# November 19, 2025

# World Toilet Day

**Today in History:**

Lincoln delivers Gettysburg Address (1863)

One Flew Over the Cuckoo's Nest debuts (1975)

**Number of the Day: 952**

**952** = 2 x 2 x 2 x 7 x 17

**952** is the number of possible queen moves on a 7 x 7 chessboard

**Fun Fact:**

On average, when asked for a color, 3 out of 5 people will say red.

**Quote of the Day:**

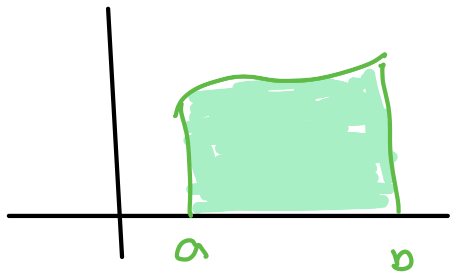
"When choosing between two evils, I always like to try the one I've never tried before."

- Mae West

**Today's Weather:**

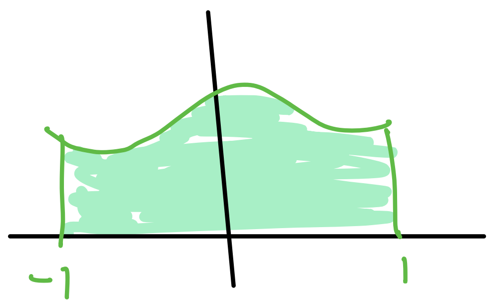
Cloudy skies, high of 46°.

# AREA



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

**EXAMPLE** $f(x) = x^2 + \cos x \qquad [-1,1]$



$$A = \int_{-1}^{1} (x^2 + \cos x)\,dx$$

$$= \frac{x^3}{3} + \sin x \Big|_{-1}^{1} = \left(\frac{1}{3} + \sin 1\right) - \left(-\frac{1}{3} + \sin(-1)\right)$$

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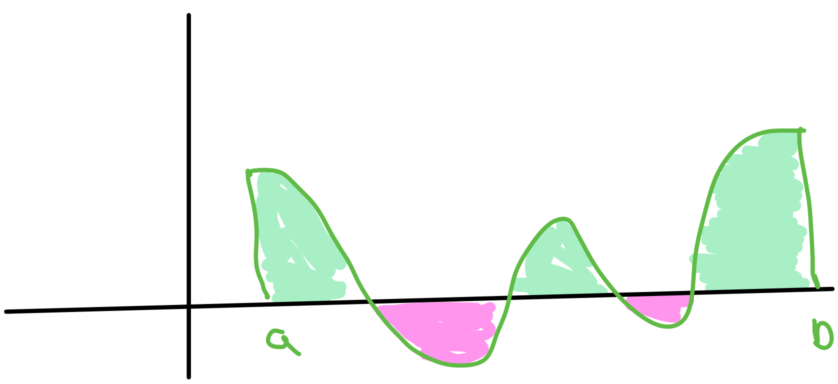
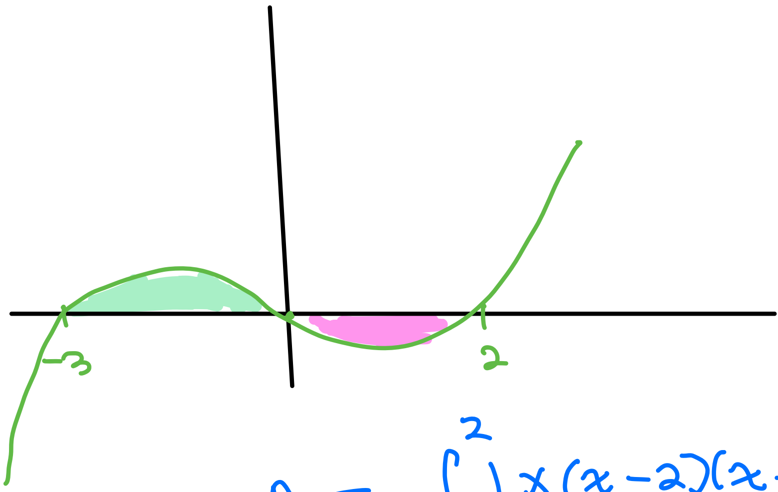


$$\int_a^b f(x)\,dx$$

$$A = \int_a^b |f(x)|\,dx$$

EXAMPLE: $f(x) = x(x-2)(x+3)$ $[-3, 2]$




$$A = \int_{-3}^{2} |x(x-2)(x+3)|\, dx$$

$$= \int_{-3}^{0} |x(x-2)(x+3)|\, dx + \int_{0}^{2} |x(x-2)(x+3)|\, dx$$

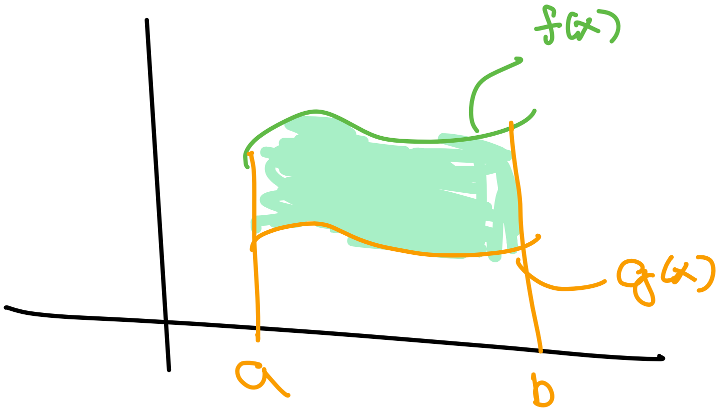
$$= \int_{-3}^{0} (x(x-2)(x+3))\, dx + \left| \int_{0}^{2} x(x-2)(x+3)\, dx \right|$$

$$= \int_{-3}^{0} (x^3 + x^2 - 6x)\, dx + \left| \int_{0}^{2} x^3 + x^2 - 6x\, dx \right|$$

$$\frac{x^4}{4} + \frac{x^3}{3} - 3x^2 \Big|_{-3}^{0} + \left| \frac{x^4}{4} + \frac{x^3}{3} - 3x^2 \Big|_{0}^{2} \right|$$

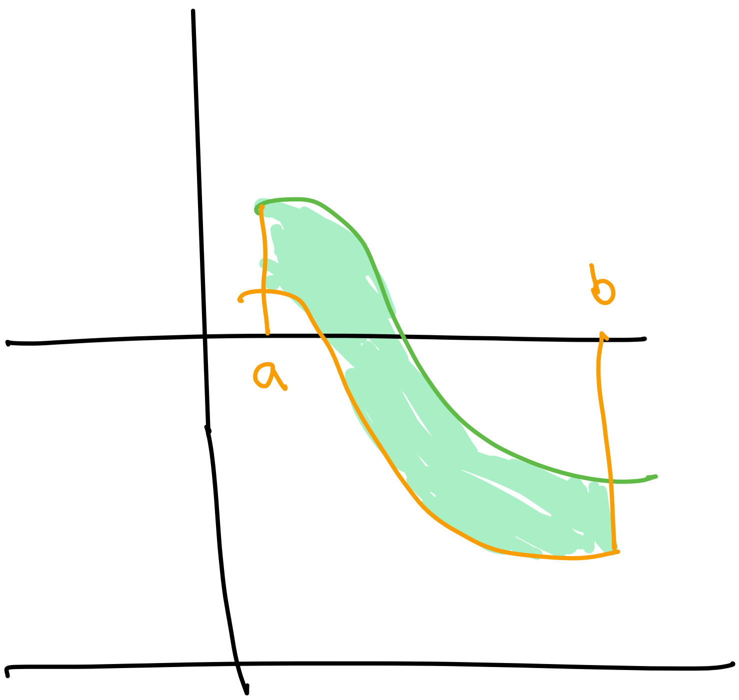
$$= \frac{253}{12}$$

# TWO CURVES

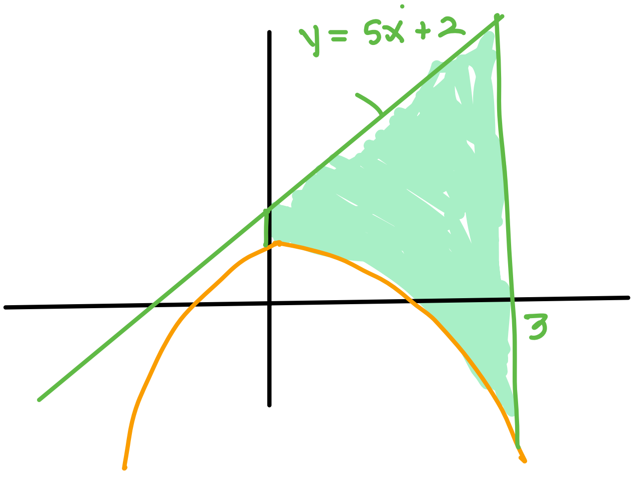



$$A = \int_a^b (f(x) - g(x))\,dx$$

$$= \int_a^b (\text{TOP} - \text{BOTTOM})\,dx$$




EXAMPLE: $y = 5x + 2$ $\quad y = 1 - 3x^2 \quad [0, 3]$




$$A = \int_0^3 \left[(5x+2) - (1 - 3x^2)\right] dx$$

$$= \int_0^3 5x - 1 + 3x^2\,dx$$

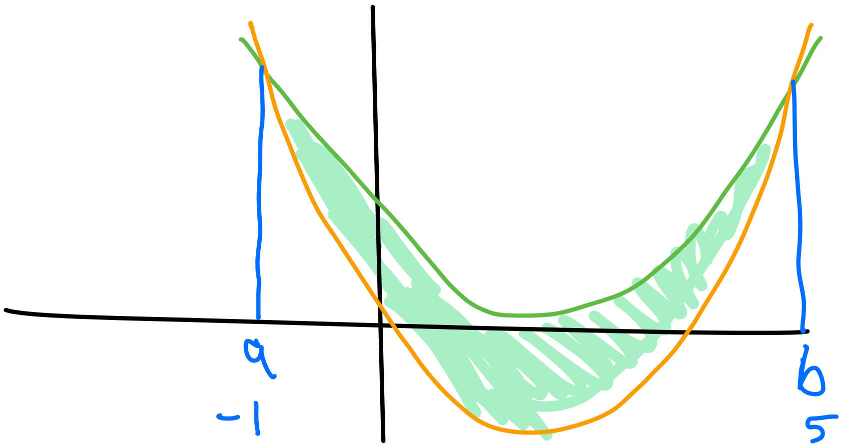
$$= \frac{5x^2}{2} - x + x^3 \Big|_0^3 = \frac{105}{2}$$

EXAMPLE

$y = 2x^2 - 2x - 4$

$y = x^2 + 2x + 1$

AREA BETWEEN




$$A = \int_a^b (\text{TOP} - \text{BOTTOM})\,dx$$

$$= \int_{-1}^{5} \left((x^2+2x+1) - (2x^2-2x-4)\right) dx$$

$$x^2+2x+1 = 2x^2-2x-4$$

$$x^2-4x-5=0$$

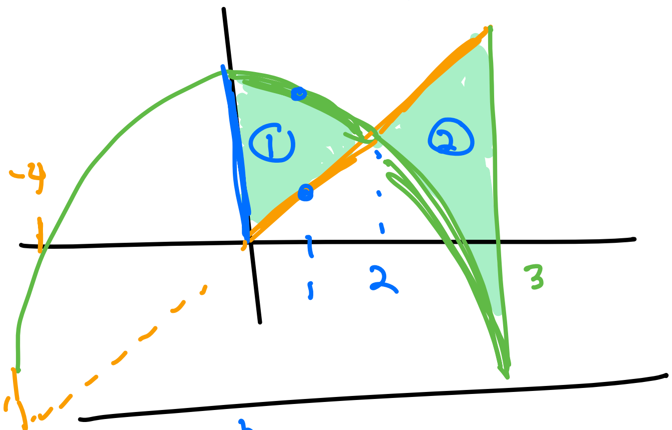
$$(x-5)(x+1)=0$$

$$x = 5, -1$$

$$= 36$$

$y = 8 - x^2$ $\quad$ $y = 2x$ $\quad$ $[0, 3]$

$7$ $\quad$ $2$




$$A = \int_a^b (\text{TOP} - \text{BOTTOM})\, dx$$

$$A_1 = \int_a^b (\text{TOP} - \text{BOTTOM})\, dx = \int_0^2 \left((8 - x^2) - (2x)\right) dx$$

$$8 - x^2 = 2x$$

$$x^2 + 2x - 8 = 0 \qquad x = -4, 2$$

$$A_2 = \int_a^b (\text{TOP} - \text{BOTTOM})\, dx = \int_2^3 \left((2x) - (8 - x^2)\right) dx$$

$$=$$

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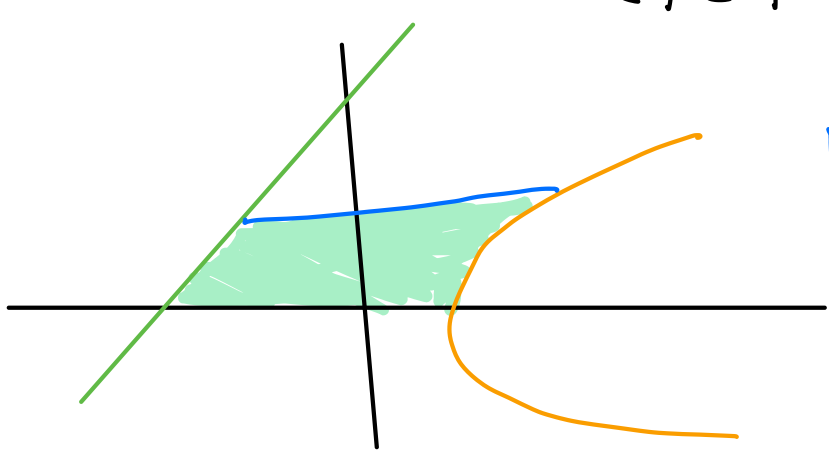
EXAMPLE $\quad$ $x = y - 3$ $\quad$ $x = 6y^2 + 1$

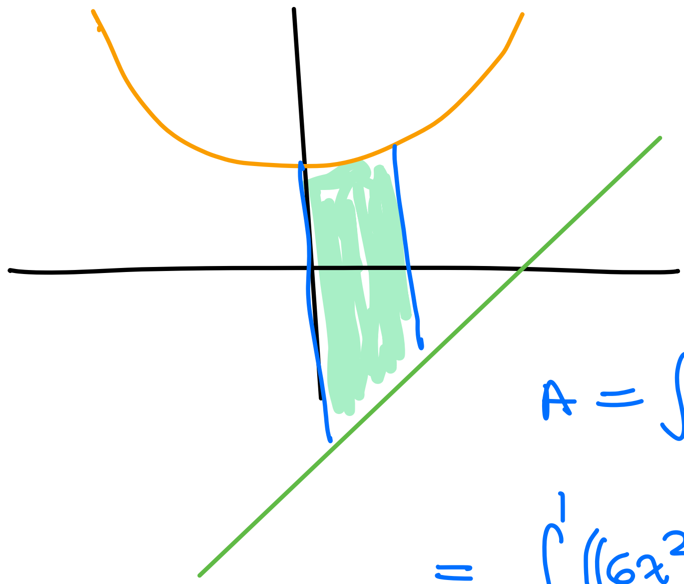
$0 \leq y \leq 1$



$$A = \int_a^b (\text{RIGHT} - \text{LEFT})\, dy$$

$$= \int_0^1 \left((6y^2 + 1) - (y - 3)\right) dy$$

EXAMPLE $y = x - 3$ $y = 6x^2 + 1$ $0 \le x \le 1$



$$A = \int (\text{TOP} - \text{BOTTOM})\, dx$$

$$= \int_0^1 \left((6x^2+1) - (x-3)\right) dx$$

$$= \frac{11}{2}$$