November 3, 2026
National Sandwich Day

Today in History:

D.C. residents cast first presidential votes (1964)

Panama declares independence (1903)

Number of the Day: 1130

1130 = 2 x 5 x 113

1130 is the product of three distinct Sophie Germain primes.

Fun Fact:

600 cows are used to manufacture a seasons worth of NFL footballs.

Quote of the Day:

"It's just a job. Grass grows, birds fly, waves pound the sand. I beat people up."

-Muhammad Ali

Today's Weather:

Partly cloudy, high of 74°.

Math 121 - Quiz #34

Find

$$\sum_{j=1}^{25}(2j+1)$$

$$= \sum_{j=1}^{25} 2j + \sum_{j=1}^{25} 1$$

$$= 2\sum_{j=1}^{25} j + \sum_{j=1}^{25} 1$$

$$= \cancel{2}\left(\frac{(25)(26)}{\cancel{2}}\right) + 25$$

$$650 + 25 = 675$$

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mpoo #9

$$\lim_{N\to\infty} \sum_{j=1}^{N} \left(\frac{j}{N}\right)^3 \left(\frac{1}{N}\right)$$

$$\lim_{N\to\infty} \frac{1}{N} \sum_{j=1}^{N} \frac{j^3}{N^3} = \lim_{N\to\infty} \frac{1}{N^4} \sum_{j=1}^{N} j^3$$

$$= \lim_{N\to\infty} \frac{1}{N^4}\left[\frac{N(N+1)}{2}\right]^2 = \frac{1}{4}$$

$f(x)$ $\quad [a,b]$ $\quad \Delta x = \frac{b-a}{N}$

$x_j = a + j\Delta x$

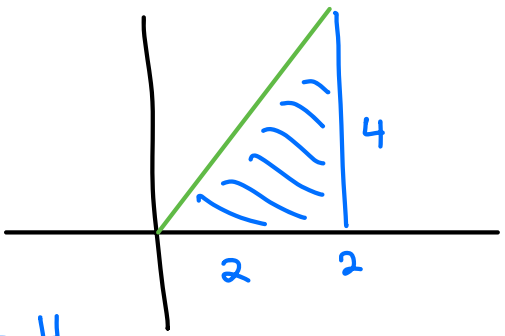
$$A = \lim_{N\to\infty} \sum_{j=1}^{N} f(x_j)\,\Delta x = \int_a^b f(x)\,dx$$

RIGHT RIEMANN SUM

$$\int_a^b f(x)\,dx = \text{NET SIGNED AREA}$$

EXAMPLE 1

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

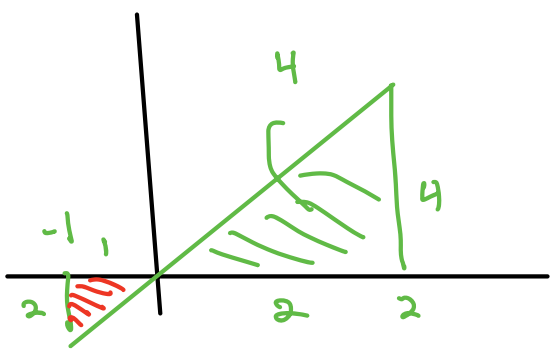


$$= \frac{1}{2}(2)(4) = 4$$

EXAMPLE 2

$$\int_{-1}^2 2x\,dx =$$

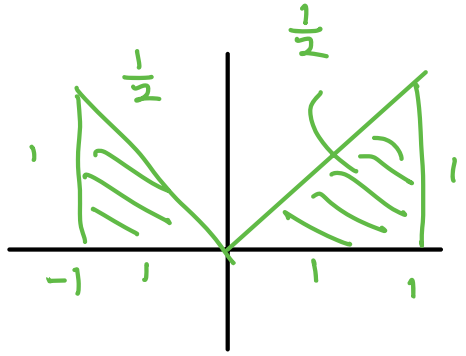
$$4 + \frac{1}{2}(1)(2)$$



$= 4 - 1 = 3$

EXAMPLE 3

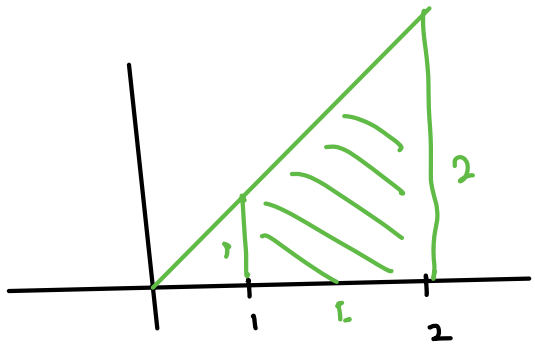
$$\int_{-1}^{1} |x|\, dx =$$



$$= \frac{1}{2} + \frac{1}{2} = 1$$

EXAMPLE 4

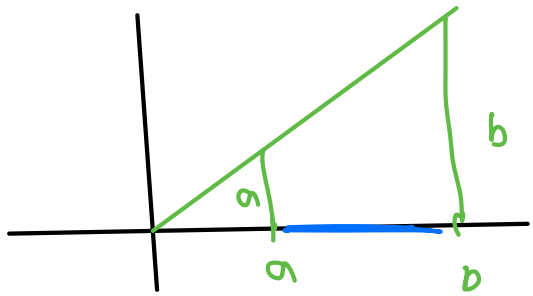
$$\int_{1}^{2} x\, dx =$$



$$= \frac{b_1 + b_2}{2} h = \frac{1+2}{2}(1) = \frac{3}{2}$$

EXAMPLE 5

$$\int_{a}^{b} x\, dx =$$

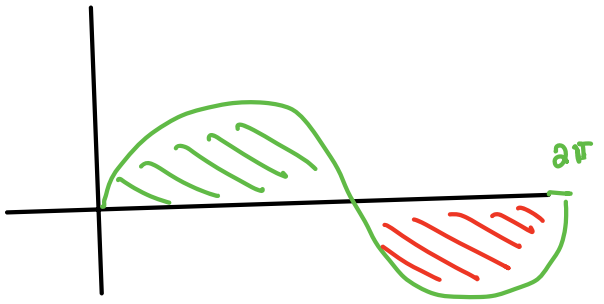


$$= \frac{b_1 + b_2}{2} h = \frac{a+b}{2}(b-a)$$

$$= \frac{b^2 - a^2}{2} = \frac{b^2}{2} - \frac{a^2}{2}$$

EXAMPLE 6

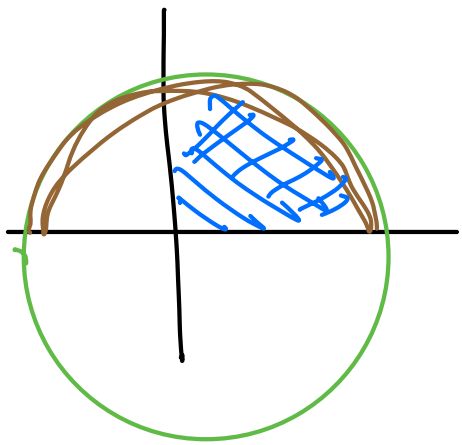
$$\int_0^{2\pi} \sin x \, dx =$$



0

EXAMPLE 7

$$\int_0^3 \sqrt{9 - x^2} \, dx =$$



$y = \pm\sqrt{9 - x^2}$

$y^2 = 9 - x^2$

$x^2 + y^2 = 9$

$= \frac{1}{4} 9\pi = \frac{9\pi}{4}$

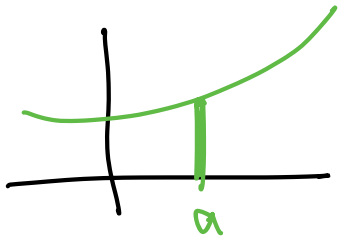
RULES

(1) $$\int_a^b (f(x) + g(x)) \, dx = \int_a^b f(x) \, dx + \int_a^b g(x) \, dx$$

(2) $$\int_a^b c f(x) \, dx = c \int_a^b f(x) \, dx$$

(3) $$\int_a^b f(x) \, dx = -\int_b^a f(x) \, dx$$

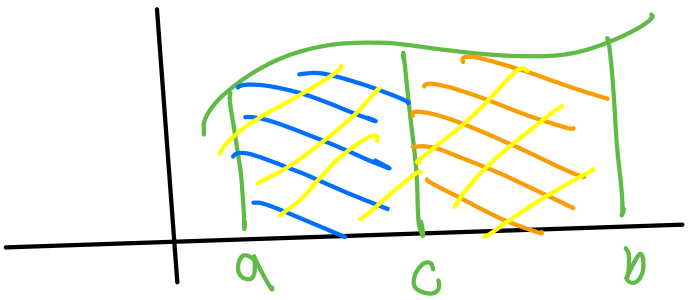
(4) $\int_a^a f(x)\,dx = 0$



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

$\int_a^b x\,dx = \frac{b^2}{2} - \frac{a^2}{2}$

(6) $\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$

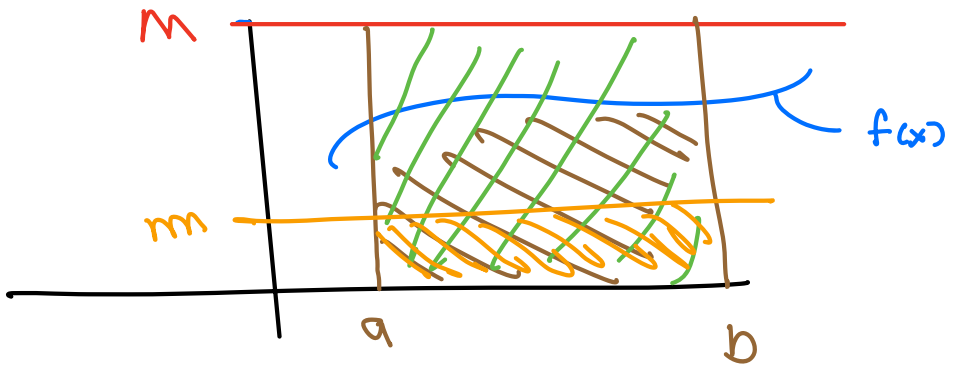


(7) IF $f(x) < g(x)$

$\int_c^b f(x)\,dx < \int_a^b g(x)\,dx$

(8) IF $m < f(x) < M$

THEN $m(b-a) < \int_a^b f(x)\,dx < M(b-a)$



$f(x) = x^2$ $\quad [0, b]$ $\quad \Delta x = \frac{b-a}{N} = \frac{b-0}{N} = \frac{b}{N}$

$$\int_0^b x^2\,dx = \lim_{N\to\infty} \sum_{j=1}^{N} f(x_j)\,\Delta x \qquad x_j = a + j\,\Delta x = 0 + j\left(\frac{b}{N}\right) = \frac{jb}{N}$$

$$= \lim_{N\to\infty} \sum_{j=1}^{N} f\left(\frac{jb}{N}\right)\left(\frac{b}{N}\right)$$

$$= \lim_{N\to\infty} \frac{b}{N} \sum_{j=1}^{N} \left(\frac{jb}{N}\right)^2 = \lim_{N\to\infty} \frac{b}{N} \sum_{j=1}^{N} \frac{j^2 b^2}{N^2}$$

$$= \lim_{N\to\infty} \frac{b^3}{N^3} \sum_{j=1}^{N} j^2 = \lim_{N\to\infty} \frac{b^3}{N^3} \cdot \frac{N(N+1)(2N+1)}{6}$$

$$= \frac{b^3}{3}$$

$$\int_a^b x^2\,dx = \frac{b^3}{3} - \frac{a^3}{3}$$

$f(x) = x^3$ $\qquad \int_a^b x^3\,dx = \frac{b^4}{4} - \frac{a^4}{4}$

$$\int_a^b x\,dx = \frac{b^2}{2} - \frac{a^2}{2}$$

$$\int_a^b x^2\,dx = \frac{b^3}{3} - \frac{a^3}{3}$$

$$\int_a^b x^3\,dx = \frac{b^4}{4} - \frac{a^4}{4}$$

$$\int_a^b x^4\,dx = \frac{b^5}{5} - \frac{a^5}{5}$$