

August 26, 2025

National Dog Day

Today in History:

First televised MLB game (1939)

19th Amendment adopted (1920)

Number of the Day: 966

966 = $2 \times 3 \times 7 \times 23$

966 is the largest number that is 46 times the sum of its digits

Fun Fact:

It took Leonardo DaVinci 10 years to paint the Mona Lisa.

Quote of the Day:

“If you can dream it, you can do it.”

-Walt Disney

Today's Weather:

Sun and clouds mixed, slight chance of a rain shower high 67°.

Math 121

Quiz #1

Write the inequality in the form $a < x < b$.

$$|2x + 1| < 5$$

$$-5 < 2x + 1 < 5$$

$$-6 < 2x < 4$$

$$-3 < x < 2$$

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$$|x - 4| > 2$$

$$x - 4 > 2$$

$$x > 6$$

$$x - 4 < -2$$

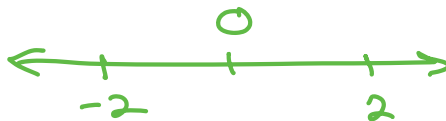
$$x < 2$$



$$(-\infty, 2) \cup (6, \infty)$$

Pg 11 * 7

$$[-2, 2]$$



$$|x - 0| \leq 2$$

$$|x| \leq 2$$

FUNCTIONS

POLYNOMIALS

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$$

DEGREE n

DOMAIN $\forall x$

a_n LEADING CO.

RATIONAL FUNCTIONS

$$f(x) = \frac{P(x)}{Q(x)}$$

$P(x), Q(x)$ ARE
POLYNOMIALS

DOMAIN $\forall x$ EXCEPT $Q(x) = 0$

$$f(x) = \frac{x}{x+1} \quad x \neq -1$$

$$f(x) = \frac{x^2 - 4}{x - 2} \quad x \neq 2$$

$$= \frac{(x-2)(x+2)}{x-2}$$

$$f(x) = x + 2$$

$$\forall x$$

ALGEBRAIC

RATIONAL + ROOTS

$$f(x) = \sqrt[3]{\frac{x^2 + 5}{x + 2}}$$

EXPONENTIAL

$$f(x) = a^x$$

$$a > 0$$

LOG

$$f(x) = \log_a x$$

$$f(x) = \log x$$

$$a = 10$$

$$f(x) = \ln x$$

$$a = e \approx 2.718281828459...$$

TRIG

$$\sin x$$

$$\cos x$$

$$\tan x$$

$$\csc x$$

$$\sec x$$

$$\cot x$$

NEW FROM OLD

$$f(x) \pm g(x) = (f \pm g)(x)$$

$$\frac{f(x)}{g(x)} = \left(\frac{f}{g}\right)(x)$$

$$f(x) \cdot g(x) = (f \cdot g)(x)$$

COMPOSITION

$$(f \circ g)(x) = f(g(x))$$

$$(g \circ f)(x) = g(f(x))$$

EXAMPLE

$$f(x) = \frac{x}{x+1}$$

$$g(x) = \sin x$$

$$(f \circ g)(x) = f(g(x)) = f(\sin x) = \frac{\sin x}{\sin x + 1}$$

$$(g \circ f)(x) = g(f(x)) = g\left(\frac{x}{x+1}\right) = \sin\left(\frac{x}{x+1}\right)$$

$$\boxed{2} + 3 = 5$$

$$f(x) = \frac{x}{x+1}$$

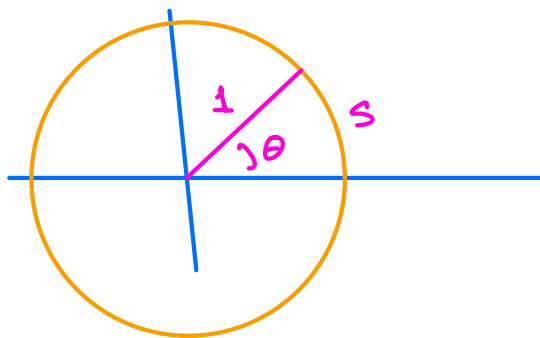
$$f(\boxed{\sin x}) = \frac{\boxed{\sin x}}{\boxed{\sin x} + 1}$$

$$f(\sin x)$$

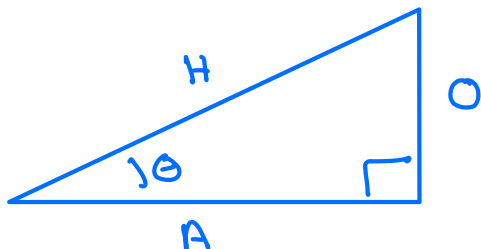
$$f(\text{sheep}) = \frac{\text{sheep}}{\text{sheep} + 1}$$

$$f(\text{SHEEP}) = \frac{\text{SHEEP}}{\text{SHEEP} + 1}$$

TRIG



$$s = \ominus$$



$$\sin \theta = \frac{O}{H}$$

$$\cos \theta = \frac{A}{H}$$

$$\tan \theta = \frac{O}{A}$$

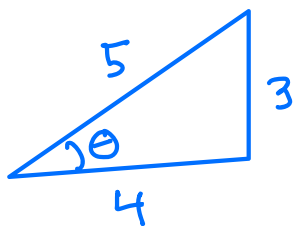
$$\sec \theta = \frac{1}{\cos \theta} = \frac{H}{A}$$

$$\csc \theta = \frac{1}{\sin \theta} = \frac{H}{O}$$

$$\cot \theta = \frac{1}{\tan \theta} = \frac{A}{O}$$

$$\sin \theta = \frac{3}{5}$$

$$0 < \theta < \frac{\pi}{2}$$



$$\cos \theta = \frac{4}{5}$$

$$\tan \theta = \frac{3}{4}$$

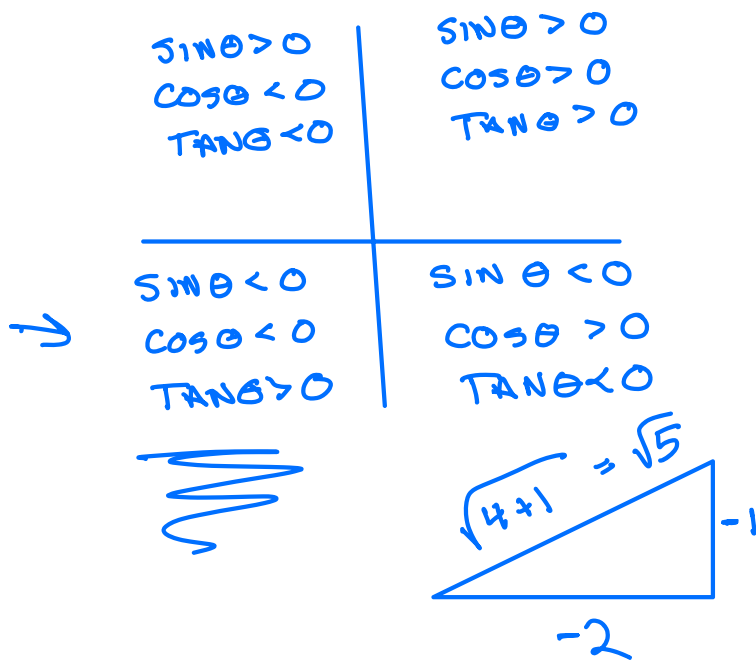
$$\csc \theta = \frac{5}{3}$$

$$\cot \theta = \frac{4}{3}$$

$$\sec \theta = \frac{5}{4}$$

EXAMPLE: $\tan \theta = \frac{1}{2}$

$\cos \theta < 0$



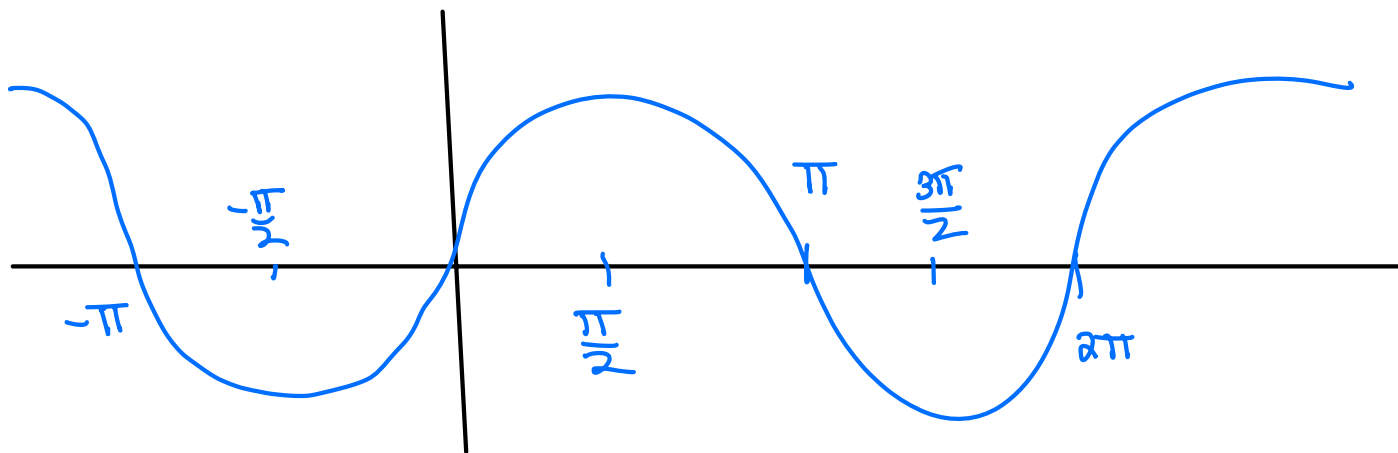
$$\sin \theta = -\frac{1}{\sqrt{5}}$$

$$\cos \theta = -\frac{2}{\sqrt{5}}$$

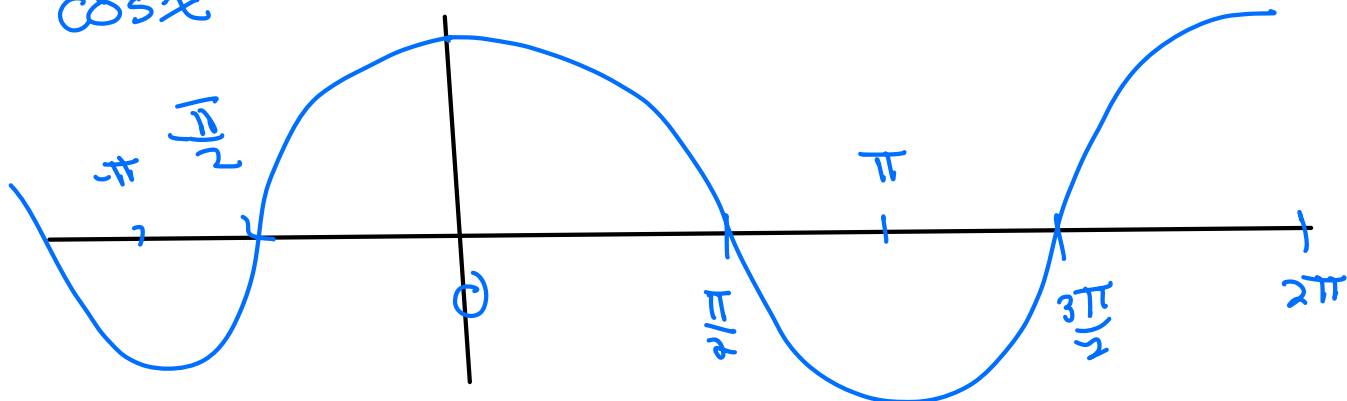
$$\cot \theta = 2$$

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin \theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	—

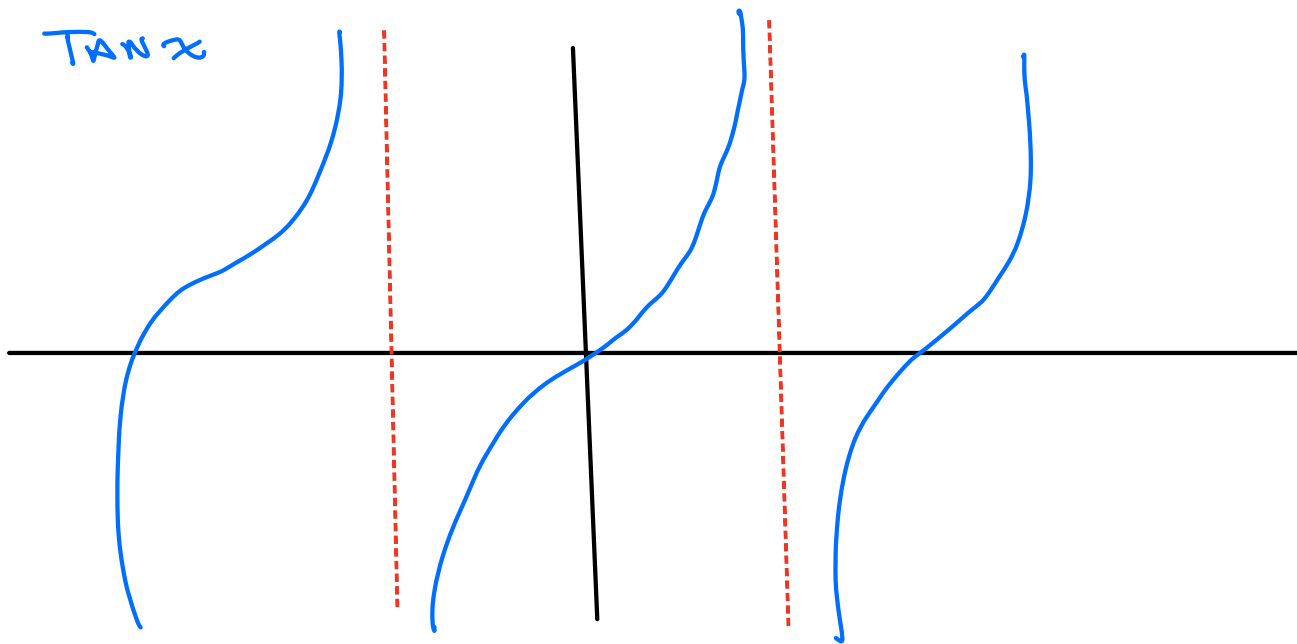
$\sin x$



$\cos x$



$\tan x$



TRIG ID.

$$\sin^2 x + \cos^2 x = 1$$

$$\tan^2 x + 1 = \sec^2 x$$

$$\cot^2 x + 1 = \csc^2 x$$

$$\sin(2x) = 2 \sin x \cos x$$

$$\cos(2x) = \cos^2 x - \sin^2 x$$

$$\sin(x+y) = \sin x \cos y + \cos x \sin y$$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$

$$\sin^2 x = \frac{1 - \cos 2x}{2} \quad \cos^2 x = \frac{1 + \cos 2x}{2}$$