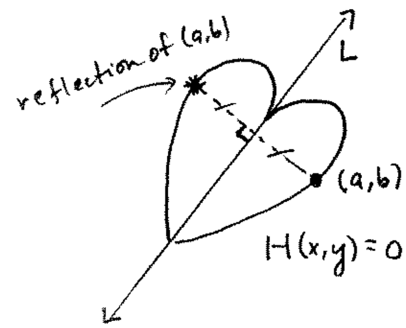
Math 1210-3
Tuesday January 22

We begin with Friday Jan. 18 notes, pages 2-4.
(Make sure you've digested page 1)

Then, we'll continue our discussion...

Symmetries

a graph $H(x,y)=0$ is symmetric with respect to a line L if for every point (a,b) in the graph, the reflected point is also in the graph:



Exercise 1 Find the lines of symmetry for the examples in Exercise 7 of Friday's notes

(1b) The most common lines of symmetry to look for are

(i) the y-axis

(ii) the x-axis

(iii) the line $y=x$

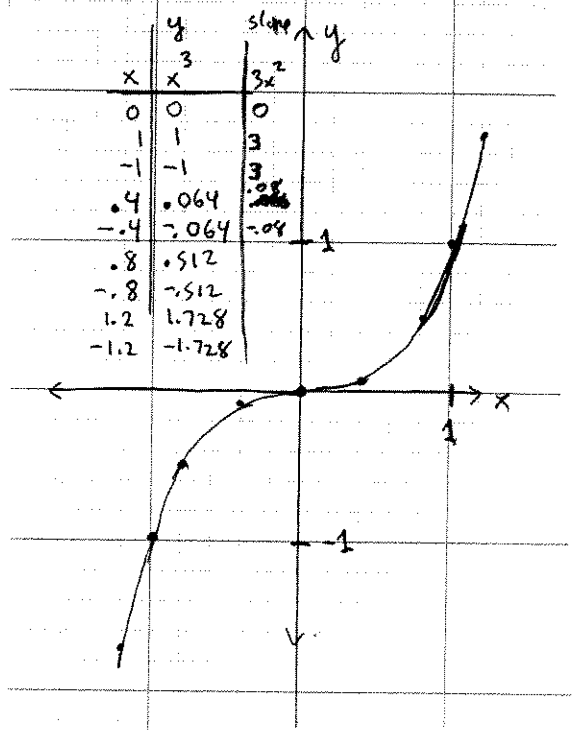
Using our work from last notes, what properties of the equation guarantee that the graph will have symmetries (i), (ii), (iii)?
Illustrate with old Exercise 7.

(1c) A graph is <u>symmetric with respect to the origin</u> if whenever (a,b) is on the graph, so is $(-a,-b)$.
Is there a test you can do on the equation to test for this symmetry?

Are any of Exercise 7 curves symmetric with respect to the origin?
Do their equations obey your test?

Example $y=x^3$

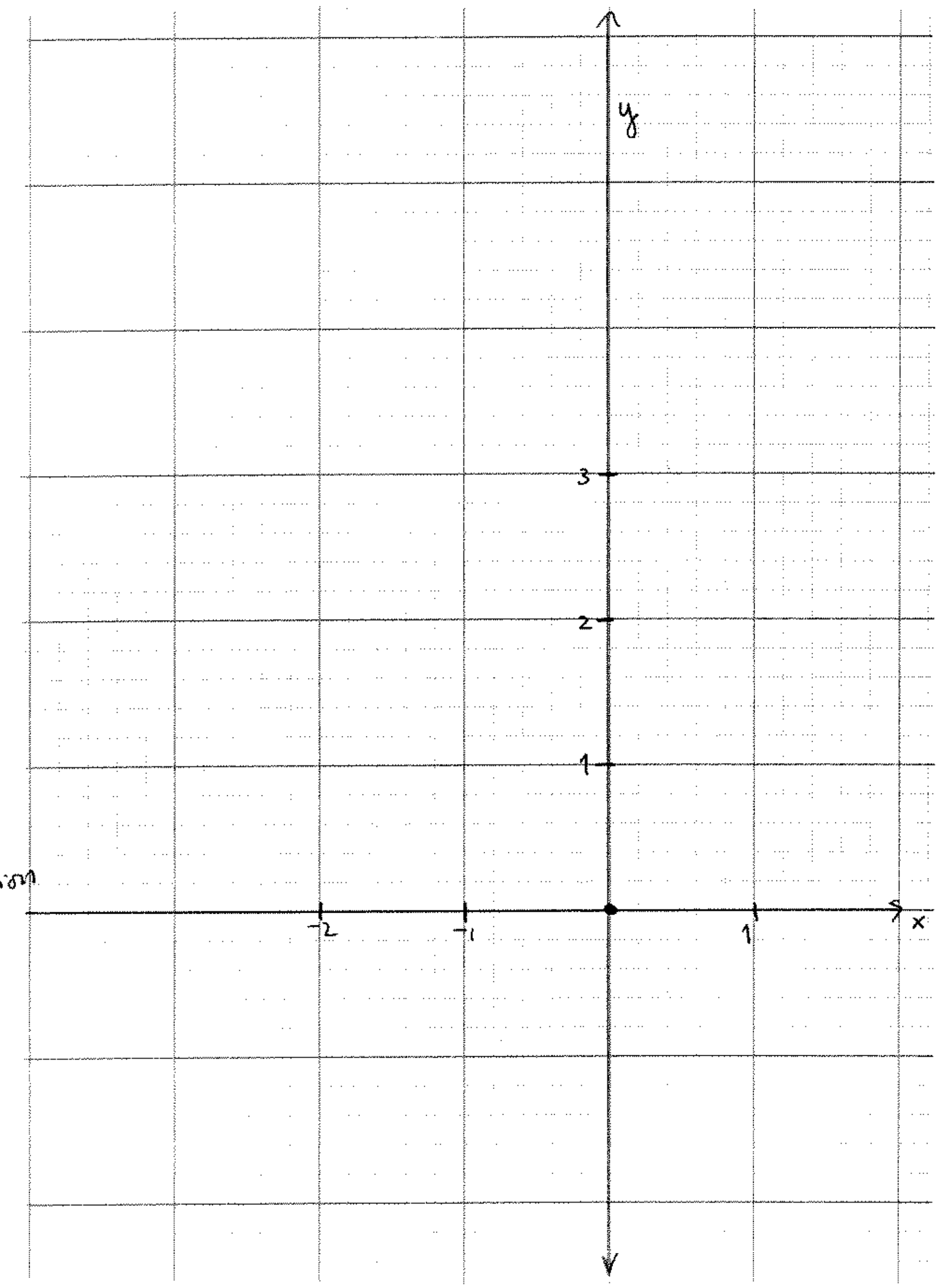
x	y x^3	slope $3x^2$
0	0	0
1	1	3
-1	-1	3
.4	.064	.48
-.4	-.064	-.48
.8	.512	
-.8	-.512	
1.2	1.728	
-1.2	-1.728	



<u>Intercepts</u> A graph intersects the x axis at points where $y=0$
(these are called x-intercepts)
So – to find x-intercepts you set $y=0$ in the equation, and solve for x.
Similarly, to find y-intercepts you find solutions to the equation with $x=0$.

<u>Intersections</u>: A point is common to two graphs exactly if it satisfies both equations. So you find the intersections of two graphs by simultaneously solving both equations (if you can)

<u>Exercise 2</u>
Plot points, find intercepts, and use translation ideas to sketch the graph of $y = x^2 + 3x$



<u>Exercise 3</u>: Repeat Exercise 2, for $y = 6 - 2x^2$. Then find the points of intersection between these two graphs