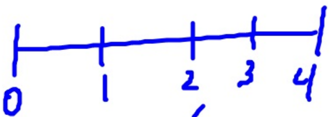
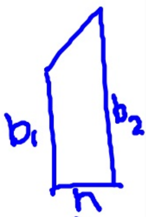
$f(x) = \frac{1}{2}x^3 + 1$ on $[0,4]$ $\underline{n=4}$



$w = \frac{4-0}{4} = 1$

Right: $1\left(f(4)+f(3)+f(2)+f(1)\right)$



Midpoint: $1\left(f\left(\frac{1}{2}\right)+f\left(1\frac{1}{2}\right)+f\left(2\frac{1}{2}\right)+f\left(3\frac{1}{2}\right)\right)$

Trapezoid: $\frac{1}{2}(1)\left[f(0)+f(1)+f(1)+f(2)+f(2)+f(3)+f(3)+f(4)\right]$

x	3	5	9	12	17
g(x)	2	4	8	6	5

$n = 4$

left: $2(g(3)) + 4g(5) + 3(g(9)) + 5g(12)$

$2 \cdot 2 + 4 \cdot 4 + 3 \cdot 8 + 5 \cdot 6$

trapezoid: $\frac{1}{2}\left[\underline{2(2+4)} + \underline{4(4+8)} + \underline{3(8+6)} + \underline{5(6+5)}\right]$

1 $\int (x^3 - 2x + 1)\,dx$

$\frac{x^4}{4} - x^2 + x + C$

2 $\int \frac{\sqrt{x} + 1}{x^2}\,dx$

$\int (x^{-3/2} + x^{-2})\,dx$

$-2x^{-1/2} + -1x^{-1} + c$

3 $\int \csc x \cot x\,dx$

$-\csc x + C$

4 $\int (1 + \tan^2 x)\,dx = \int \sec^2 x\,dx$

$= \tan x + C$

5 $\int_1^{16} \frac{1}{\sqrt{x}}\,dx = \int_1^{16} x^{-1/2}\,dx$

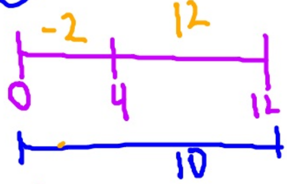
$= 2x^{1/2}\Big]_1^{16} = 2(4-1)$

6

6 $\int (4\sin x - 2\cos x)\,dx$

$-4\cos x - 2\sin x + C$

$$\int_0^4 f(x)\,dx = -2 \qquad \int_0^{12} f(x)\,dx = 10$$



① $\int_4^{12} f(x)\,dx = 12$

② $\int_{12}^{4} f(x)\,dx = -12$

③ $\int_0^4 2f(x)\,dx$

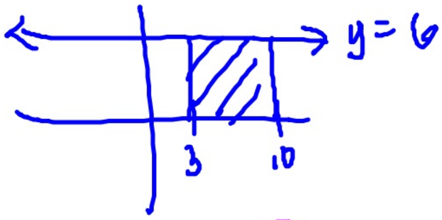
-4

④ $\int_4^{12} (3f(x) - 5)\,dx = \int_4^{12} 3f(x)\,dx - \int_4^{12} 5\,dx$

$36 - 40$

-4

$$\int_3^{10} g(x)\,dx = 11$$

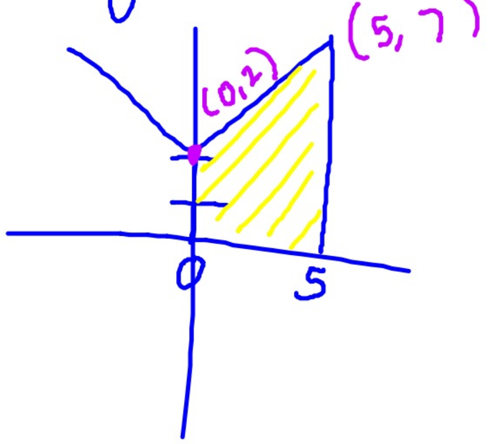


5 $$\int_3^{10} \left(6 - 4g(x)\right)dx = \int_3^{10} 6\,dx - 4\int_3^{10} g(x)\,dx$$

$$42 - 4(11)$$

$$-2$$

$$\int_0^5 (|x| + 2)\,dx$$

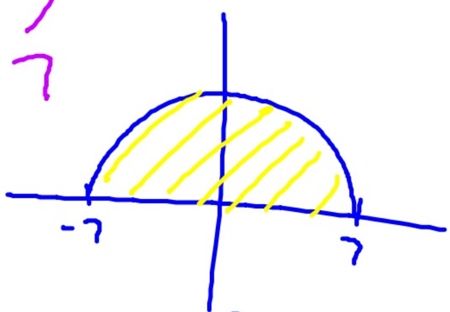


$$\frac{1}{2}h(b_1 + b_2)$$

$$\frac{1}{2}(5)(2+7)$$

$$\frac{45}{2}$$

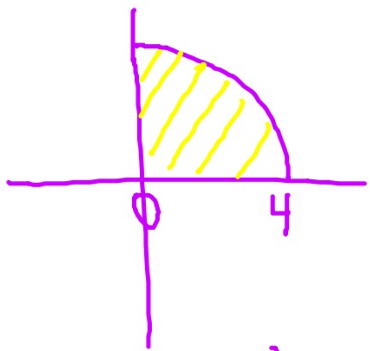
① $$\int_{-7}^{7}\sqrt{49-x^2}\,dx$$



$$\frac{1}{2}\pi(7)^2$$

$$\frac{49\pi}{2}$$

② $$\int_{0}^{4}\sqrt{16-x^2}\,dx$$



$$\frac{1}{4}\pi r^2$$

$$4\pi$$

Average value $y = \cos 2x$ $[0, \frac{\pi}{12}]$

$$\frac{1}{\frac{\pi}{12} - 0} \int_0^{\pi/12} \cos 2x \, dx$$

$$\frac{1}{2} \cdot \frac{12}{\pi} \int_0^{\pi/12} \cos 2x \, dx = \frac{6}{\pi} \int \cos u \, du = \frac{6}{\pi} \sin u$$

$$\frac{6}{\pi} \sin 2x \Big]_0^{\pi/12} = \frac{6}{\pi}\left(\frac{1}{2} - 0\right)$$

$$\frac{3}{\pi}$$

$u = 2x$

$\frac{du}{2} = \frac{\cancel{2}dx}{\cancel{2}}$

$$\int \frac{dy}{\cancel{dx}} = \int x(1-x^2)^5\,dx$$

$$y = \int x(1-x^2)^5\,dx = -\frac{1}{2}\int u^5\,du$$

$$u = 1-x^2$$

$$\frac{du}{-2} = \frac{\cancel{-2}x\,dx}{\cancel{-2}}$$

$$y = -\frac{1}{2}\cdot\frac{u^6}{6} + C$$

$$y = \frac{-(1-x^2)^6}{12} + C$$

general solution

$$F(x) = \int_3^{x^2} \sin t^3 \, dt$$

$$F'(x) = \sin x^6 \cdot 2x$$

$$g(x) = \int_{3}^{x^3} \sqrt{1+t}\, dt$$

$$g'(x) = \sqrt{1+x^3} \cdot 3x^2$$

$$g'(2) = \sqrt{9} \cdot 12$$

$$= 36$$