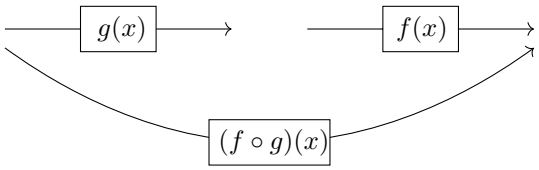
MATH 2A/5A Prep: Composition of Functions

Facts to Know:

$f(x)$ and $g(x)$ are functions, then the composition $f \circ g$ is defined by:

$(f \circ g)(x) =$

Diagram explanation: for example, take $f(x) = \sqrt{x}$, $g(x) = 3x + 1$,



Examples:

1. Let $f(x) = e^x$, $g(x) = x^2 - 1$. Find the functions $f(g(x))$ and $g(f(x))$, then find $f(g(1))$ and $g(f(1))$.

2. Let $F(x) = \ln(e^x + 1)$. Write $F(x)$ in terms of the elementary functions e^x, $\ln(x)$ and $mx + b$, and function composition.

3. Let $f(x) = 2x^2 + 3x + 1$, simplify the expression $\dfrac{f(x+2) - f(x)}{2}$.