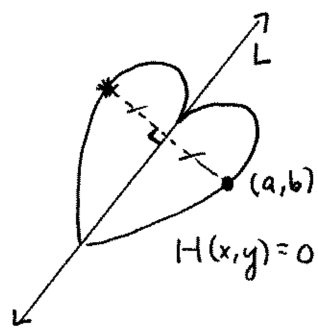
Math 1210-2
Fri Aug 31

0.4 cont'd : graphing equations

On Wednesday we talked about how certain changes to equations $H(x,y)=0$ cause the resulting graphs to be reflections, translations, or rescalings of the original graph. The discussion was more advanced than we need for section 0.4, but you might find those notes useful as we progress in 1210, 1220.
(and today and next week.)

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 : Return to our solutions of Exercise 7 last time.
(1a) Find lines of symmetry for each example

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

(i) the y-axis

(ii) the x-axis

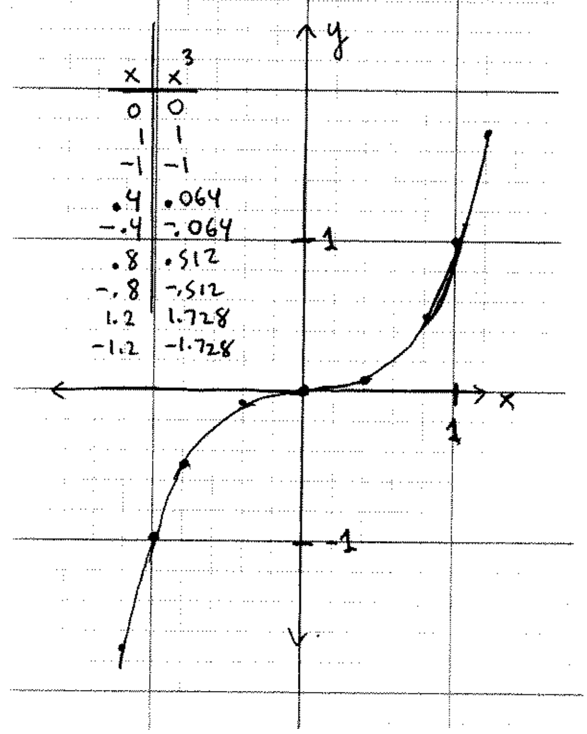
(iii) the line $y = x$

Using our work from last time, 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?

Example $y=x^3$

x	x^3
0	0
1	1
-1	-1
.4	.064
-.4	-.064
.8	.512
-.8	-.512
1.2	1.728
-1.2	-1.728

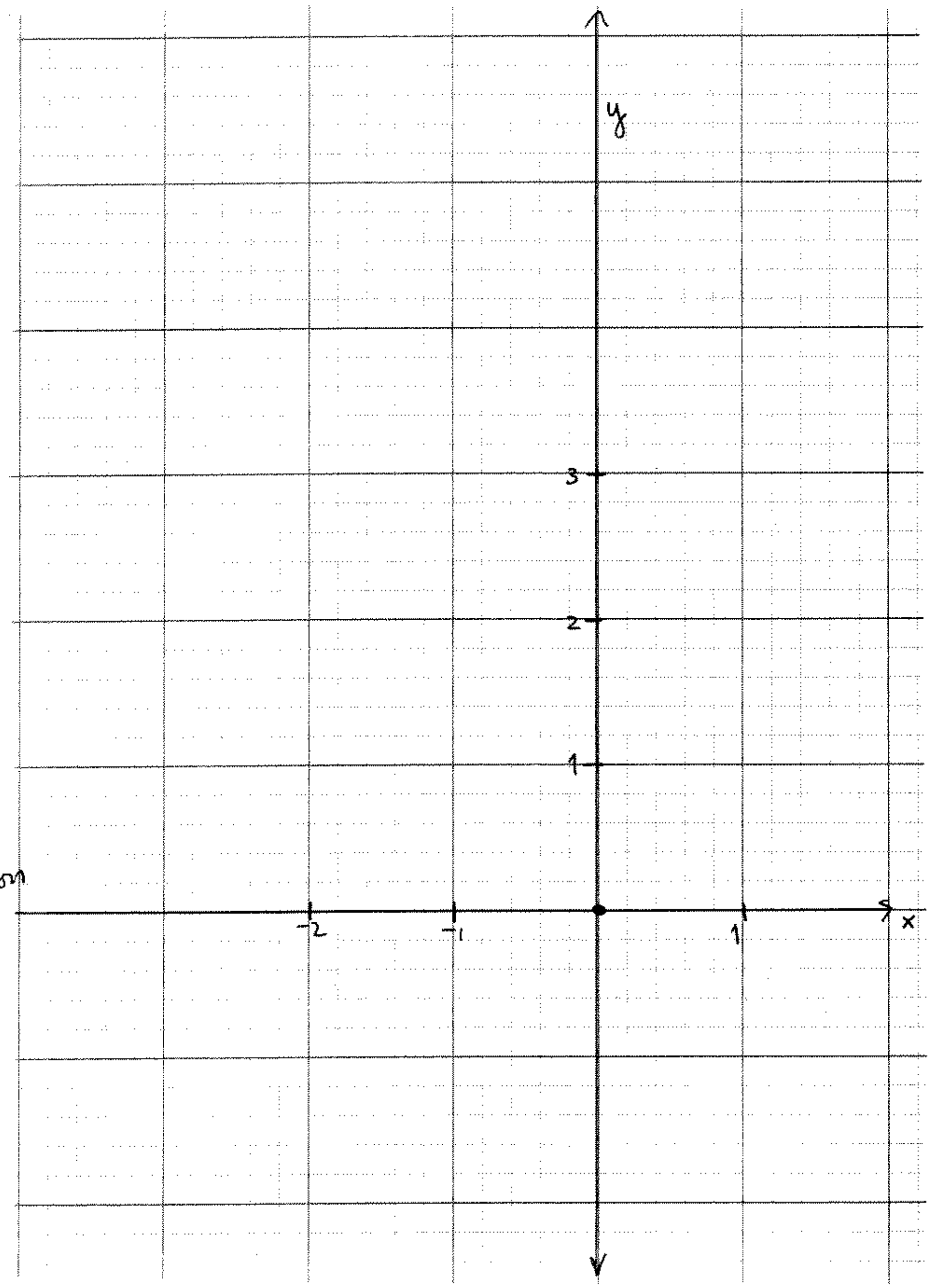


Are any of yesterday's Exercise 7 curves symmetric with respect to the origin?

Intercepts 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 $x=0$.

Intersections : 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)

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



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