

Inverses Day 2

State if the given functions are inverses.

1) $f(x) = \sqrt[5]{x+3}$
 $h(x) = x^5 - 3$
 $f \circ h = \sqrt[5]{(x^5 - 3) + 3} = \sqrt[5]{x^5} = x$
 $h \circ f = (x+3)^5 - 3$
yes

2) $g(x) = \frac{-10 - 3x}{2}$
 $f(x) = -4x - 4$
 $y = -4x - 4$
 $x = \frac{-y - 4}{4}$
 $f^{-1}(x) = \frac{-x - 4}{4}$
NOT INVERSES

3) $g(x) = \frac{1}{x+1}$
 $f(x) = \frac{2}{x-1}$
NOT INVERSES
 $y = \frac{2}{x-1} \rightarrow y(x-1) = 2$
 $x-1 = \frac{2}{y} \rightarrow x = \frac{2}{y} + 1$
 $f^{-1}(x) = \frac{2}{x} + 1$

4) $f(x) = 2 - \frac{5}{3}x$
 $g(x) = -\frac{3}{5}x + \frac{6}{5}$
yes
 $y = 2 - \frac{5}{3}x \rightarrow \frac{5}{3}x = 2 - y$
 $x = \frac{3}{5}(2 - y) = \frac{6}{5} - \frac{3}{5}y$
 $f^{-1}(x) = \frac{6}{5} - \frac{3}{5}x$

5) $g(x) = \sqrt[5]{\frac{x+3}{2}}$
 $f(x) = -3 + 2x^5$
yes
 $y = -3 + 2x^5 \rightarrow y + 3 = 2x^5$
 $x^5 = \frac{y+3}{2} \rightarrow x = \sqrt[5]{\frac{y+3}{2}}$
 $f^{-1}(x) = \sqrt[5]{\frac{x+3}{2}}$

6) $f(x) = \frac{x+35}{10}$
 $g(x) = 10x - 35$
yes
 $y = \frac{x+35}{10} \rightarrow 10y = x+35$
 $x = 10y - 35$
 $f^{-1}(x) = \frac{x+35}{10}$

7) $g(x) = \frac{1}{x+2} - 1$
 $f(x) = \frac{1}{x+1} - 2$
yes
 $y = \frac{1}{x+1} - 2 \rightarrow y + 2 = \frac{1}{x+1}$
 $x+1 = \frac{1}{y+2} \rightarrow x = \frac{1}{y+2} - 1$
 $f^{-1}(x) = \frac{1}{x+2} - 1$

8) $g(x) = \frac{4}{x+3} + 1$
 $f(x) = \frac{4}{x-1} - 3$
yes
 $y = \frac{4}{x-1} - 3 \rightarrow y + 3 = \frac{4}{x-1}$
 $x-1 = \frac{4}{y+3} \rightarrow x = \frac{4}{y+3} + 1$
 $f^{-1}(x) = \frac{4}{x+3} + 1$

