

## EX 2.2

$$29. (f \circ g)(x) = f(g(x)) = f\left(\frac{1}{x}\right) = \frac{1}{x} \div \left(\frac{1}{x^2} + 1\right) = \frac{1}{x} \cdot \frac{x^2}{x^2 + 1} = \frac{x}{x^2 + 1}.$$

$$(g \circ f)(x) = g(f(x)) = g\left(\frac{x}{x^2 + 1}\right) = \frac{x^2 + 1}{x}.$$

$$32. h(2) = g[f(2)]. \text{ But } f(2) = (2^2 - 1)^{1/3} = 3^{1/3}, \text{ so} \\ h(2) = g(3^{1/3}) = 3(3^{1/3})^3 + 1 = 3(3) + 1 = 10.$$

$$51. \frac{f(a+h) - f(a)}{h} = \frac{\frac{1}{a+h} - \frac{1}{a}}{h} = \frac{\frac{a - (a+h)}{a(a+h)}}{h} = -\frac{1}{a(a+h)}.$$

$$52. \frac{f(a+h) - f(a)}{h} = \frac{\sqrt{a+h} - \sqrt{a}}{h} \cdot \frac{(\sqrt{a+h} + \sqrt{a})}{(\sqrt{a+h} + \sqrt{a})} = \frac{(a+h) - a}{h(\sqrt{a+h} + \sqrt{a})} = \frac{1}{\sqrt{a+h} + \sqrt{a}}$$