1) Find the x and y intercepts for $x^2 + 3x = y^2 + 4$

$x^2 + 3x = 4$

$x^2 + 3x - 4 = 0$

$(x+4)(x-1)$

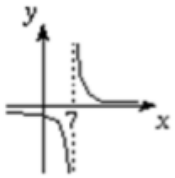
$x = -1, -4$

$0 = y^2 + 4$

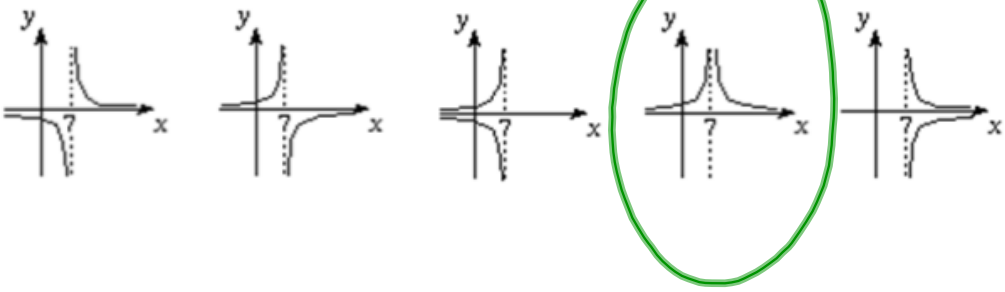
$-4 = y^2$

2) ACT Practice:

The graph of $y = \frac{7}{x-7}$ is shown below.



Among the following, which is the best representation of $y = \frac{7}{|x-7|}$?



p9

1) b
2) d
3) a
4) c
5) y-int: -2
   x-int: -2, 1
6) y-int: 0
   x-int: 0, 2, -2
7) y-int: 0
   x-int: 0, 3, -3
8) y-int: 0
   x-int: 0, -3
9) y-int: 0
   x-int: 0
10) y-int: -1
    x-int: $\pm\sqrt{1/3}$

38a) 2.47
b) -1.65
40) y = (x + 5/2)(x - 2)(x - 3/2)
54) i -- b , k = 2
    ii -- d , k = -10
    iii -- a , k = 3
    iv -- c , k = 36
57) 1/4

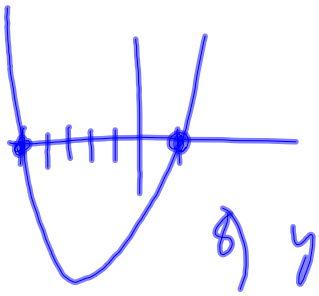
6) $y^2 = x^3 - 4x$

$y^2 = x(x^2 - 4)$

$0 = x(x+2)(x-2)$

6) $y = -x^2 + 4x - 5$

$(x+5)(x-1)$



8) $y = \frac{x^2+3x}{(3x+1)^2}$

$y = \frac{0}{1} = 0$

$0 = \frac{x^2+3x}{(3x+1)^2}$

$0 = x^2 + 3x$

$0 = x(x+3)$

13) $x^2 + y = 9$

$3 + x - y = 0$

$(3 + x) = y$

$x^2 + 3 + x = 9$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = 2, -3$

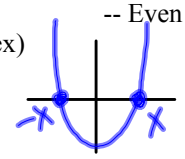
$(2, 5)$ $(-3, 0)$

Symmetry

3 Basic Symmetries:

1) y-axis sym -- reflect across y-axis
   -- if point (x,y) is on the graph, then (-x,y) is also on the graph
   -- replacing x with -x results in the same eqn.
   -- Even function

ex)



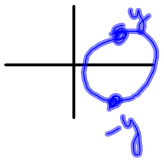
$y = x^2 - 7$

$y = (-x)^2 - 7$

$y = x^2 - 7$

2) x-axis sym -- reflect across x-axis
   -- if point (x,y) is on the graph, then (x,-y) is also on the graph
   -- replacing y with -y results in the same eqn.
   -- not a function

ex)



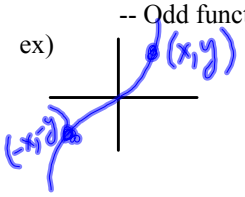
$x^2 - 3x = y^2 + 2$

$x^2 - 3x = (-y)^2 + 2$

$x^2 - 3x = y^2 + 2$

3) origin sym -- reflect through the origin (0,0)
   -- if point (x,y) is on the graph, then (-x,-y) is also on the graph
   -- replacing x with -x, and y with -y results in the same equation.
   -- Odd function

ex)



$y = x^3$

$(-y) = (-x)^3$

$-y = -x^3$

$y = x^3$

$y^2 + x^2 = 4$

ex1) $x^2 - 3y^2 = 7$

x-axis : $x^2 - 3(-y)^2 = 7 \rightarrow x^2 - 3y^2 = 7$ yes

y-axis : $(-x)^2 - 3y^2 = 7$ yes

origin $(-x)^2 - 3(-y)^2 = 7$ yes

2) $x = 5y^3$

$-x = 5(-y)^3$

$-x = -5y^3$

$x = 5y^3$

origin

Points of Intersection

2 Methods:

1) solve each eqn for the same variable, then set them equal to each other.

2) solve one eqn for a single variable, then substitute into the other eqn.

ex 1) $x^2 - y = 3$ and $x - y = 1$

$x^2 = 3 + y$

$y = x^2 - 3$

$x - (x^2 - 3) = 1$

$x - x^2 + 3 - 1 = 0$

$-x^2 + x + 2 = 0$

$x^2 - x - 2 = 0$

$(x - 2)(x + 1)$

$x = 2, -1$

$(2, 1)$

$(-1, -2)$

ex 2) $x^2 + y^2 = 5$ and $x - y = 1$

* How many intersection points can 2 graphs have?

HW: p 9, # 12-26 evens, 34, 36, 41, 42, 44-46, 53, 59-62