U3D9   **TRANSFORMATIONS SUMMARY**

The base curve is: $y = f(x)$

- The new curve is:

$$y = af(b(x-h)) + k$$

If $a < 0$,
reflection
in x-axis

If $b < 0$, reflection
in the y-axis

If $h > 0$,
translation right
h units.

If $k > 0$,
translation up
k units.

If $|a| > 0$, vertical
stretch by a factor
of a

If $|b| > 1$,
horizontal
compression of
factor 1/b.

If $0 < |a| < 1$,
vertical
compression by
a factor of 'a'

If $0 < |b| < 1$,
horizontal stretch
of factor 1/b

If $h < 0$,
translation left
h units.

If $k < 0$,
translation down
k units.

To be successful on the test, you should be able to:
- describe transformations
- interpret function notation and create equations in function notation given descriptions OR the translated function
- write the new image equation if given transformation descriptions   OR   the translated function
- graph using transformations
  - → Draw the base curve first
  - → Stretch or compress and/or Reflect, then shift last
  - → Show all graphs needed to get to your final image. Full marks will only be given if the transition graphs are shown. Remember, some transitions can be combined as explained in class. Clearly label your final graph. Intermediate graphs (if used) need not be labeled.

  OR
  - → use table of values to determine new final key points and then graph.
- determine invariant points
- determine the inverse given a graph
- determine the inverse given an equation (and interpret whether the inverse is a function)
- determine the transformations given a graph of the original and final function

1. Consider $f(x) = x^2$.
   a) List the transformations in the order you would apply them to the function $f(x) = x^2$ to graph $y = -f(2x - 6) - 4$

      1.

      2.

      3.

      4.

   b) Graph the base function $f(x) = x^2$ and the transformed image. Show all work/graphs for full marks. Label the base function and the final graph.

   c) Write the image equation for the transformed function.
      $y =$

   d) State the domain and range of $y = -f(2x - 6) - 4$
      D: {   }   R: {   }

Given that the lighter object is f(x),
   a) Describe the transformations required to produce the **HEAVY** lined object

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   b) Give the correct function notation for the **HEAVY** lined object.