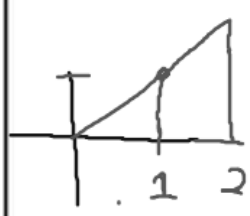
18) $\int_{-1}^{1}(1-|x|)dx$

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



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

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

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

$\int_0^3 (x)dx = 9/2$

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

$\int_0^5 (x)dx = \frac{25}{2}$

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

$f'(x) = x$

What you'll Learn About

- Average Value
- How to take the anti-derivative of a function
- How to evaluate the anti-derivative of a function (Part of the Fundamental Theorem of Calculus

$\int_3^6 5dx = 5x+4\Big]_3^6$

$[5(6)+4] - [5(3)+4]$

$f'(x) = -20$

$f(x) = -20x$

Anti derivative

8) $\int_3^7 -20dx = (-20)(7-3) = -80$

$\int_3^7 -20dx = -20x\Big]_3^7$

$= -20(7) - (-20)(3)$

$= -140 + 60$

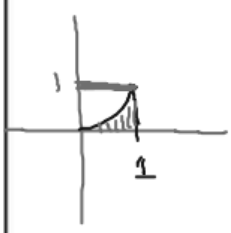
a) $\int_3^6 5dx = 5(6-3) = 15$

$\int_3^6 5dx = 5x\Big]_3^6$

$= 5(6) - 5(3)$

$30 - 15$

b) $\int_0^1 x^2 dx =$



$\int_0^1 x^2 dx = \frac{1}{3}x^3\Big]_0^1 = \frac{1}{3}$

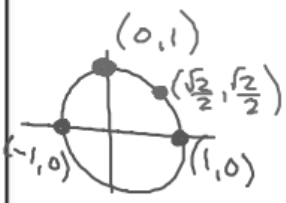
$= \frac{1}{3}(1)^3 - \frac{1}{3}(0)^3$

d) $\int_0^1 x^3 dx =$

$\int_0^1 x^3 dx = \frac{1}{4}x^4\Big]_0^1 = \frac{1}{4}$

$= \frac{1}{4}(1)^4 - \frac{1}{4}(0)^4$

19) $\int_\pi^{2\pi} \sin x dx =$



$\int_\pi^{2\pi} \sin x dx = -\cos x\Big]_\pi^{2\pi} = -2$

$-\cos(2\pi) - (-\cos\pi)$

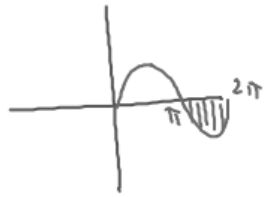
$-1 + (-1)$

22a) $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \csc^2 x dx =$

$\int_{\pi/4}^{\pi/2} \csc^2 x dx = -\cot x\Big]_{\pi/4}^{\pi/2}$

$-\cot\frac{\pi}{2} - (-\cot \pi/4)$

$0 + 1 = 1$



24a) $\int_{-1}^4 -5x^3 dx =$

$-5\int_{-1}^4 x^3 dx = -5\left(\frac{1}{4}x^4\right)$

$= \frac{-5}{4}x^4\Big]_{-1}^4$

$= \frac{-5}{4}(4)^4 - \left(\frac{-5}{4}(-1)^4\right)$ ✓

$-5(4)^3 + \frac{5}{4}$

28) $\int_0^{\frac{1}{2}} \frac{1}{\sqrt{1-x^2}} dx =$

$\int_0^{\frac{1}{2}} \frac{1}{\sqrt{1-x^2}} dx = \arcsin x\Big]_0^{1/2}$

$\arcsin\left(\frac{1}{2}\right) - \arcsin(0)$

$\frac{\pi}{6} - 0$

$30a)\int_1^2 \frac{1}{x^3}\,dx =$

$\int_1^2 x^{-3}\,dx = -\frac{1}{2}x^{-2}\Big]_1^2$

$= \frac{-1}{2x^2}\Big]_1^2$

$= -\frac{1}{8} - \left(\frac{-1}{2}\right)$

$30)\int_0^5 x^{3/2}\,dx = \frac{2}{5}x^{5/2}\Big]_0^5$

$\frac{2}{5}(5)^{5/2} - 0$

$34)\int_0^{\pi} \boxed{(1+\cos x)}\,dx =$

$\int_0^{\pi} 1\,dx + \int_0^{\pi} \cos x\,dx$

$x + \sin x\Big]_0^{\pi}$

$(\pi + \sin\pi) - (0 + \sin(0))$

π

$\boxed{40)\int_0^4 \frac{1-\sqrt{x}}{\sqrt{x}}\,dx = 0}$

$\int_0^4 \frac{1 - x^{1/2}}{x^{1/2}}\,dx$

$\int_0^4 x^{-1/2}(1 - x^{1/2})\,dx$

$\int_0^4 (x^{-1/2} - 1)\,dx = 2x^{1/2} - x\Big]_0^4$

$(2\sqrt{4} - 4) - (0 - 0)$

0