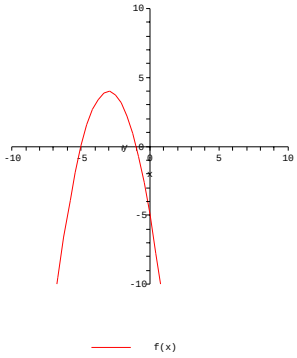
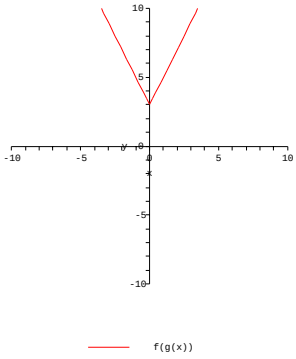
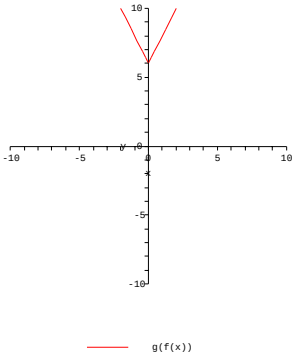
1.



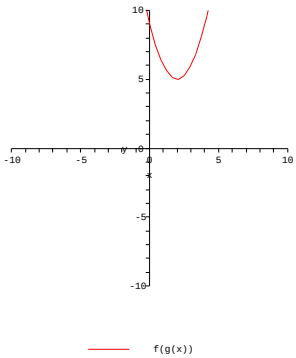
2. $(f \cdot g(x) = \frac{(x+3)^2}{x}$, $(f - g)(x) = \frac{1}{x} - (x+3)^2$, $f \circ g(5) = \frac{1}{64}$

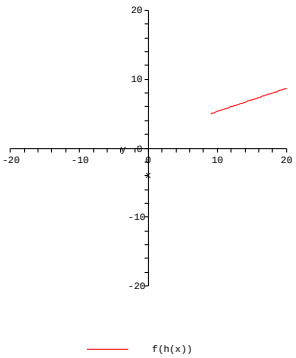
3. $f(g(x)) = |2x| + 3$, $g(f(x)) = 2(|x| + 3)$





4. $f \circ g(x) = (x-2)^2 + 5$, $f \circ h = \frac{1}{3}x + 2$ with domain $x \geq 9$.





5. $f^{-1}(x) = \frac{x^2-5}{4}$ with domain all x such that $x \leq 0$.

6. $f^{-1}(x) = \sqrt[3]{x-1}$, $f^{-1}(x) = (\frac{1}{y})^2 - 1$, $f^{-1}(x) = \begin{cases} x+2 & x < -2 \\ \sqrt{x} & x \geq 0 \end{cases}$

7. $\frac{\pi}{12}$, $\frac{5\pi}{12}$

8. (a) $\frac{\ln 3}{\ln 2} + 5$, (b) $\frac{1+\sqrt{1+4e}}{2}$, (c) e^2 and e^{-1}, (d) -1, (e) 5 and 2.

9. (a) -5, (b) DNE, (c) DNE (d) 0 (e) 0 (f) $\sqrt{14}$.