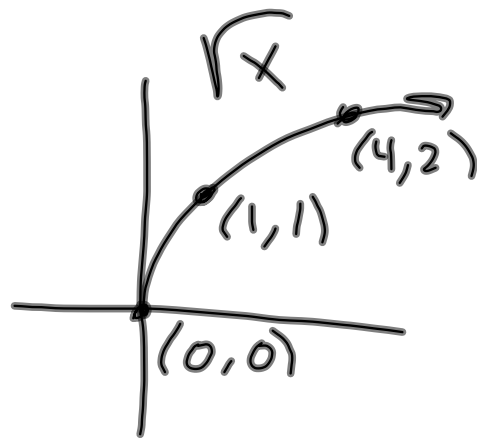
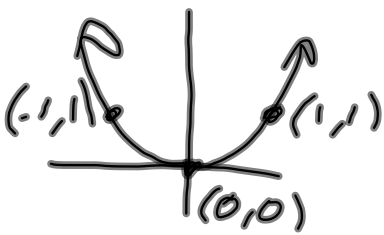
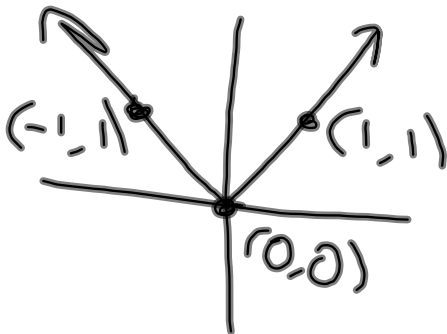


Graph  $f(x) = x^2$



$f(x) = |x|$



$\subseteq 5$  in general

$$\rightarrow (a^b)(a^c) = a^{b+c}$$

$$(3x)(-5x) = -15x^2$$

$$\rightarrow (a^b)^c = a^{bc}$$

$$(x^2)^3 = x^6$$

$$(ab)^c = a^c b^c$$

$$(3x)^2 = 3^2 x^2 = 9x^2$$

$$a(b+c) = ab + ac \quad \text{Distributive Law}$$

$$(a+b)(c+d) = ac + ad + bc + bd$$

Just distribute each term  
in the first thru the 2<sup>nd</sup>.

$$(2x-3)(5x+7) = (2x)(5x) + (2x)(7)$$

$$+ (-3)(5x) + (-3)(7)$$

most w/ experience,  
jump to here  $\rightarrow = 10x^2 + 14x - 15x - 21$

$$= 10x^2 - x - 21$$

Hot shots do

Hot shots  
tend to lose  
points due to  
cockiness  
carelessness.

THIS is  
their heads  
and skip to

$$\begin{aligned}
 (x+1)(3x^2-5x+2) &= \\
 (x)(3x^2) + (x)(-5x) + (x)(2) & \\
 + (1)(3x^2) + (1)(-5x) + (1)(2) & \\
 = 3x^3 - 5x^2 + 2x + 3x^2 - 5x + 2 & \\
 = 3x^3 - 2x^2 - 3x + 2 &
 \end{aligned}$$

$$\begin{aligned}
 &(x^2-3x+7)(5x-2) \\
 = &(5x-2)(x^2-3x+7) \\
 = &5x^3 - 15x^2 + 35x \\
 &\quad - 2x^2 + 6x - 14 \\
 \hline
 &5x^3 - 17x^2 + 41x - 14
 \end{aligned}$$

Stack 'em &  
rack 'em.

## Special Products

$$ab = ba$$

$$(a-b)(a+b) = a^2 - b^2 \quad \text{Know it.}$$

$$(a-b)(a+b) = a^2 + ab - ba - b^2 \\ = a^2 + \cancel{ab} - \cancel{ab} - b^2$$

$$(x-y)(x+y) = x^2 - y^2$$

$$(2x+7y)(2x-7y) = (2x)^2 - (7y)^2 \\ = 2^2 x^2 - 7^2 y^2 \\ = 4x^2 - 49y^2$$

$$\boxed{(a+b)^2 = a^2 + 2ab + b^2} \quad \text{Memorize.}$$

we'll be taking these:  
 $a^2 + 2ab + b^2$

in to these:

$(a+b)^2$  in the sequel.  
 you'll need to RECOGNIZE this,  
 and even BUILD it, when needed:

"Completing the Square."

$$\begin{aligned} (a+b)^2 &= (a+b)(a+b) = a^2 + \underbrace{ab + ba}_{2ab} + b^2 \\ &= a^2 + 2ab + b^2 \end{aligned}$$

$$(a-b)^2 = a^2 - 2ab + b^2 \quad \text{Confirm: Exercise.}$$

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

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

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

$$\begin{aligned}
 & \left[ \begin{array}{c} a - b \\ (2x+7) - 5 \end{array} \right] \left[ \begin{array}{c} a + b \\ (2x+7) + 5 \end{array} \right] = \left[ \begin{array}{c} a^2 - b^2 \\ (2x+7)^2 - 5^2 \end{array} \right] = \left[ \begin{array}{c} 2x+2 \\ 2x+12 \end{array} \right] \\
 & = (2x+7)^2 - 5^2 = (2x)(2x) + (2x)(12) + (2)(2x) + (2)(12) \\
 & = (2x)^2 + 2(2x)(7) + 7^2 - 25 = 4x^2 + 24x + 4x + 24 \\
 & = 4x^2 + 28x + 49 - 25 = 4x^2 + 28x + 24 \\
 & = 4x^2 + 28x + 24
 \end{aligned}$$

§5.5 GCF = Greatest Common Factor

$$\begin{aligned}
 & 6x + 2y && \text{Factor of 2 is shared} \\
 & = 2 \cdot 3x + 2 \cdot y \\
 & = 2(3x + y)
 \end{aligned}$$


---

Factor of 2 is shared:

$$2\left(\frac{6x}{2} + \frac{2y}{2}\right) = 2(3x + y) \text{ is one way to do it.}$$

$$3(x+5)^7 - 5(x+5)^2$$

Factor out the  $(x+5)^2$ :

Common Factor of  $(x+5)^2$

$$= (x+5)^2 \left[ \frac{3(x+5)^7}{(x+5)^2} - \frac{5(x+5)^2}{(x+5)^2} \right]$$

$$= (x+5)^2 [3(x+5)^5 - 5]$$

$$\begin{aligned}
 & \frac{x}{x^2} \text{ 5 of 'em} \\
 & = \frac{\cancel{x}\cancel{x}x x x x x}{\cancel{x}\cancel{x}} \\
 & = x^5
 \end{aligned}$$

Quiz Tuesday

Homework's graded, but I need to go get it!