Welcome to the Pre-Calculus Power Point Flash Drill!

Developed by Susan Cantey
and student Elizabeth Albert
at Walnut Hills H.S.
2006

I’m going to ask you a lot of questions about math. These are facts that you should know extremely well. You also need to be able to recall them quickly if you want to succeed in Calculus.

When you think you know the answer,

(or if you give up) click to get to the next slide to see if you were correct.

Ready?

Define an Even Function

$$f(-x) = f(x)$$

Note: It is NOT enough to know the graph is symmetric with respect to the y-axis.

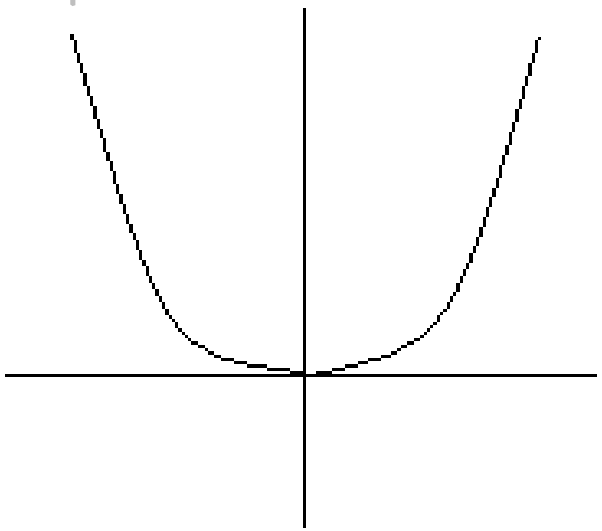
Define an

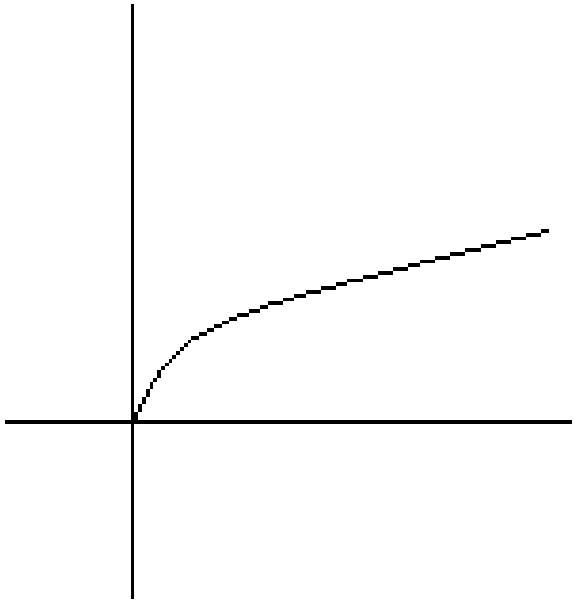
Odd Function

$$f(-x) = -f(x)$$

Again, please note that it is NOT enough to know that the graph has origin symmetry.

See if you can identify the function that probably goes with each of these simple graphs….





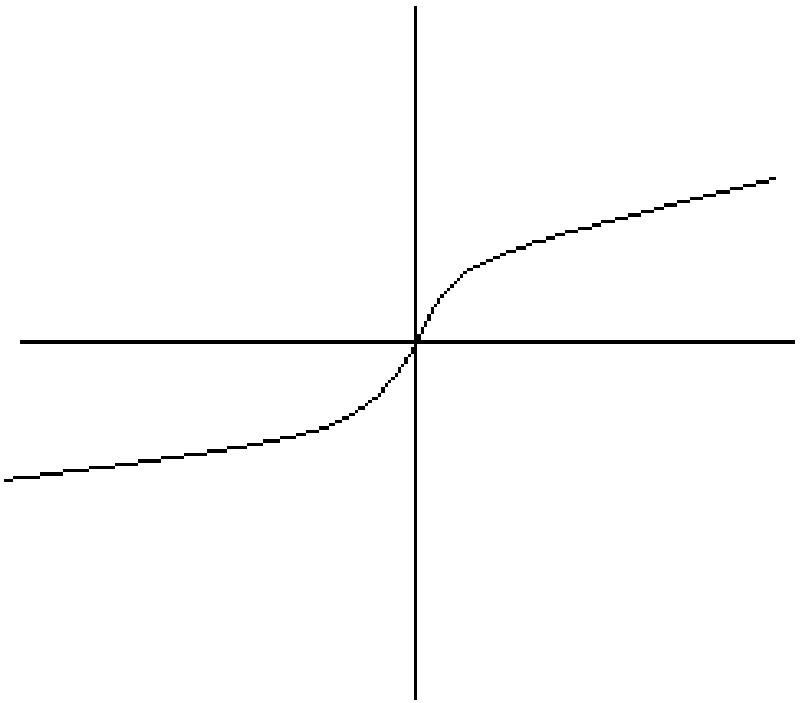
$$f(x) = x^2$$

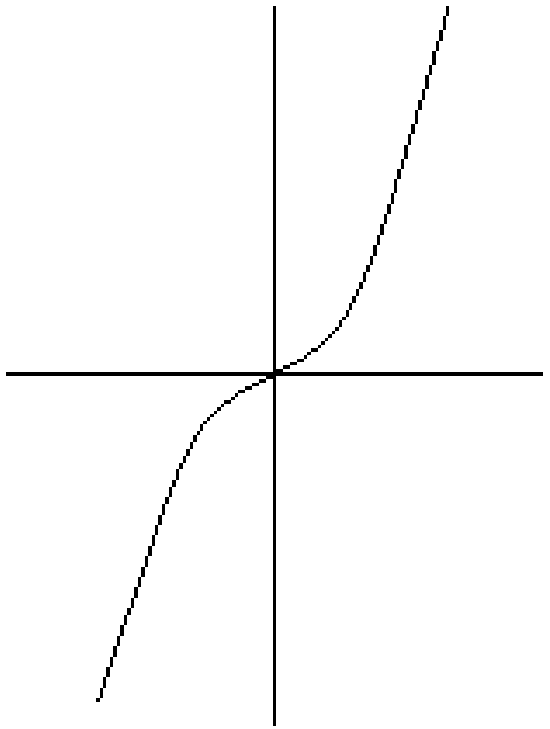
and

$$f(x) = \sqrt{x}$$

respectively

How about these?





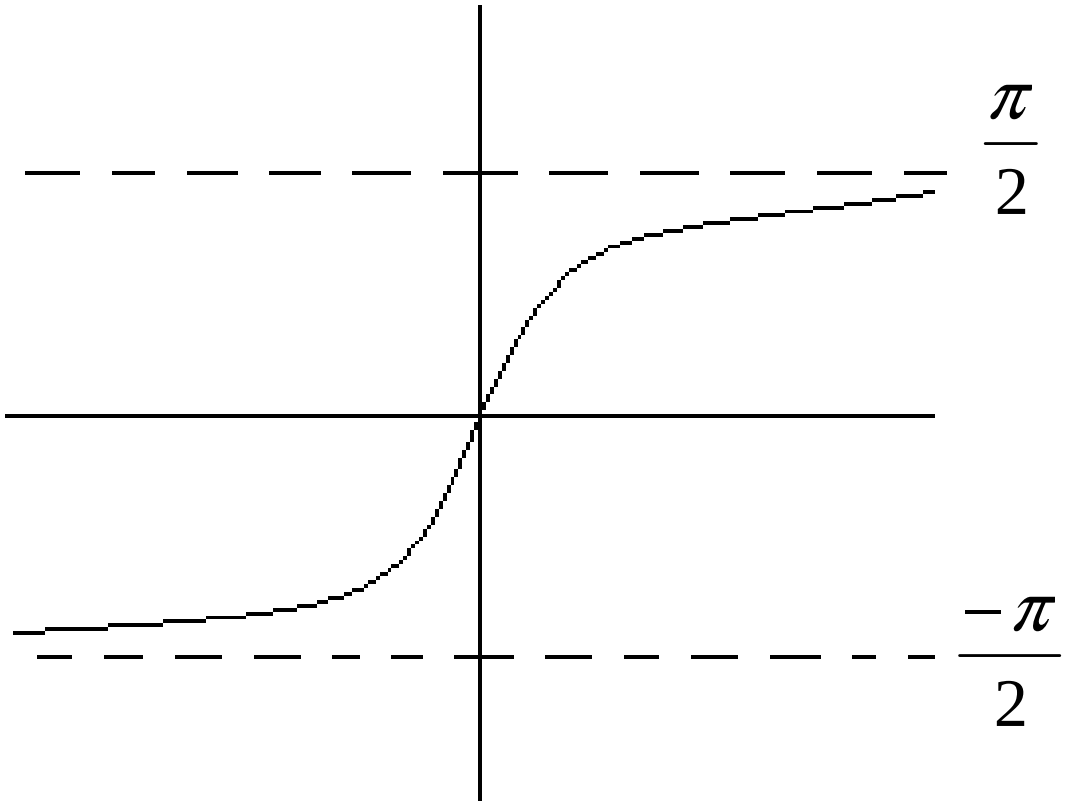
$$f(x) = \sqrt[3]{x}$$

and

$$f(x) = x^3$$

respectively

What about this one?

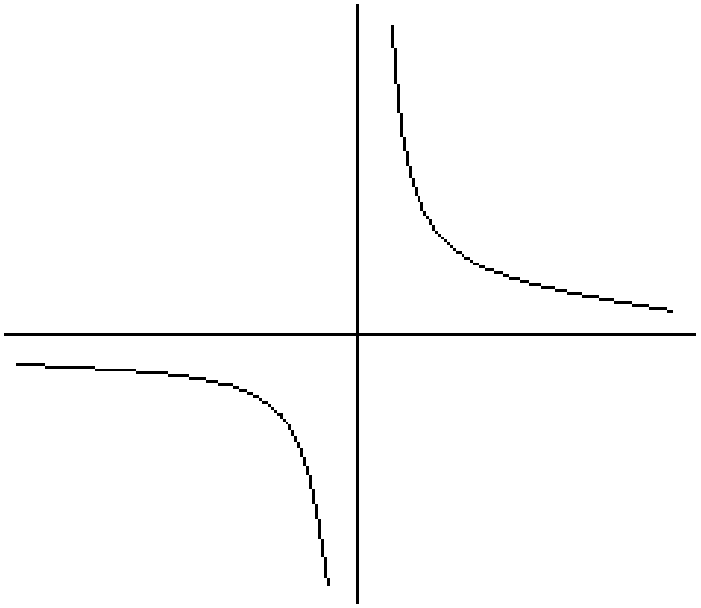


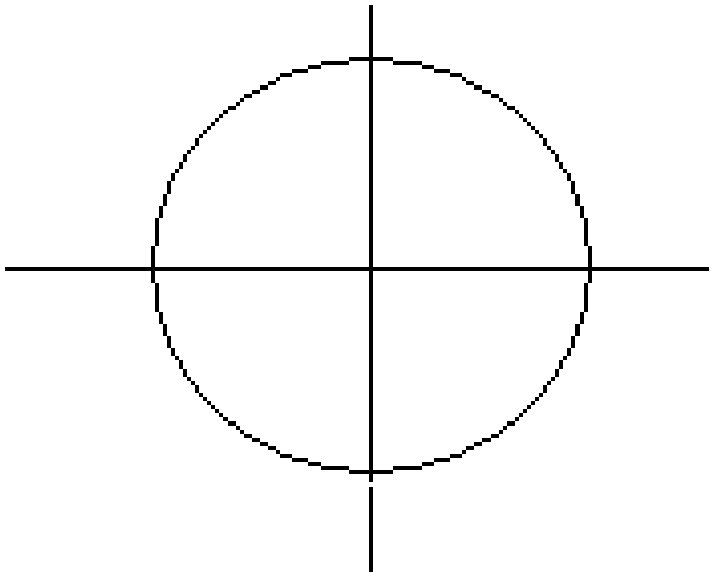
$$f(x) = \tan^{-1} x$$

Did you know it?

You are a tiger!

How about these?



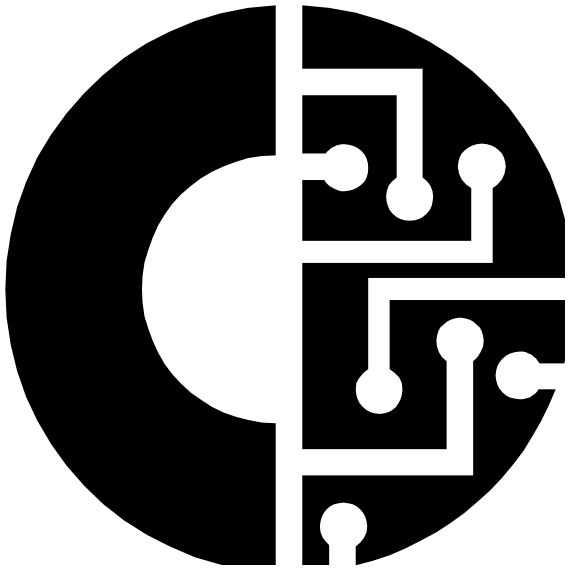


$$f(x) = \frac{1}{x}$$

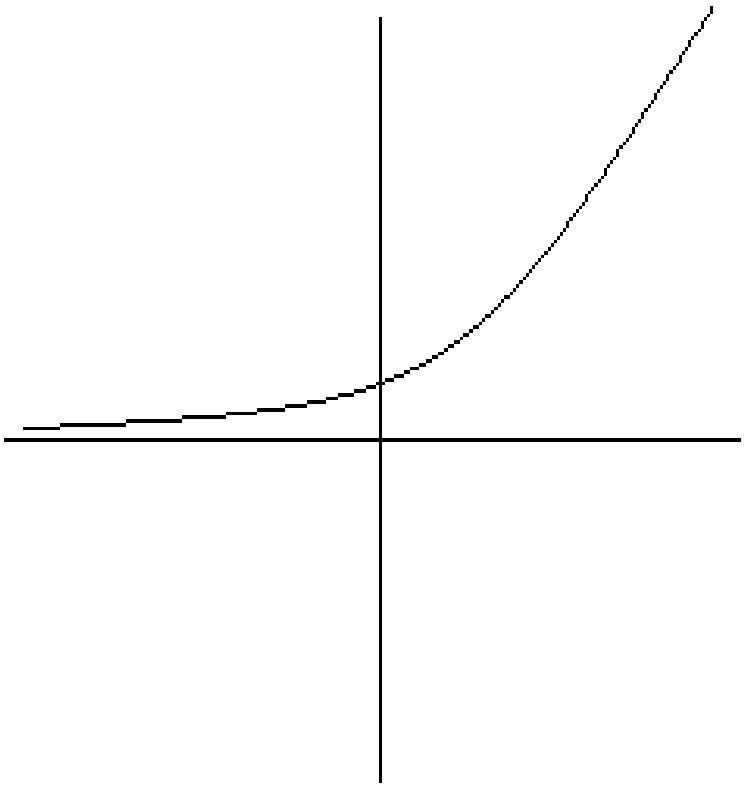
and

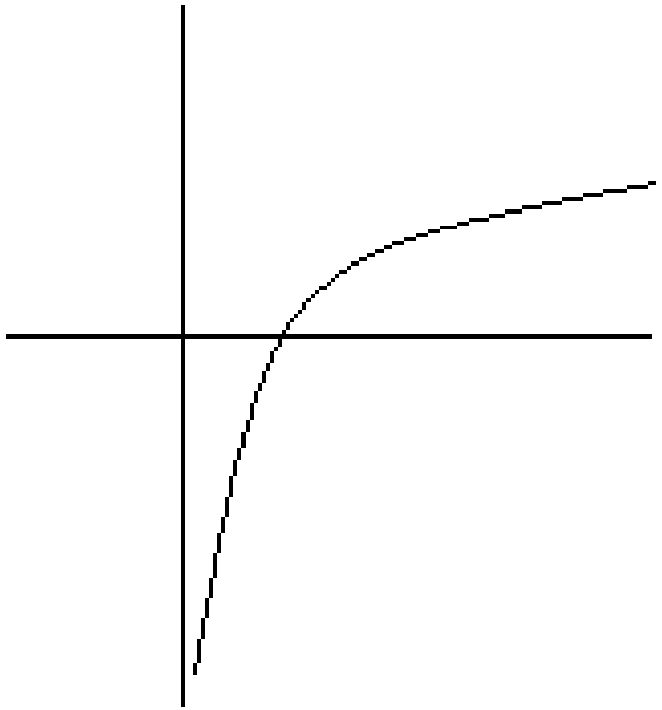
$$x^2 + y^2 = r^2$$

respectively



and finally:





$$f(x) = e^x$$

and

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

respectively

The graph of $x = a$ is...

… a vertical line.

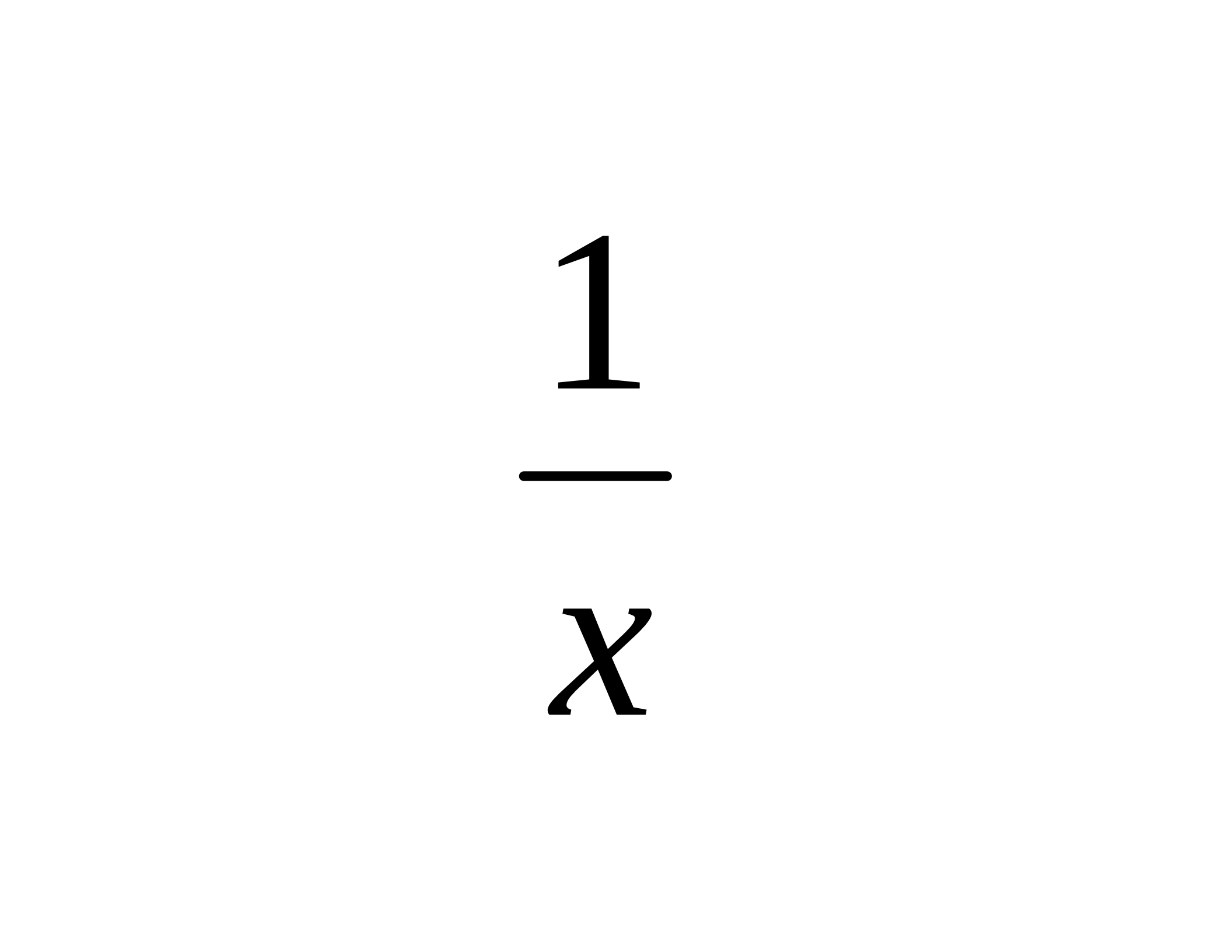
The graph of $y = a$ is…

… a horizontal line.

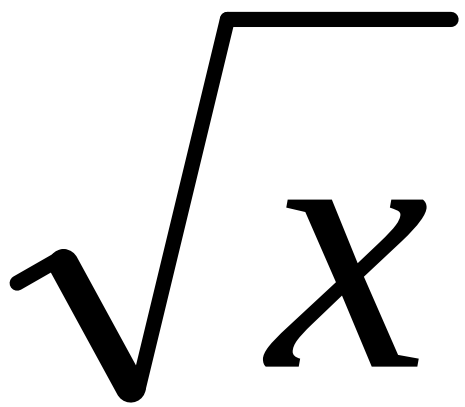
OK…that's enough about graphs!

Let's move on…

$$x^{-1} = ?$$



$$x^{1/2} = ?$$



$$x^{-2} = ?$$

$$\frac{1}{x^2}$$

$$\sqrt[n]{x^m} = ?$$

$$x^{\frac{m}{n}}$$

Think “flower” & “root”

$$\ln x^n = ?$$

$$n \ln x$$

$$\ln xy = ?$$

$$\ln x + \ln y$$

$$\ln \frac{x}{y} = ?$$

$$\ln x - \ln y$$

$$\log_b x = \frac{?}{?}$$

$$\frac{\ln x}{\ln b}$$

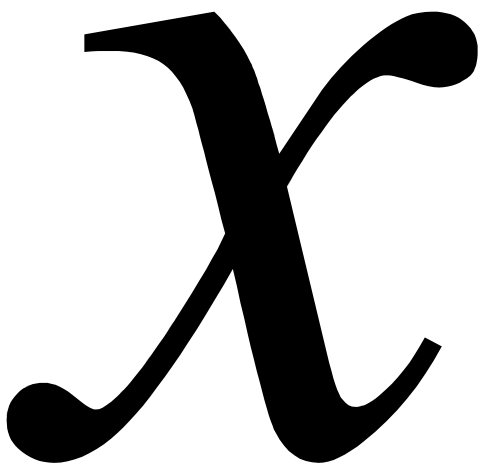
$$\ln\left(\frac{1}{x}\right) = ?$$

$$-\ln x$$

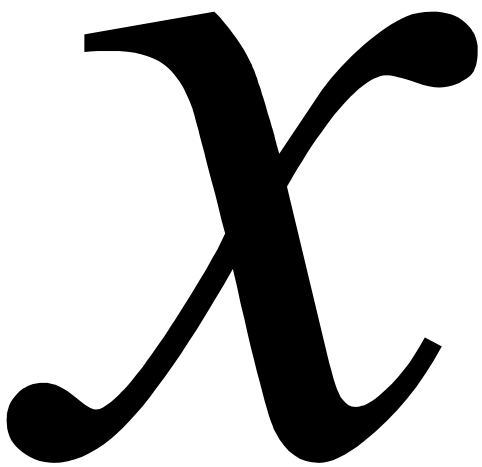
$$\ln 1 = ?$$

0

$$e^{\ln x} = ?$$



$$\ln e^{x} = ?$$



OK…enough of the logs already!

The formula for the slope of a line is

$m = ?$

$$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Point slope equation of a line ?

$$y - y_1 = m(x - x_1)$$

Midpoint Formula = ?

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Distance Formula=?

$$\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

Define: $|X|$

$$|x| \begin{cases} x \text{ for } x \geq 0 \\ -x \text{ for } x < 0 \end{cases}$$

$$[[2.98]] = ?$$

2

(Greatest integer < 2.98)

$$[[-2.17]] = ?$$

-3

You always round

down the number line!

Here comes your favorite thing!

Yeah! Trigonometry!

$$\sin 0 = ?$$

0

$$\cos 0 = ?$$

1

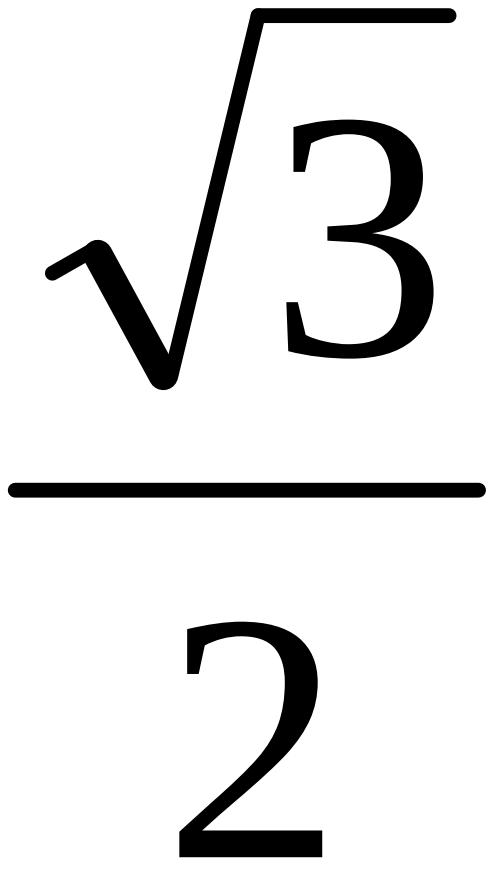
$$\sin \frac{\pi}{6} = ?$$

$$\frac{1}{2}$$

$$\sin \frac{\pi}{4} = ?$$

$$\frac{1}{\sqrt{2}} \text{ or } \frac{\sqrt{2}}{2}$$

$$\sin \frac{\pi}{3} = ?$$



$$\sin \frac{\pi}{2} = ?$$

1

$$\cos\frac{\pi}{2} = ?$$

0

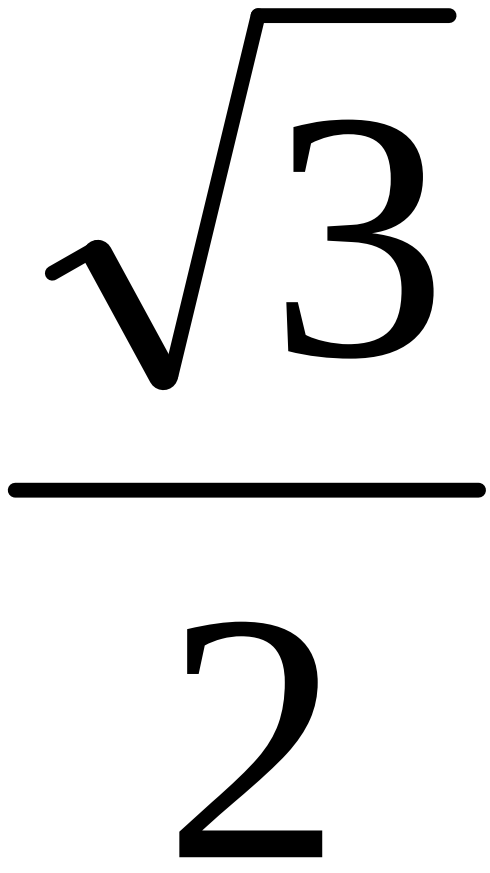
$$\cos\frac{\pi}{3} = ?$$

$$\frac{1}{2}$$

$$\cos \frac{\pi}{4} = ?$$

$$\frac{1}{\sqrt{2}} \text{ or } \frac{\sqrt{2}}{2}$$

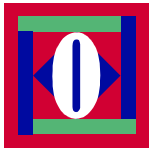
$$\cos\frac{\pi}{6} = ?$$

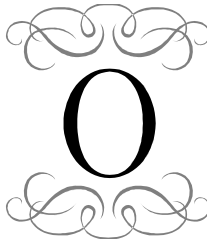


$$\cos \pi = ?$$

-1

$$\tan 0 = ?$$





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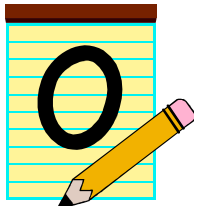
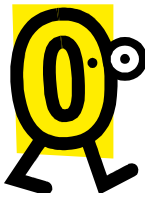


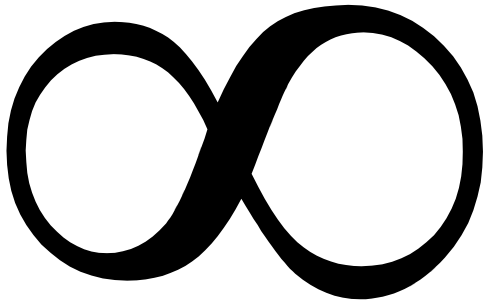


$$\tan \frac{\pi}{4} = ?$$

1

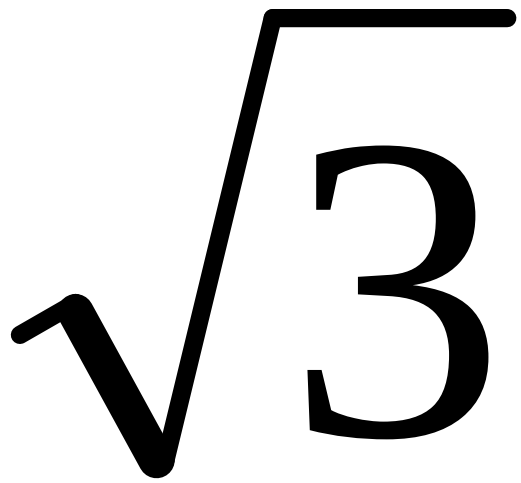
because: $\cos\frac{\pi}{4} = \sin\frac{\pi}{4}$

$$\tan \frac{\pi}{2} = ?$$



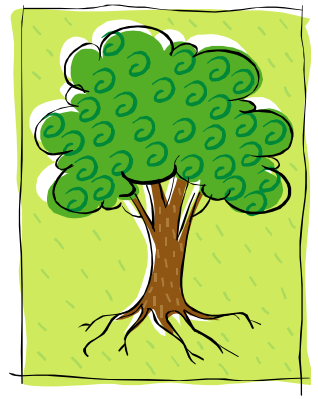
(or undefined)

$$\tan \frac{\pi}{3} = ?$$



$$\tan \frac{\pi}{6} = ?$$

$$\frac{1}{\sqrt{3}} \quad \text{or} \quad \frac{\sqrt{3}}{3}$$

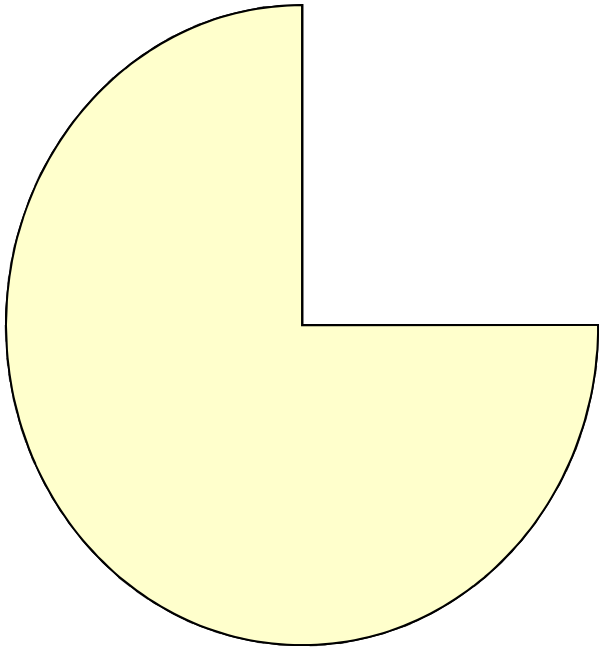


What are the Principle domains of the 6 trig functions?

That is, what quadrants are the angles in which can be used to answer inverse trig function problems?

$[0, \pi]$ for cosine

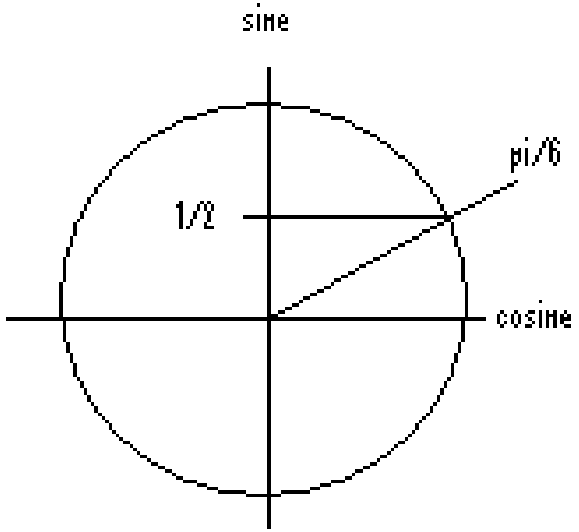
$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ for sine



$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ for tangent

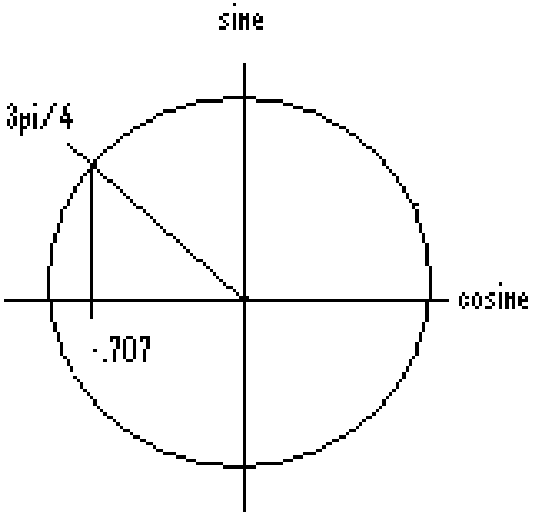
(Different texts assign different principle domains to the other three trig functions, so we won't bother with them.)

$$\sin^{-1}\frac{1}{2} = ?$$



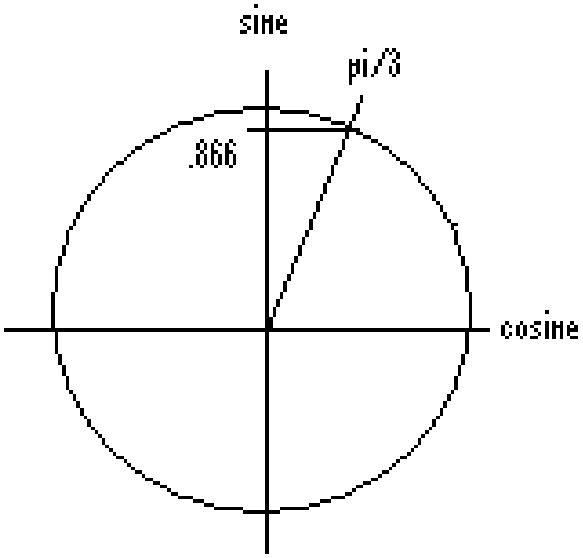
$$\frac{\pi}{6}$$

$$\cos^{-1}\left(\frac{-1}{\sqrt{2}}\right) = ?$$

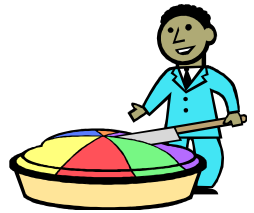


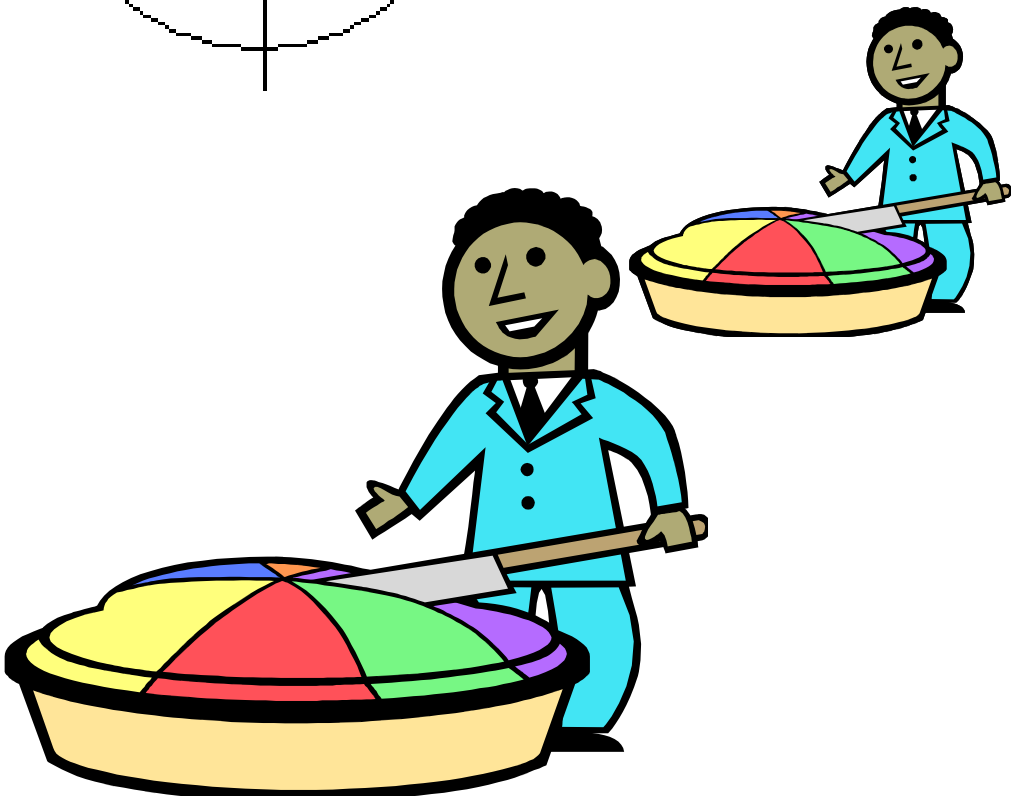
$$\frac{3\pi}{4}$$

$$\sin^{-1}\frac{\sqrt{3}}{2} = ?$$



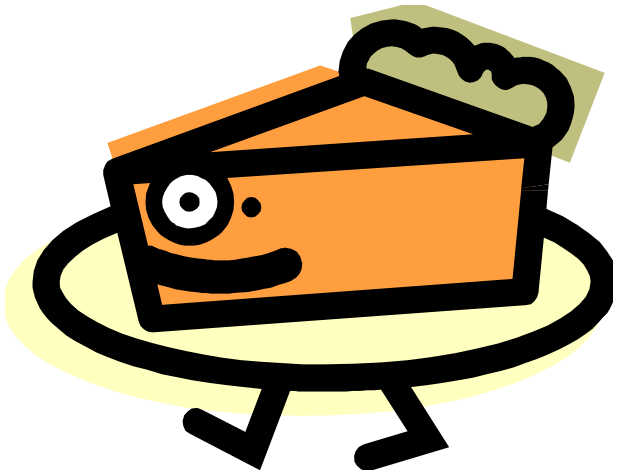
$$\frac{\pi}{3}$$





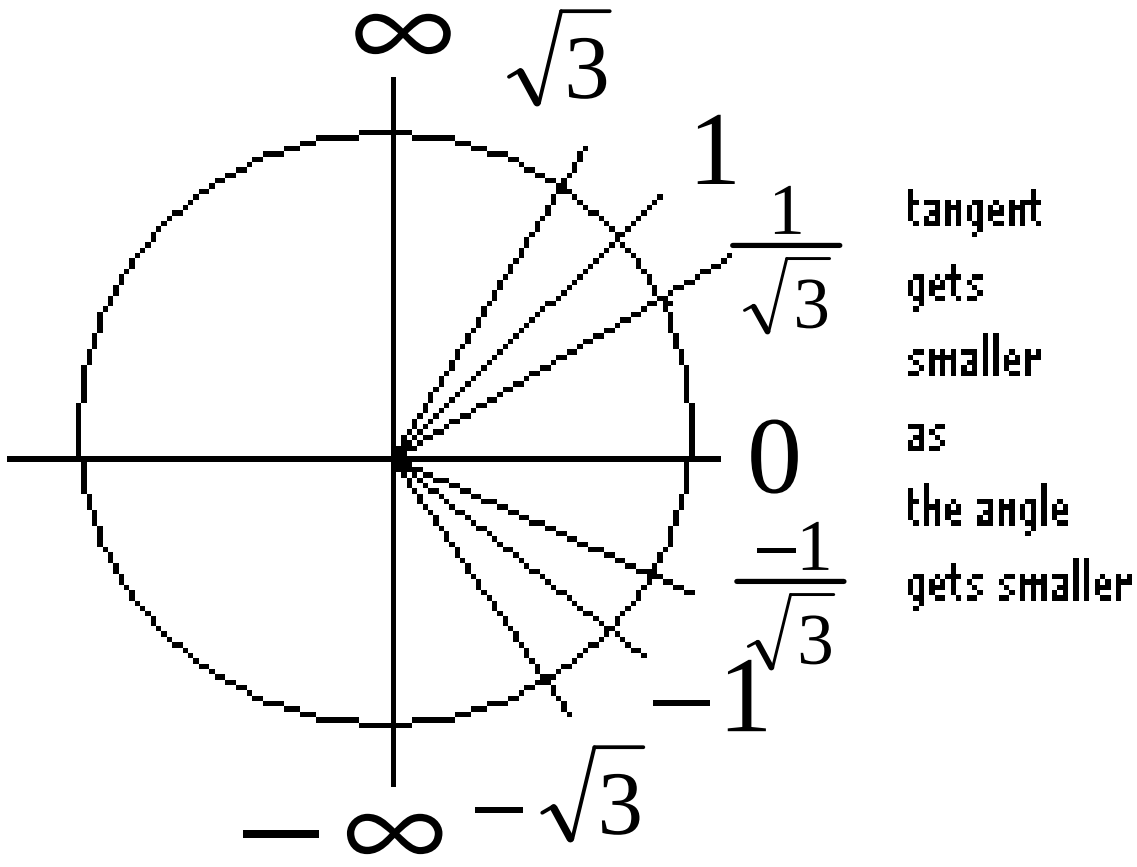
$$\tan^{-1} 1 = ?$$

sine and cosine
have to be equal!



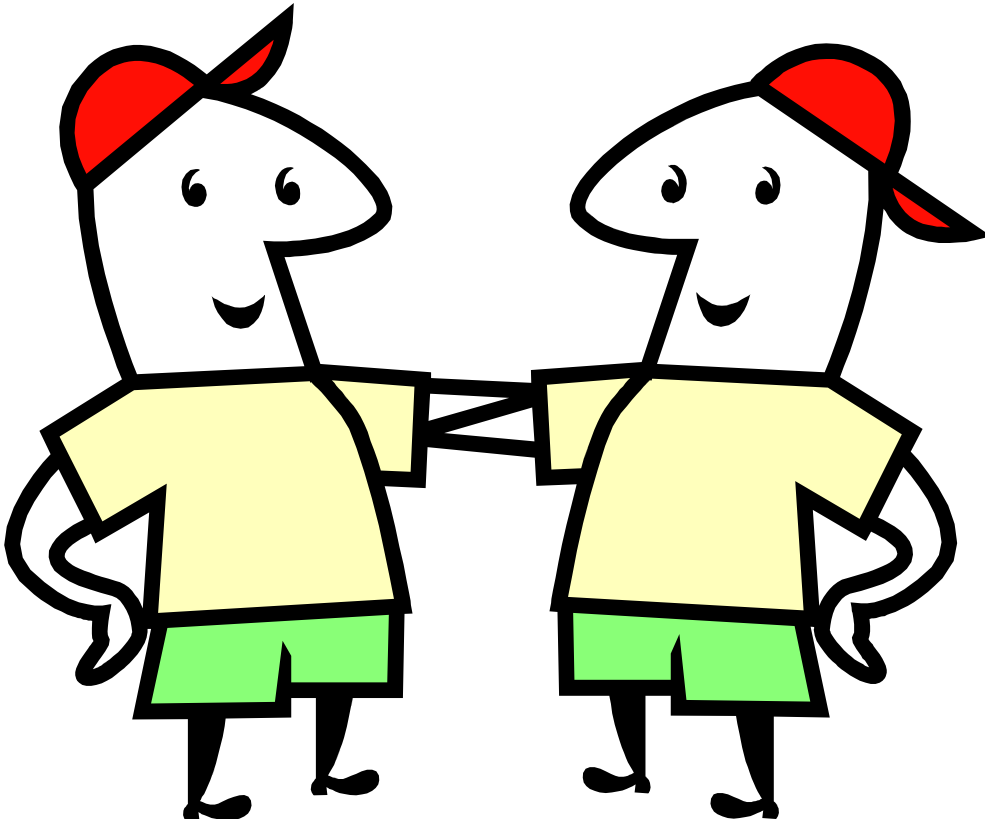
$$\frac{\pi}{4}$$

$$\tan^{-1}\left(-\sqrt{3}\right)=?$$



Answer: $\frac{-\pi}{3}$

OK…now let’s see if you know your identities!



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

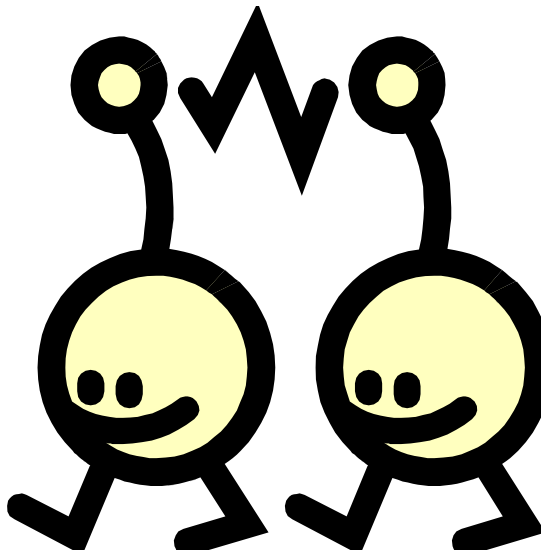
1

I hope you knew that one!!!

$$\sin^2 x = ?$$

$$1 - \cos^2 x$$

OK, that's really the same one!



What's the one with the ½'s in it?

$$\sin^2 x = ?$$

$$\frac{1}{2} - \frac{1}{2}\cos 2x$$

That one is harder, but you will need it in calculus!

$$\cos^2 x = ?$$

Do you know both of them?

$$1-\sin^2 x$$

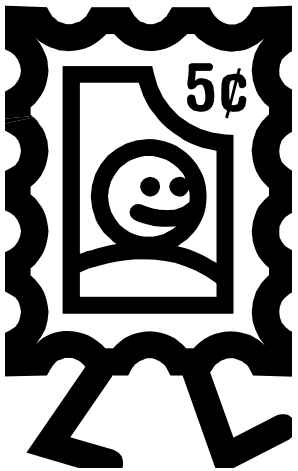
and

You rock!!!

$$\frac{1}{2}+\frac{1}{2}\cos 2x$$

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

$$\sec^2 x$$



Did ya get the ol’
“stamp of approval”
on that one?

$$\sec^2 x - 1 = ?$$

$$\tan^2 x$$

They’re laughing because this is really the same one again!

$$\cos^2 x - \sin^2 x = ?$$

$$\cos 2x$$

I don’t know why Santa thought this was funny!

$$\sin 2x = ?$$

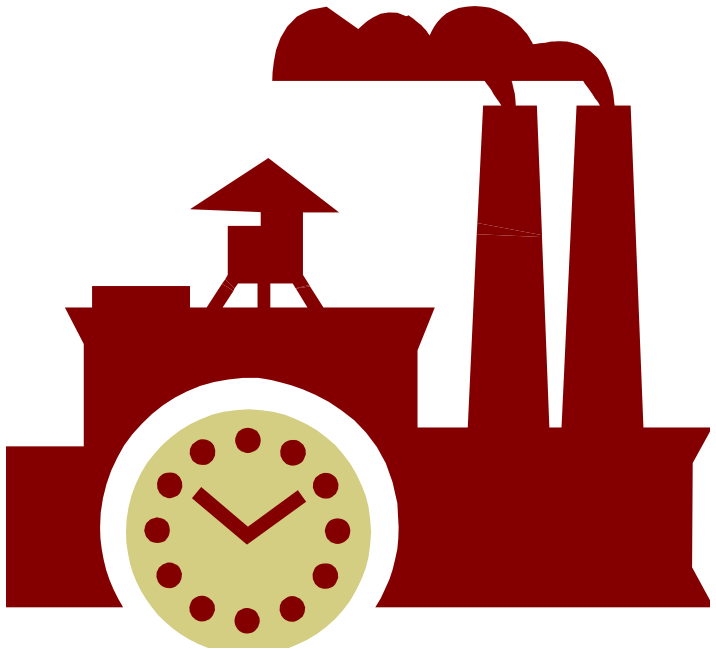
$$2 \sin x \cos x$$

This one is very important!!

Now for a little algebra and you'll be done!!

$$a^2 - b^2 = ?$$

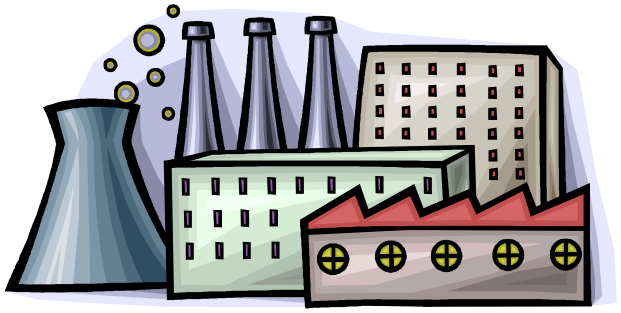
$$(a+b)(a-b)$$



$$a^3 - b^3 = ?$$

$$(a-b)(a^2+ab+b^2)$$

Notice there is NO “2”



$$a^3 + b^3 = ?$$

$$(a+b)(a^2-ab+b^2)$$

Still no 2!!!

$$(a+b)^2 = ?$$

(almost finished!!!)

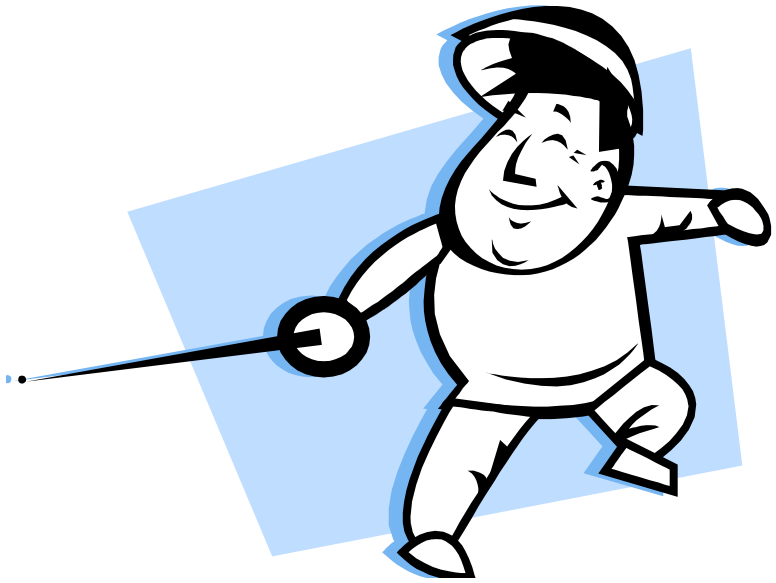
$$a^2 + 2ab + b^2$$

There's that two you wanted before!!

Last one!!!!

$$(a+b)^3$$

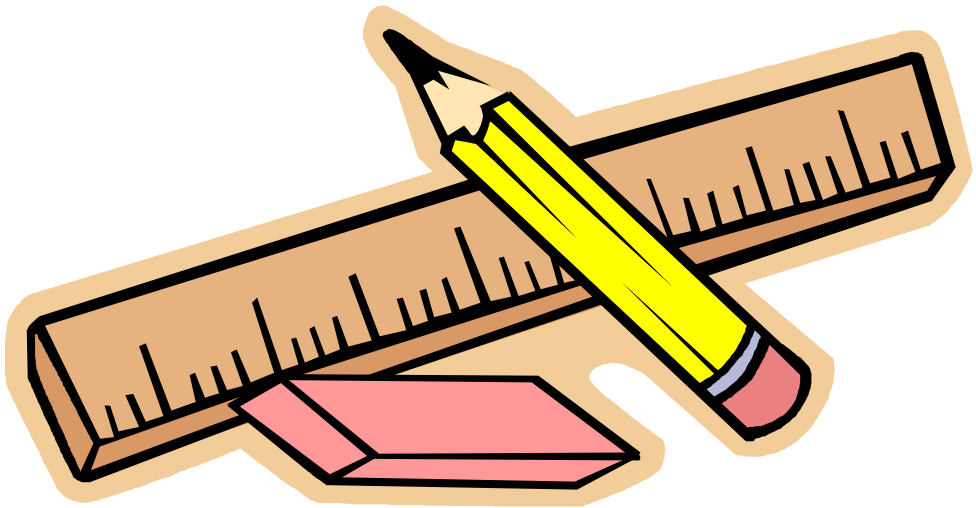
$$a^3 + 3a^2b + 3ab^2 + b^3$$



Don’t be foiled!

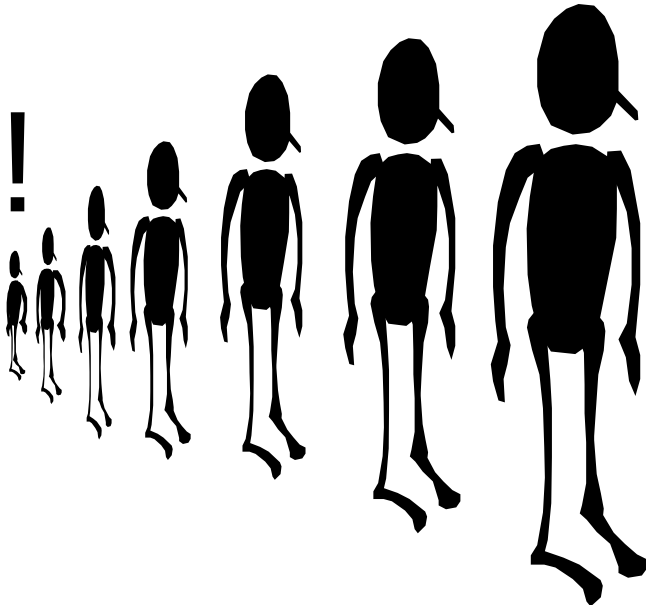
Use the binomial Theorem.

If you know all this material, then you are prepared to begin calculus… All you need now is a sharp mind, a sharp pencil and a really big eraser!



GOODBYE!!!!

ADIOS!

AUFWIEDESEHEN!

CHOW!