- $(a \pm b)^2 = a^2 \pm 2ab + b^2$
- $a^2 - b^2 = (a+b)(a-b)$
- $x^{-m} = \frac{1}{x^m}$
- $\sqrt[q]{x^p} = x^{p/q}$

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

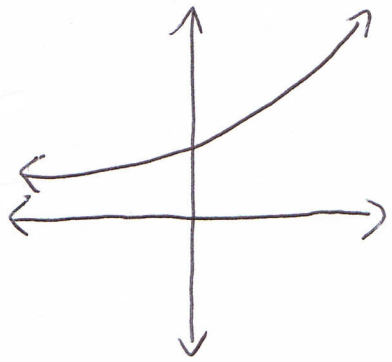
- $\tan x = \frac{\sin x}{\cos x}$
- $\csc x = \frac{1}{\sin x}$
- $\cot x = \frac{\cos x}{\sin x}$
- $\sec x = \frac{1}{\cos x}$

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

Remember

$e^x > 0$

Never! $e^x \neq 0$



Vertical Asymptote vs. Hole

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

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

E1P3

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

$a = 4$, $b = -4$, $c = -3$

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 $b = -4$ the largest factor

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.

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