Name:_____ Date:_____

Lesson 15

DO NOW:

Describe how the graph of the function $f(x) = -\frac{1}{2}(x-5)^2 + 7$ is related to the parent function $f(x) = x^2$. (Describe the transformations!)

- $-$ • reflection over x-axis
- $\frac{1}{2}$ • wider
- -5 • right 5
- $+7$ • up 7

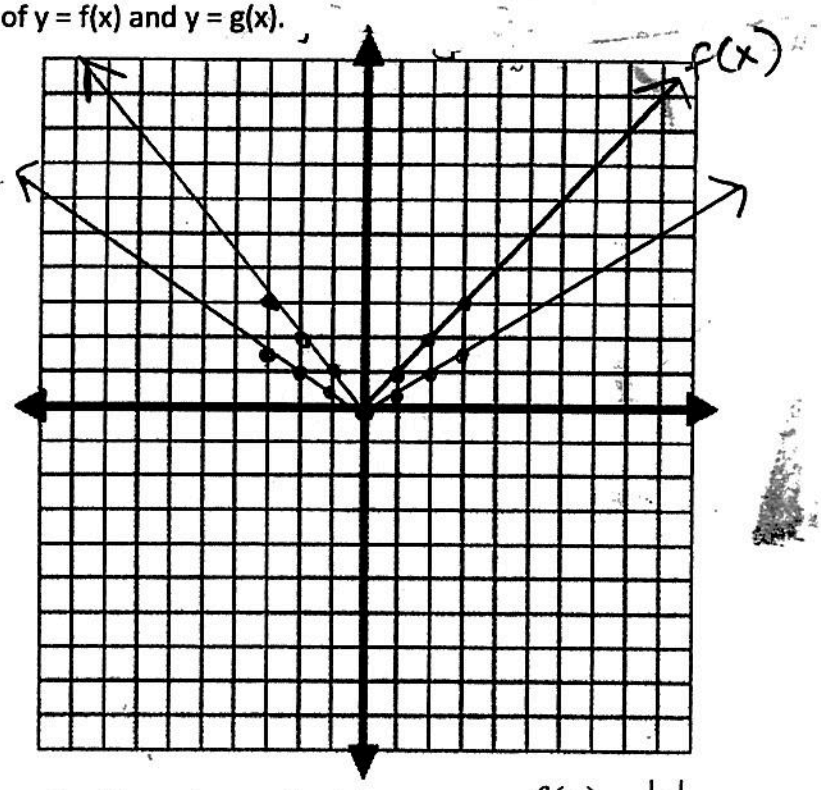
Aim SOLVING FUNCTIONS GRAPHICALLY

1. a. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.

$f(x) = |x|$ and $g(x) = \left|\frac{1}{2}x\right|$.

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3

x	y
-3	1.5
-2	1
-1	.5
0	0
1	.5
2	1
3	1.5



b. Explain how decreasing the coefficient of x affects the graph of the equation $f(x) = |x|$

stretched horizontally (wider)

$0 < a < 1$

c. When does $f(x) = g(x)$? → Point of intersection

(0,0)

* look at table on calc → same y-values

2. a. Graph the following systems of equations graphically over the interval $-4 \le x \le 2$

no arrows

$f(x) = x^2 + 2x - 1$

-4	7
-3	2
-2	-1
-1	-2
0	-1
1	2
2	7

$g(x) - 5 = x$

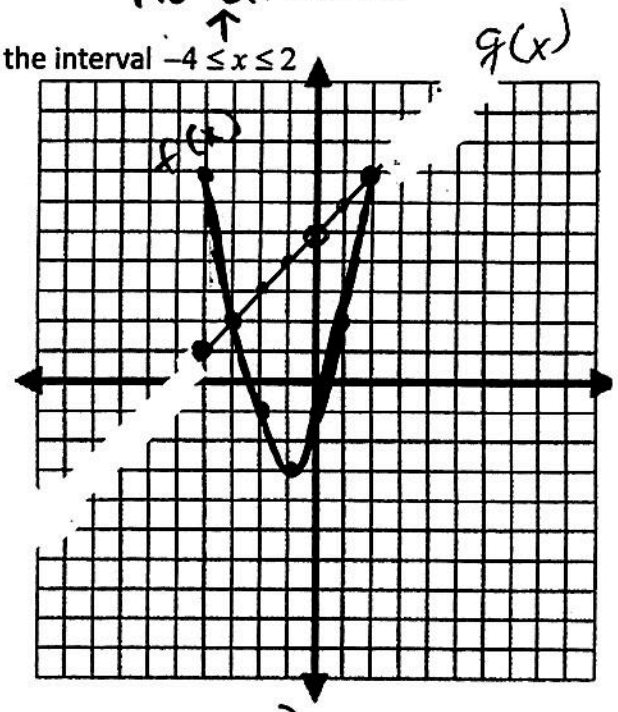
$y - 5 = x$

$+5 \quad +5$

$y = x + 5$

$m = \frac{1}{1}$

$b = 5$



b. When does $f(x) = g(x)$? → POI?

$(-3, 2)$ + $(2, 7)$

3. Solve the following system of equations graphically.

find POI!

right 4

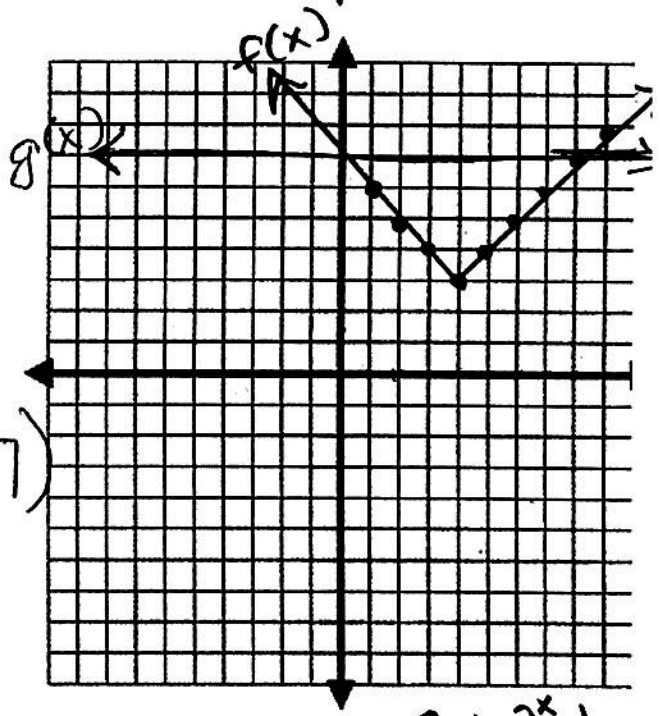
$f(x) = |x - 4| + 3$ → up 3

1	6
2	5
3	4
4	3
5	4
6	5
7	6

$g(x) = 7$

$y = 7$

* horizontal



$(0, 7)$ and $(8, 7)$

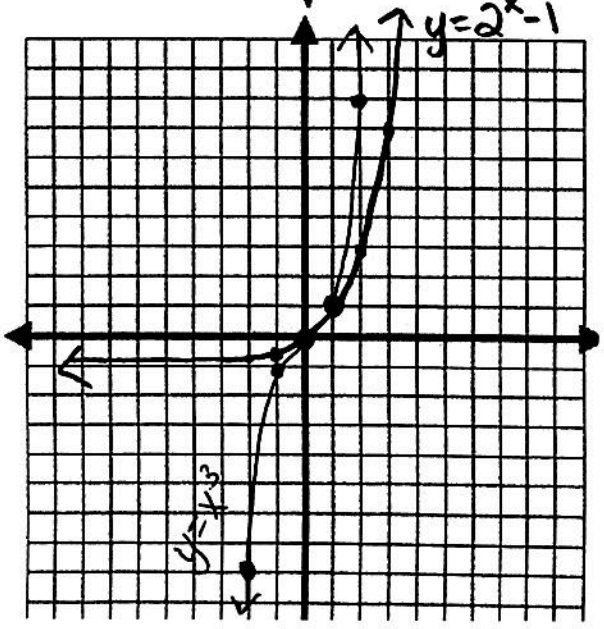
4. Solve the following system of equations graphically.

$y = 2^x - 1$ down 1 exponential growth

$y = x^3$ → cubic

-3	-.875
-2	-.75
-1	-.5
0	0
1	1
2	3
3	7

-2	-8
-1	-1
0	0
1	1
2	8



$(0, 0)$ and $(1, 1)$