

- $(a \pm b)^2 = a^2 \pm 2ab + b^2$

- $x^{-m} = \frac{1}{x^m}$

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

- $\sqrt[q]{x^p} = x^{p/q}$

Trick to multiply terms

$$h(x) = (2x+1)(3x^2+2x+1) = 6x^3 + 7x^2 + 4x + 1$$

	$3x^2$	$2x$	1
$2x$	$6x^3$	$4x^2$	$2x$
1	$3x^2$	$2x$	1

$$\tan x = \frac{\sin x}{\cos x}$$

$$\csc x = \frac{1}{\sin x}$$

$$\cot x = \frac{\cos x}{\sin x}$$

$$\sec x = \frac{1}{\cos x}$$

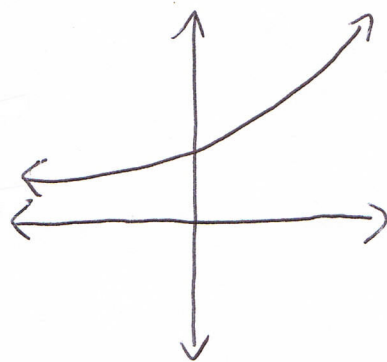
Remember

$$e^x > 0$$

Never! $e^x \neq 0$

	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
sin	$0/2$	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	$\sqrt{4}/2 = 1$
cos	$\sqrt{4}/2$	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	$0/2 = 0$

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Vertical Asymptote vs. Hole

Hole when factors cancel out. $f(x) = \frac{x^2(x-4)}{x-4}$

If no cancellation, then VA. $f(x) = \frac{1}{x}$

Remember $\sin^2 x = [\sin x]^2 \neq \sin(x^2)$

Logarithmic Properties

- (a) $\ln e^x = x$
- (b) $\ln(ab) = \ln(a) + \ln(b)$
- (c) $\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b)$
- (d) $\ln(a^x) = x \ln(a)$

Quadratic Formula

$$ax^2 + bx + c = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

a-c method for factoring

ex. $4x^2 - 4x - 3$

$\underbrace{4}_a x^2 - \underbrace{4}_b x - \underbrace{3}_c$

First find $ac = 4 \cdot (-3) = -12$

Next list all factors of $ac = -12$

- 1 12
- 2 6
- 3 4

The idea is to add the factors to yield $b = -4$

Note since $ac = -12$ and $b = -4$ the largest factor gets a negative. So

$ac = -12$

- 1 -12 = -11
- $2 - 6 = -4 = b$
- 3 -4 = -1

Rewrite the middle term with the numbers in the pink box.

$$4x^2 - 4x - 3 = 4x^2 + 2x - 6x - 3$$

Now factor by grouping.

$$= 2x(2x+1) - 3(2x+1)$$

Check that the parenthesis match.

$$= (2x-3)(2x+1)$$