

Problem statement Suppose f is the function defined by $f(x) = |x - 1|$.

a) Sketch the graph of $y = f(x)$.

b) Sketch the graph of $y = (f \circ f)(x) = f(f(x))$.

c) Suppose g is the function defined by $g(x) = |x - 2| + |x + 3| - 2|x - 1|$. Sketch the graph of $y = g(x)$.

d) What can you conclude about the behavior of $g(x)$ when x is large positive? What about when x is large negative? Verify your assertions using algebra.

Suggestion: Work on the intervals $(-\infty, -3]$ and $[2, \infty)$ and get algebraic formulas for $g(x)$ on each interval which do not involve absolute value.