8) $\int_3^7 -20\,dx = 4(-20) = -80$



8A) $\int_2^7 22\,dx = 110$ upper lower $= (7-2)(22)$



* Find the area between f(x) and the x-axis on the given interval

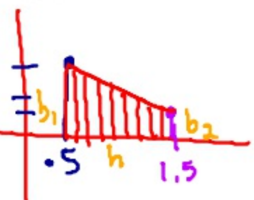
14) $\int_{.5}^{1.5} (-2x+4)\,dx = \frac{1}{2}(1)(3+1) = 2$

b_1

$f(.5) = -2(.5)+4 = 3$

$f(1.5) = -2(1.5)+4 = 1$

b_2



$\boxed{A = \frac{1}{2}h(b_1+b_2)}$

h: upperlimit - lowerlimit

16) $\int_{-4}^{0} \sqrt{16-x^2}\,dx$

Circle

$A = \frac{1}{4}\pi r^2 = \frac{1}{4}\pi(4)^2$

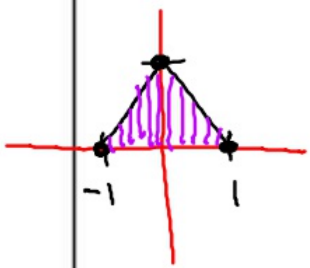
4π

$A = \frac{1}{2}bh$

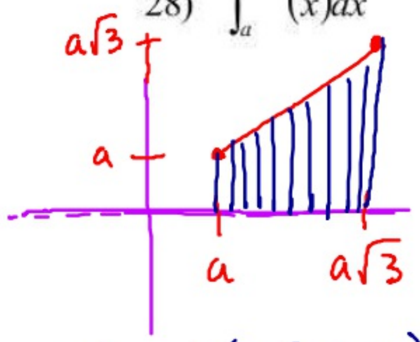
$A = \frac{1}{2}(2)(1)$

$A = 1$

18) $\int_{-1}^{1} (1 - |x|)\,dx$

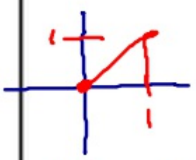


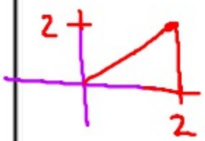
28) $\int_{a}^{\sqrt{3}a} (x)\,dx$



$A = \frac{1}{2}(a\sqrt{3} - a)(a\sqrt{3} + a)$

Graph $f(x) = \frac{1}{2}x^2$ using areas under the curve





$\int_0^1 x\,dx = \frac{1}{2}$ $(1, \frac{1}{2})$

$\int_0^2 x\,dx = 2$ $(2, 2)$

$\int_0^3 x\,dx = 4.5$ $(3, 4.5)$

$\int_0^4 x\,dx = 8$ $(4, 8)$

$\int_0^5 x\,dx = 12.5$ $(5, 12.5)$

$\int_0^0 x\,dx = 0$ $(0, 0)$

$f(x) = \frac{1}{2}x^2$

$f'(x) = x$

Use properties of Definite Integrals to answer the following

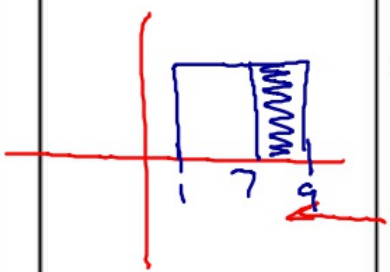
$\boxed{\int_1^9 f(x)dx=-1}$ $\boxed{\int_7^9 f(x)dx=5}$ $\boxed{\int_7^9 h(x)dx=4}$

$a)\int_1^9 -2f(x)dx = -2\boxed{\int_1^9 f(x)dx} = -2\boxed{(-1)} = 2$

$b)\int_7^9 [f(x)+h(x)]dx = \int_7^9 f(x)dx + \int_7^9 h(x)dx = 5+4=9$

$c)\int_7^9 [2f(x)-3h(x)]dx = 2\int_7^9 f(x)dx - 3\int_7^9 h(x)dx = -2$

$2(5)-3(4)$



$d)\int_9^1 f(x)dx = -\int_1^9 f(x)dx = -(-1) = 1$

$e)\int_1^7 f(x)dx = \int_1^9 f(x)dx - \int_7^9 f(x)dx$

$f)\int_9^7 [h(x)-f(x)]dx = -\left[\int_7^9 h(x)dx - \int_7^9 f(x)dx\right] = 1$

$-(4-5)$

$g)\int_9^9 h(x)dx = 0$