

$10^2 \cdot 10^3 =$

$10^a \cdot 10^b =$

$e^a \cdot e^b =$

$\ln(a \cdot b) =$

$(10^2)^3 =$

$(10^a)^b =$

$(e^a)^b =$

$\ln(a^b) =$

$\frac{10^2}{10^3} =$

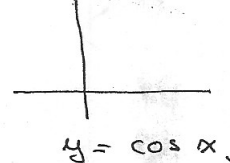
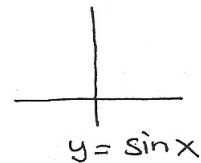
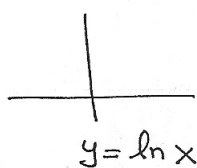
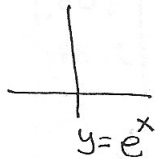
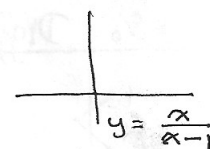
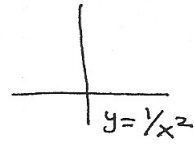
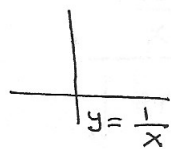
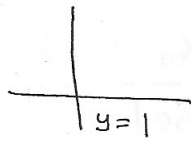
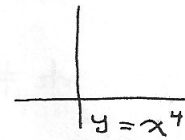
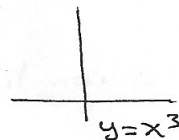
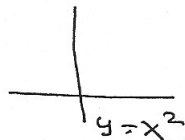
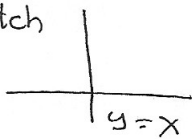
$\frac{10^a}{10^b} =$

$\frac{e^a}{e^b} =$

$\ln(c \cdot a^b) =$

Name: _____

sketch



Tell your neighbor the meaning of

rational number

rational function

irrational —

irrational —

algebraic —

algebraic —

transcendental —

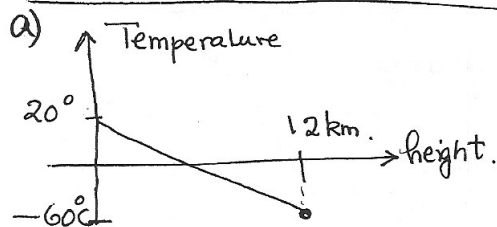
transcendental —.

How many ways can you write the formula for a line?

$y =$

$y - y_0 =$

$ax + \dots = 0$



Express the temperature in the Troposphere as a function of height.

What is the temperature at the top of Mount Everest (8850m)

What is the temperature difference between the summit of Mount Everest (8850m) and base camp (5350m).

If you are flying at 32,000 feet - what's the temperature outside

Ⓐ = homework #24 section 1,2.

Rural
x = population

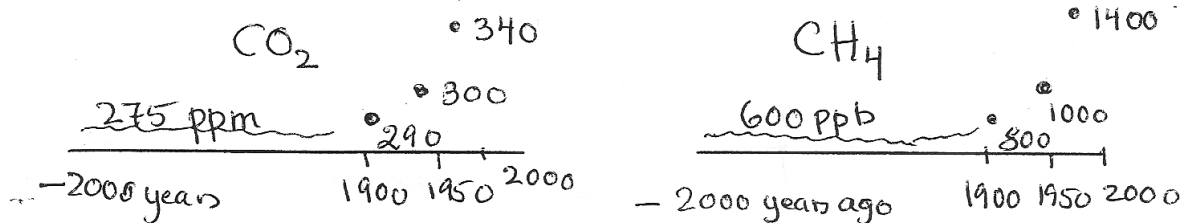
Year	in % Difference	Year	$\frac{100}{x}$	Year	$\ln(x)$
1960	26.4	1960	3.79	1960	3.27
1970	21.1	70	4.74	70	3.05
1980	17.1	80	5.85	80	2.89
1990	13.0	90	7.69	90	2.56
2000	10.5	2000	9.52	2000	2.35

Find a straight line that approximate the data in the last table

What percentage of the Argentine population was living in the rural area's in 1985.

What percentage do you expect will be there in 2015?

Ⓑ Here is the concentration of CO_2 and CH_4 for 2000 years



Do you see linear or exponential increase ?

$$e^x \cdot e^y =$$

$$(e^x)^y =$$

$$\frac{e^x}{e^y} =$$

Name: _____

$$\ln(a \cdot b) =$$

$$\ln\left(\frac{a}{b}\right) =$$

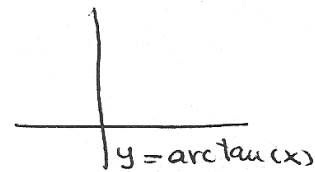
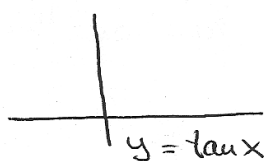
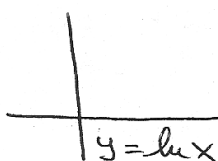
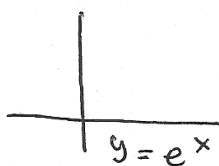
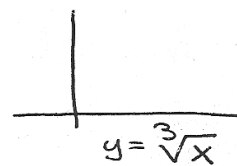
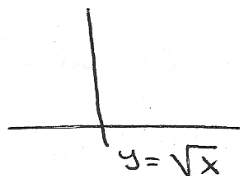
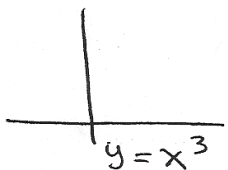
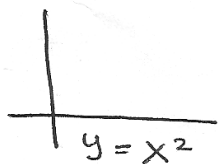
$$\ln(a^b) =$$

How do you define $e =$

How do you compute $e^x =$

$f(x)$ is a function from A to B means:

The vertical line test says

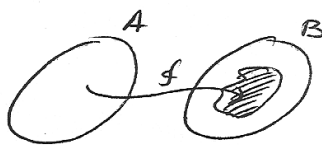


$f(x)$ is an increasing function means:

f is 1-1 means

f is onto means

Explain Domain, Range



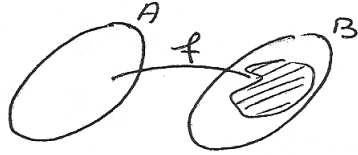
Ⓘ (a) Does e^x satisfy the horizontal line test?

(b) True-False: All increasing functions are 1-1.

(c) Is \sqrt{x} 1-1?

(d) Find a function that is NOT 1-1.

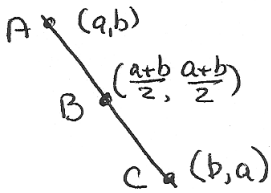
(II) Give Domain and Range of $f \circ f^{-1}$ and $f^{-1} \circ f$.



(III) (a) Prove $\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b)$.

(b) Prove $\ln(1) = 0$ and $\ln(e) = 1$.

(IV) Use Pythagoras to show that $|AB| = |BC|$ where



(V) Let $y = f(x) = 1 + x^2$ for $x \geq 0$. Find and sketch $f^{-1}(x)$.

(VI) Sketch $\arcsin(x)$ and $\arccos(x)$.

(a) $e^x \cdot e^y = (e^x)^y = \frac{e^x}{e^y}$ Name: _____

(b) $\ln(a \cdot b) = \ln\left(\frac{a}{b}\right) = \ln(a^b) =$

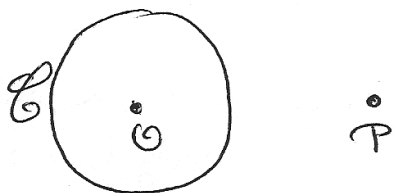
The analogue to (a), (b) for 10^x , $\log_{10}(a)$ are

True-False : $f = 1-1 \Rightarrow f$ increasing
 $f = \text{increasing} \Rightarrow f$ satisfy horizontal line test
 f satisfy vertical line test $\Rightarrow f$ has an inverse function f^{-1} .

The line l through (x_0, y_0) and (x_1, y_1) has slope?

The 3 ways of writing the equations for a line are.

Find the line l through point P that is tangent to Circle \mathcal{C}



True - False $\arcsin(x) = \sin^{-1}(x) = \frac{1}{\sin x}$.

The analogue to $y = e^{\ln(y)}$ and $x = \ln(e^x)$ for the exponential function 10^x are

(I) Show that $\ln(x) = \frac{\log_{10}(x)}{\log_{10}(e)}$

(II) Compute the slope of the secant $m = \frac{x^2-1}{x-1}$ for

x	m
$8/5$	
$7/5$	
$6/5$	
$5/5$	
$4/5$	

What's the limit of the slopes as $x \rightarrow 1$.

(III) Show that $y = 2x_0x - x_0^2$ touches $y = x^2$ at ONE point

(IV) Find the limit of the slopes of the secants for $y = \sqrt{x}$ at $(x_0, \sqrt{x_0})$.

(V)

t	$s(t)$	instantaneous velocity	time interval	average velocity
0	0		(0,1)	
1	4.9		(1,2)	
2	19.6		(2,3)	
3	44.1		(3,4)	
4	78.4			

(a) Calculate the instantaneous velocity for $t=0,1,2,3,4$

(b) Calculate average velocity over (0,1), (1,2), (2,3), (3,4)

(c) Why is your average velocity smaller than the instantaneous?

(d) How fast is the book moving (in miles/hour) when it hit the professor?

$$e^{\frac{1}{x}} \cdot e^{\frac{1}{y}} =$$

$$(e^{\frac{1}{x}})^{\frac{1}{y}} =$$

$$\frac{e^{\frac{1}{x}}}{e^{\frac{1}{y}}} =$$

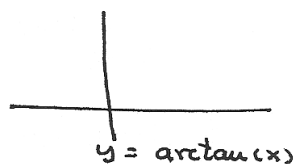
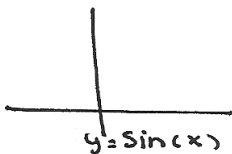
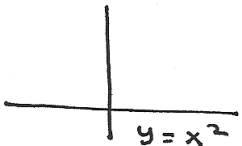
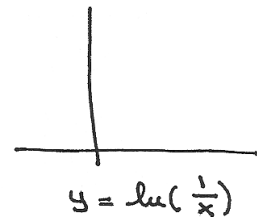
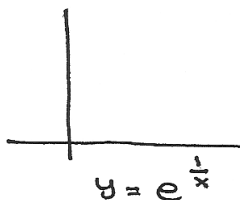
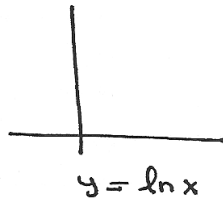
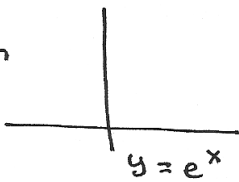
Name: _____

Simplify: $e^{\ln(\frac{1}{x})}$

$$\ln(e^{\frac{1}{x}})$$

$$\ln(\frac{1}{x} e^{\frac{1}{x}}) =$$

Sketch



Angle $\theta = 1$ radian means

— $\theta = \pi$ — s means

— $\theta = 1$ degree —

Which of the following expressions makes sense?

$$\infty + \infty$$

$$0^0$$

$$\infty - \infty$$

$$0 \cdot \infty$$

$$\infty \cdot \infty$$

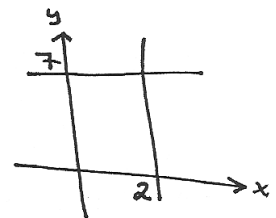
$$0^\infty$$

$$\infty / \infty$$

$$\infty^0$$

$y = f(x)$ has a vertical asymptote at $x = 2$ means

----- horizontal ----- $y = 7$ -----



Find Domain and Range for $y = \frac{x^2 - 1}{x - 1}$.

Complete the table for $f(x) = x^2 - 2$

x	$f(x)$
2.1	
2.01	
2.001	

As x gets close to 2 then $f(x)$ gets close to _____

Ⓐ

Let $f(x) = \frac{\sqrt{x^2+1}-1}{x^2}$

$g(x) = \frac{\sqrt{x^{10}+1}-1}{x^{10}}$

x	f(x)
0.1	
0.01	
0.001	

x	g(x)
0.1	
0.01	
0.001	

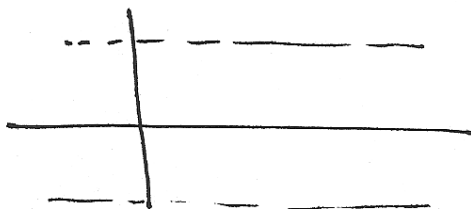
Hence $\lim_{x \rightarrow 0} f(x) =$

$\lim_{x \rightarrow 0} g(x) =$

Ⓑ

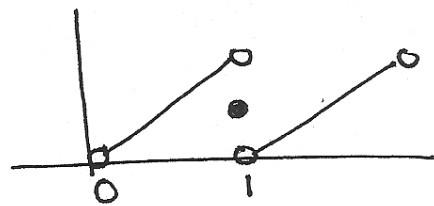
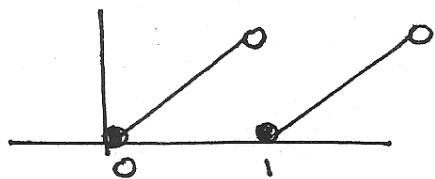
Sketch $y = \sin(\frac{1}{x})$ and determine

$\lim_{x \rightarrow 0} \sin(\frac{1}{x})$.



Ⓒ

Find $\lim_{x \rightarrow 1^+} f(x)$ and $\lim_{x \rightarrow 1^-} f(x)$ when



Ⓓ

Determine horizontal and vertical asymptotes for

