Solutions of Practice for Section 1.5

1. Find:

Zeros   approximately $-1.8, 2.6, 5.2$

g(-2)$= -2$

g(c)=-2 for what values of c? $c = -2, 3, 5$

even, odd, neither?   neither. Look at $g(-4)$. It is not $g(4)$, nor $-g(4)$.
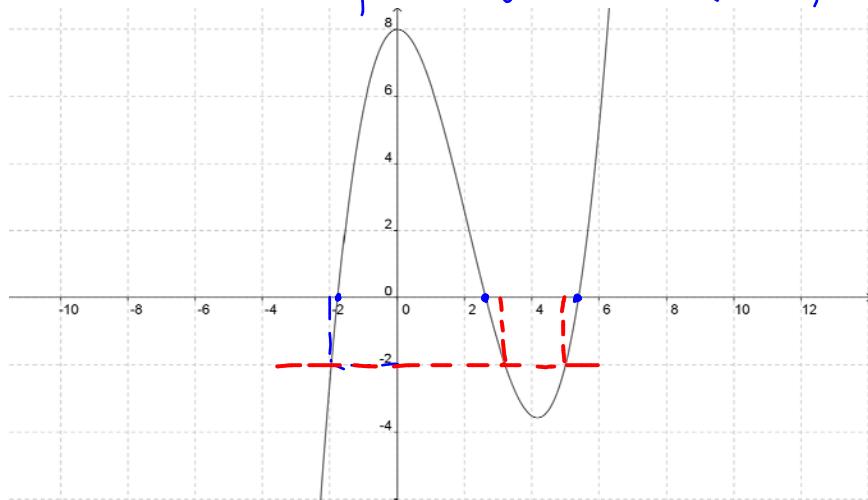
b) Find:

Domain and range   From the graph it appears that   Domain: $x \in [-10, 10]$
   Range: $[-3.8, 3.8]$

zeros $-9, -4.5, 0, 4.5, 9$

h(2)≈ 3.7

interval of x over which h(x) increases. $x \in (-10, -6.8) \cup (-2.2, 2.2) \cup (6.8, 10)$

For what x does a local maximum occur? $x = -6.8$; $x = 2.2$

Notice that this is an odd function.
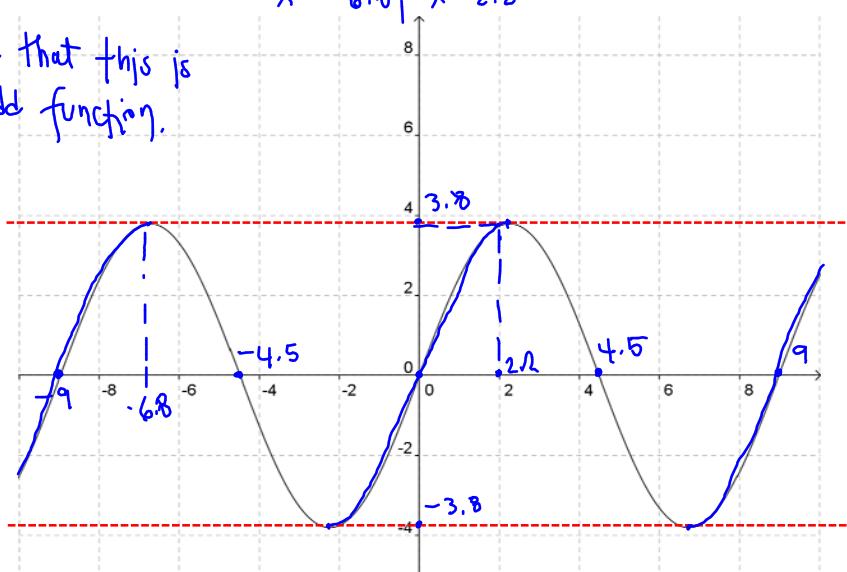
2. For the function $f(x)= x^3-4x^2-9x+36$, find zeros and its value at -2.

In order to do this we will first factor our function

$$f(x) = x^3 - 4x^2 - 9x + 36 =$$
$$= x^2(x-4) - 9(x-4) =$$
$$= (x-4)(x^2-9) =$$
$$= (x-4)(x-3)(x+3)$$

$f(x) = 0$ for $\quad x = 4, \; x = 3, \; x = -3$

also
$$f(-2) = (-2)^3 - 4(-2)^2 - 9(-2) + 36$$
$$= -8 - 4 \cdot 4 + 18 + 36$$
$$= -16 + 46 = 30$$

3. Graph the following lines:

Graph intercepts!   x=0 y=-3
                    y=0 x=2
$3x-2y=6$

Horizontal; all ys are equal
$y=-2$

Vertical; all xs are equal
$x=4$

Point (-1,2), slope 3
$y-2=3(x+1)$

Slope (-3), intercept (0,0)
$y=-3x$

Slope (-2/3), y-intercept (0,6)
$y=-\dfrac{2}{3}x+6$

3
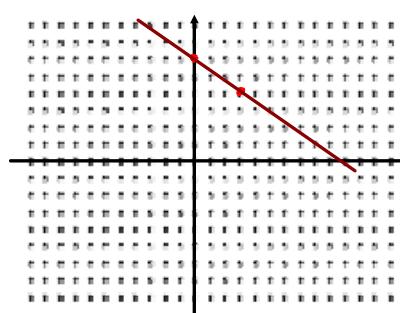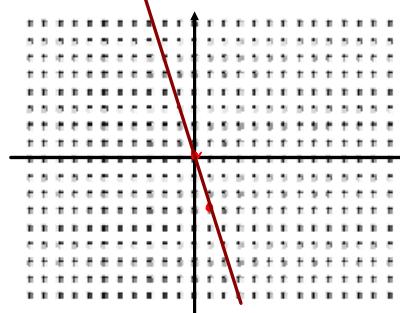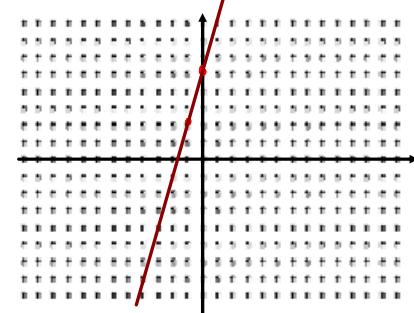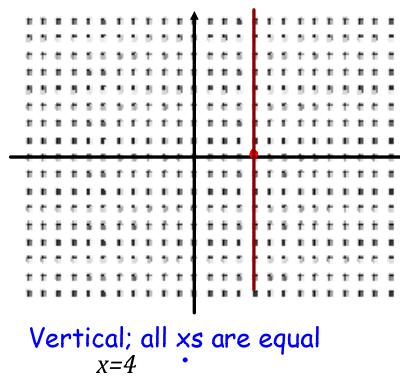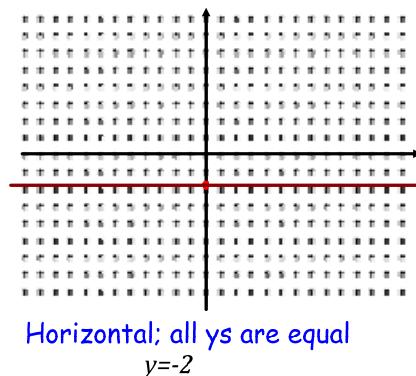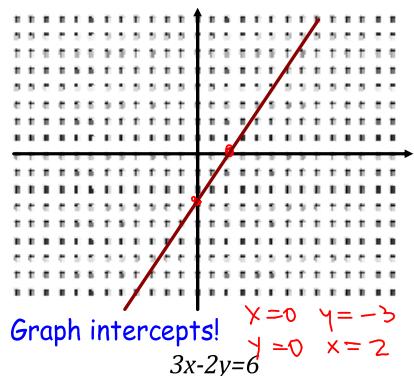
4. Graph the following functions:

$f(x) = |x|$
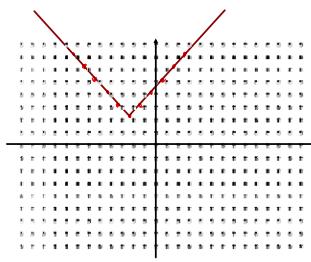
$f(x) = x^2$
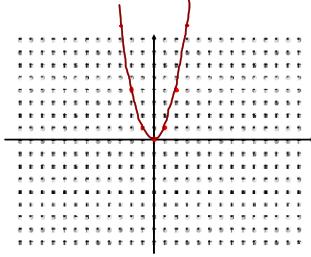
$f(x) = \dfrac{1}{x}$
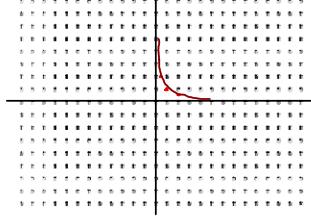
$f(x) = x^3$
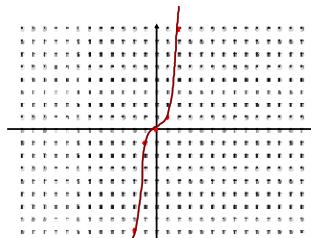
$f(x) = \llbracket x \rrbracket$ (greatest integer) — greatest integer less than or equal to the number
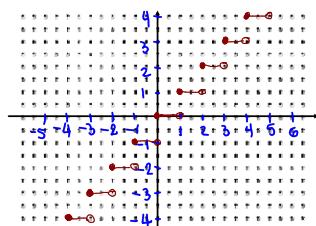
x	$\llbracket x \rrbracket$
-1.2	-2
-1	-1
-0.7	-1
0.3	0
1.2	1
2	2
2.8	2

$f(x) = \begin{cases} \sqrt{x} & x > 0 \\ 2 - x & x \leq 0 \end{cases}$
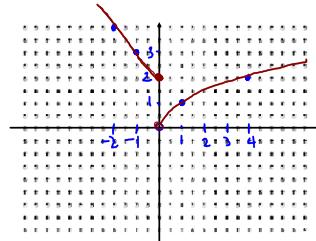
5. Draw these transformations of the graph $y = x^2$

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

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

$y = -0.5x^2 + 2$

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

①

$g(x) = x^2$

$h(x) = (x-1)^2$: shift right 1 unit

$k(x) = 2(x-1)^2$: scale by factor of 2

$f(x) = -2(x-1)^2$: reflect about x-axis
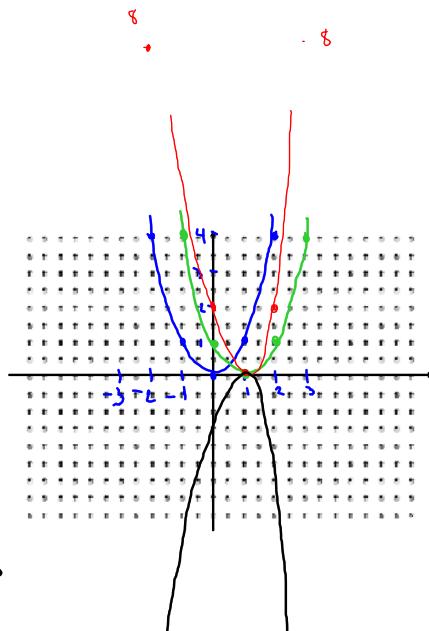
②

$g(x) = x^2$

$h(x) = (x+1)^2$: shift left 1 unit

$f(x) = (x+1)^2 - 3$: shift down 3 units
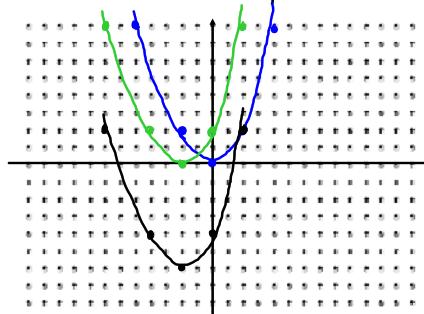
③

$g(x) = x^2$

$h(x) = 0.5x^2$: scale by a factor of 0.5

$k(x) = -0.5x^2$: reflect about x-axis

$f(x) = -0.5x^2 + 2$: shift up by 2 units
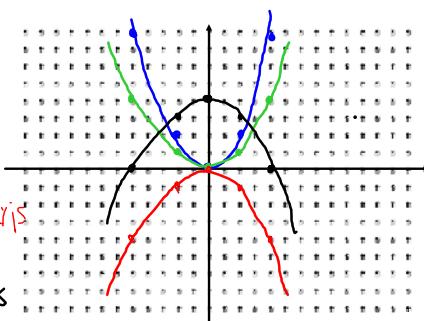
④

$g(x) = x^2$

$h(x) = (x+2)^2$: shift left by 2 units

$k(x) = 3(x+2)^2$: scale by factor of 3

$f(x) = 3(x+2)^2 - 1$: shift down 1 unit

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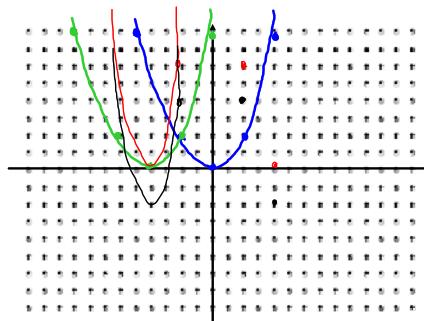
6. Write a possible equation for each of these transformations of $y = \sqrt{x}$

$y = \sqrt{x+3}$

$y = \sqrt{-(x-2)} + 1$

$y = 2\sqrt{x+1} - 2$

$y = -2\sqrt{x+2} + 1$