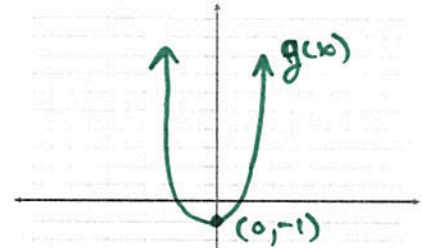# PreCalculus – Parent Graphs & Transformations

For problem 1- 6, please give the name of the parent function and describe the transformation represented. You may use your graphing calculator to compare & sketch.

1. $g(x) = x^2 - 1$

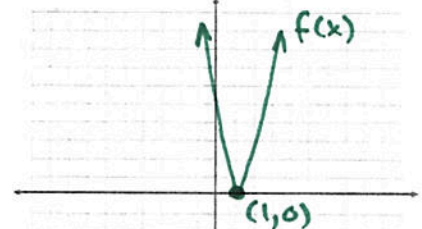   Parent: $y = x^2$, QUADRATIC

   Transformations: translate down 1 unit (shift)

2. $f(x) = 2|x - 1|$

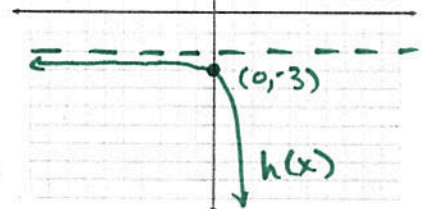   Parent: $y = |x|$, ABSOLUTE VALUE

   Transformations: vertical stretch by factor of 2 translate right 1 unit

3. $h(x) = -e^x - 2$

   Parent: $y = e^x$, EXPONENTIAL
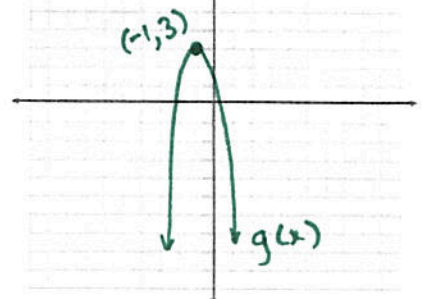
   Transformations: reflect across x-axis translate down 2 units

4. $g(x) = -2(x + 1)^2 + 3$

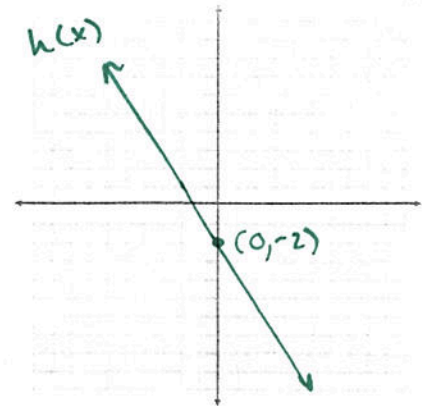   Parent: $y = x^2$, QUADRATIC

   Transformations: reflect across x-axis vertical stretch by factor of 2 translate up 3 units and left 1 unit
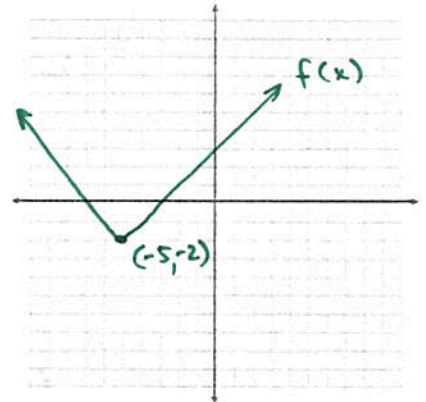

5. $h(x) = -3x - 2$

   Parent: $y = x$, LINEAR

   Transformations: reflect across x-axis
   vertical stretch by factor 3
   translate down 2 units

   $(0,-2)$

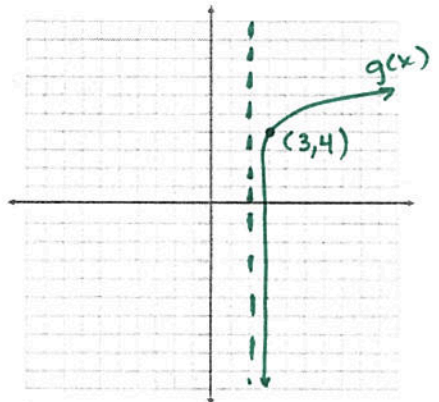6. $f(x) = |x + 5| - 2$

   Parent: $y = |x|$, ABSOLUTE VALUE

   Transformations: translate down 2 units
   and left 5 units

   $(-5,-2)$

7. $g(x) = \ln(x - 2) + 4$

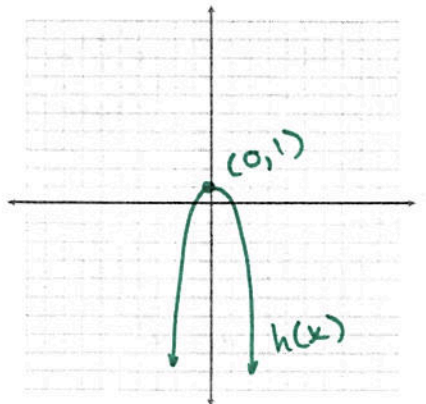   Parent: $y = \ln(x)$, NATURAL LOGARITHM

   Transformations: translate up 4 units
   and right 2 units
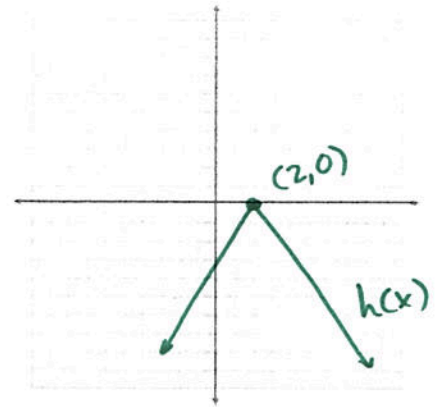
   $(3,4)$

8. $h(x) = -x^2 + 1$

   Parent: $y = x^2$, QUADRATIC

   Transformations: reflect across x-axis
   translate up 1 unit

   $(0,1)$

9. $h(x) = -|x - 2|$

Parent: __$y = |x|$__ , ABSOLUTE VALUE

Transformations: __reflect across x-axis__
__translate right 2 units__

(2,0)

h(x)

For problems 10 – 15, given the parent function and a description of the transformation, write the equation of the transformed function, $f(x)$.

10. Absolute value—vertical shift up 5, horizontal shift right 3. __$f(x) = |x - 3| + 5$__

11. Linear—vertical stretch/compression by $\dfrac{2}{5}$ __$f(x) = \dfrac{2}{5}x$__
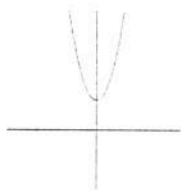
12. Root —flipped over the x-axis, vertical shift down 2. __$f(x) = -\sqrt{x} - 2$__
(reflected)

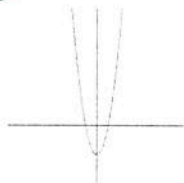13. Exponential—vertical stretch by 8 __$f(x) = 8e^x$__

14. Quadratic—vertical stretch by 5, horizontal shift left 8. __$f(x) = 5(x + 8)^2$__

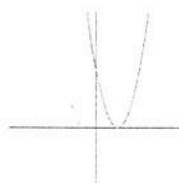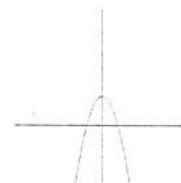15. Which graph best represents the function $f(x) = 2x^2 - 2$?

a.   (b.)   c.   d.

• translate
  down 2 units
• vertical stretch
  by factor of 2