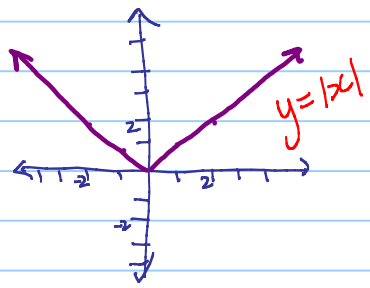
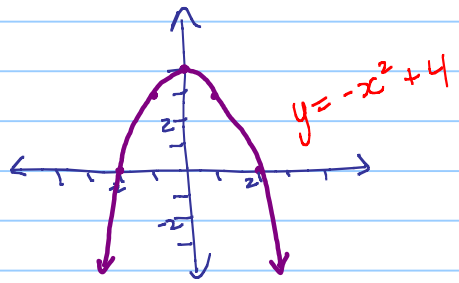
4.1 Combining Functions Graphically

Note Title 15/10/2012

For the functions $y=f(x)$ and $y=g(x)$ shown,

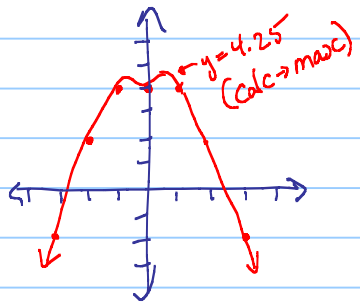




What would the graph of $y=f(x)+g(x)$ look like?

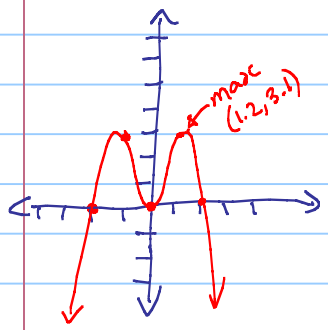
($f(x)+g(x)$: y value from each graph)

OR $y=(f+g)(x)$



x	y
-2	2+0=2
-1	1+3=4
0	0+4=4
1	1+3=4
2	2+0=2
3	3+(-5)=-2

What does $y=f(x)\cdot g(x)$ OR $y=(f\cdot g)(x)$



x	y
-3	(3)(-5)=-15
-2	(2)(0)=0
-1	(1)(3)=3
0	(0)(4)=0
1	(1)(3)=3
2	(2)(0)=0
3	(3)(-5)=-15

Domain & Range

$y=f(x)$: D: $x\in\mathbb{R}$; R: $y\geq 0$

$y=g(x)$: D: $x\in\mathbb{R}$; R: $y\leq 4$

$y=f\cdot g(x)$: D: $x\in\mathbb{R}$; R: $y\leq 3.1$

Draw the graph of $y=\frac{f(x)}{g(x)}$

Try values close to $x=-2$ or $+2$

$x=1.9$ $f(1.9)=|1.9|$

$=1.9$

$g(1.9)=-(1.9)^2+4$

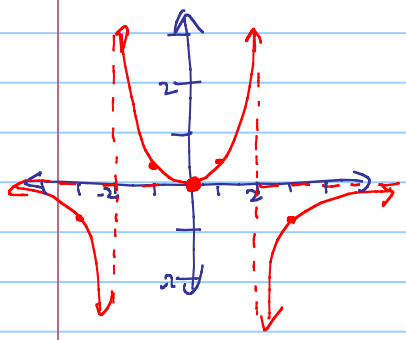
$=0.39$

so $y=\frac{1.9}{0.39}=4.87$

holes or asymptotes?

getting big ⇒ asymptote

x	y
-3	3/-5 = -0.6
-2	2/0 undefined
-1	1/3 = 0.3̄
0	0/4 = 0
1	0.3̄
2	undefined
3	-0.6



Domain: $x \neq \pm 2$ *Domain changes!

Range: $y \in \mathbb{R}$

Asymptotes: $x = \pm 2$

$y = 0$