Review for Test #12 – Transformations of Functions

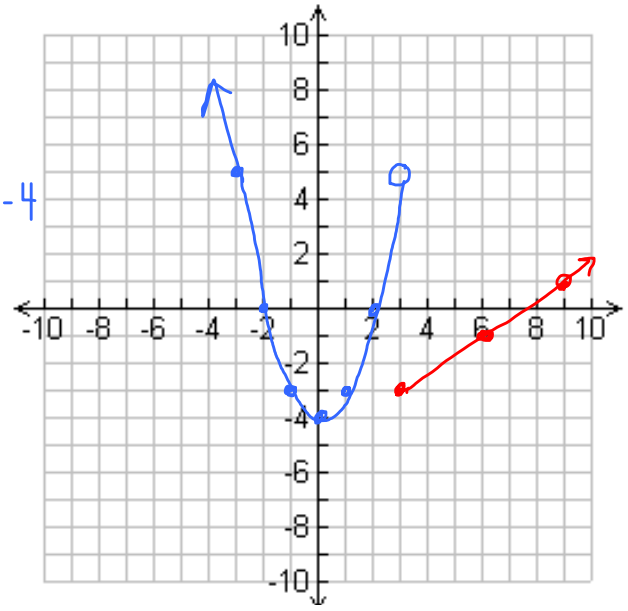
Name: _____ Class: _____

Graph the piecewise functions below.

1.) $f(x)=\begin{cases} x^2-4 & x<3 \\ \frac{2}{3}x-5 & x\geq 3 \end{cases}$

Find $f(-1)$ = -3 $f(-1)=(-1)^2-4=1-4$

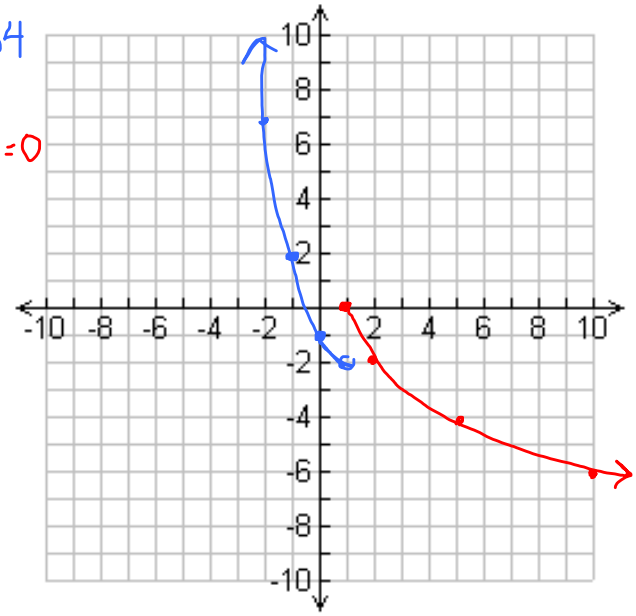
Find $f(3)$ = -3 $f(3)=\frac{2}{3}(3)-5=2-5=-3$



2.) $f(x)=\begin{cases} (x-1)^2-2 & x<1 \\ -2\sqrt{x-1} & x\geq 1 \end{cases}$

Find $f(-5)$ = 34 $f(-5)=(-5-1)^2-2=34$

Find $f(1)$ = 0 $f(1)=-2\sqrt{1-1}=-2\sqrt{0}=-2(0)=0$



For 3 – 4, rewrite each quadratic function in vertex form. Identify the vertex and state if it is a minimum or a maximum.

3.) $f(x)=2x^2-4x+5$

$f(x)=2(x^2-2x+1)+5-2$

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

$(1,3)$ – min

4.) $g(x)=-\frac{1}{2}x^2-20x+3$

$g(x)=-\frac{1}{2}(x^2+40x+400)+3+200$

$g(x)=-\frac{1}{2}(x+20)^2+203$

$(-20,203)$ – max

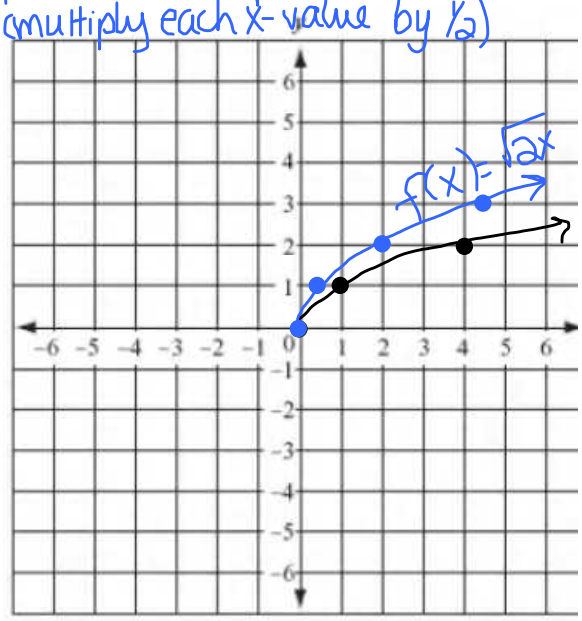
5 – 10: For each graph, you must first graph the parent function. Then, identify the transformations. Finally, complete the graph transformation.

5.) $f(x) = \sqrt{2x}$

Parent function: $p(x) = \sqrt{x}$

Transformations:

horizontal compression s.f. = 1/2
(multiply each x-value by 1/2)



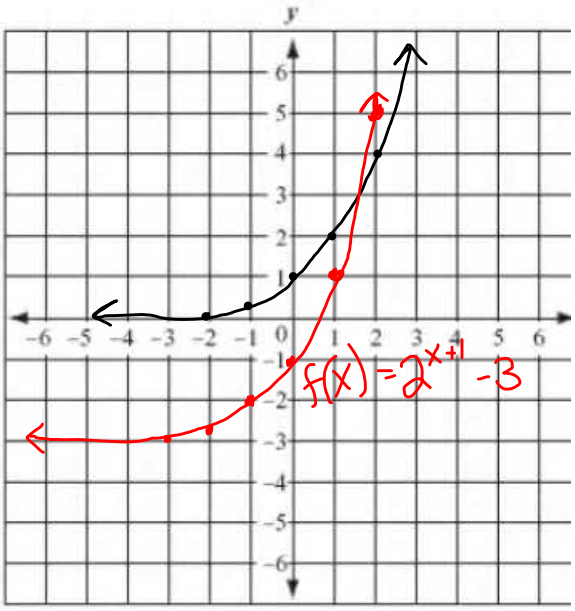
6.) $f(x) = 2^{x+1} - 3$

parent: $p(x) = 2^x$

Transformations:

left 1

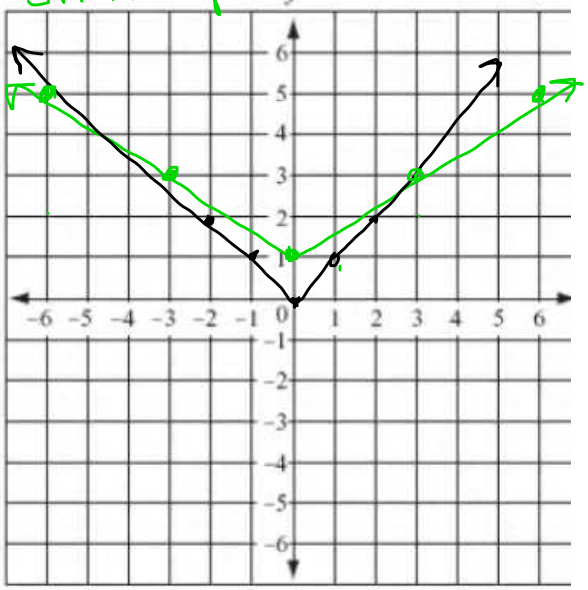
down 3



7.) $f(x) = 2\left|\frac{1}{3}x\right| + 1$ parent: $p(x) = |x|$

Transformations:

- horizontal stretch s.f. = 3
- vertical stretch s.f. = 2
- shift up 1



8.) $f(x) = \frac{1}{3}x^2 + 2x + 4$

$f(x) = \frac{1}{3}(x^2+6x+9)+4-3$

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

Put the equation in vertex form, first.

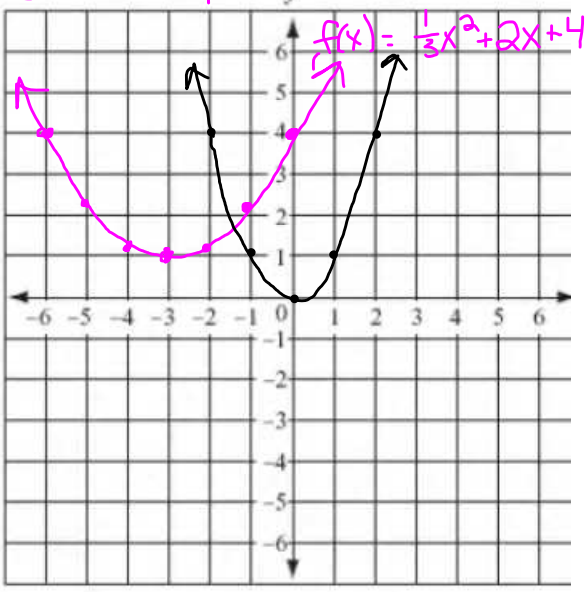
parent: $p(x) = x^2$

Transformations:

① left 3

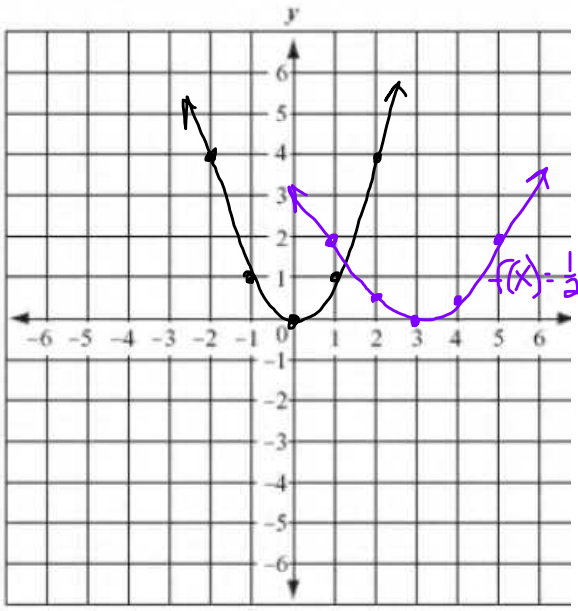
② vertical comp. s.f. = 1/3

③ shift up 1



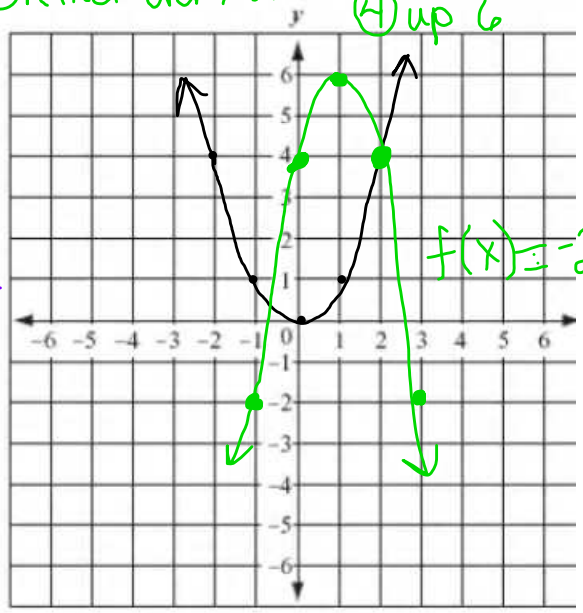
9.) $f(x)=\frac{1}{2}(x-3)^3$ parent: $p(x)=x^2$

Transformations:
- right 3
- vertical compression s.f. = $\frac{1}{2}$



10.) $f(x)=-2x^2+4x+4$ $f(x)=-2(x^2-2x+1)+4+2$ $f(x)=-2(x-1)^2+6$

Transformations:
parent: $f(x)=x^2$
1. right 1
2. reflect over x-axis
3. vertical stretch s.f. = 2
4. up 6



11.) Solve the following system of equations:

$y=x^2+4x+1$

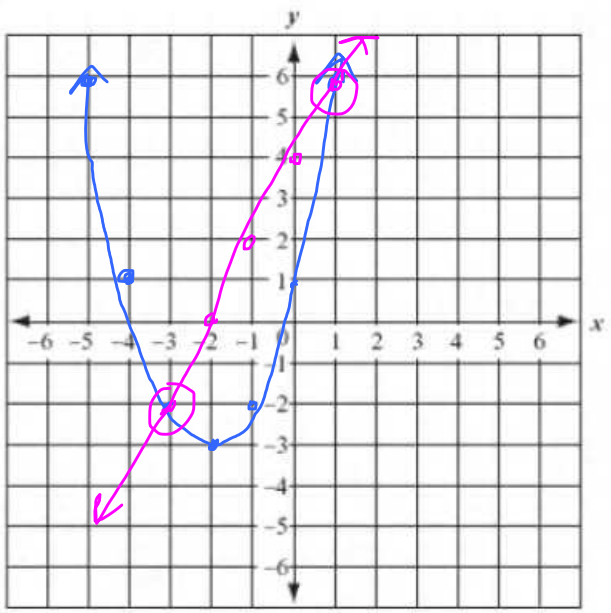
$y-4=2x$

$y-4=2x$

$y=2x+4$

$x=\frac{-b}{2a}=\frac{-4}{2}=-2$

x	y
-5	6
-4	1
-3	-2
-2	-3
-1	-2
0	1
1	6



$\{(1,6)\ \&\ (-3,-2)\}$