Math S-Xab Summer 2004
Handout: Transformation Rules
July 1, 2004

The following is a summary of the transformation rules discussed in Section 3.4.

1. $y = f(x) + a$ shifts the graph of $y = f(x)$ vertically by a units—up if $a > 0$ and down if $a < 0$.

2. $y = f(x - a)$ shifts the graph of $y = f(x)$ horizontally by a units—right if $a > 0$ and left if $a < 0$.

3. Assuming $a > 0$, $y = af(x)$ stretches the graph of $y = f(x)$ vertically by a factor of a if $a > 1$ and compresses the graph of $y = f(x)$ vertically by a factor of a if $a < 1$.

4. $y = -f(x)$ reflects the graph of $y = f(x)$ about the x-axis.

5. Assuming $a > 0$, $y = f(ax)$ compresses the graph of $y = f(x)$ horizontally by a factor of a if $a > 1$ and stretches the graph of $y = f(x)$ horizontally by a factor of $1/a$ if $a < 1$.

6. $y = f(-x)$ reflects the graph of $y = f(x)$ about the y-axis.

7. $y = |f(x)|$ leaves the portion of the graph of $y = f(x)$ above the x-axis unchanged, but reflects the portion below the x-axis across the x-axis.

8. See page 130 for a description of the effect of $y = \frac{1}{f(x)}$.