U4 Day 2 HW - Finding the Inverse Algebraically KEY

In these problems, determine whether f(x) is one-to-one. If it is not, restrict the domain so that $f^{-1}(x)$ is one-to-one. **Give the restricted domain and the range. Then find $f^{-1}(x)$ and write its domain and range.**

1. $f(x) = -4x - 3$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

$f(x) = -4x - 3$

$f^{-1}(x) = \frac{x-3}{4}$ or $-\frac{1}{4}x - \frac{3}{4}$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

2. $f(x) = \frac{5}{x-2}$

D: $(-\infty, 2) \cup (2, \infty)$

R: $(-\infty, 0) \cup (0, \infty)$

$f(x) = \frac{5}{x-2}$

$f^{-1}(x) = \frac{2x+5}{x}$

D: $(-\infty, 0) \cup (0, \infty)$

R: $(-\infty, 2) \cup (2, \infty)$

Ex. $f(x) = \sqrt{x-1} + 3$

D: $[1, \infty)$

R: $[3, \infty)$

$f(x) = \sqrt{x-1} + 3$

$f^{-1}(x) = x^2 - 6x + 10$

D: $[3, \infty)$

R: $[1, \infty)$

Ex. $f(x) = -3\sqrt[3]{x+2}$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

$f(x) = -3\sqrt[3]{x+2}$

$f^{-1}(x) = \frac{-x^3}{27} - 2$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

Ex. $f(x) = -2(x-3)^2 - 4$

D: $[3, \infty)$

R: $(-\infty, -4)$

V: $(3, -4)$

$f(x) = -2(x-3)^2 - 4$

$f^{-1}(x) = \sqrt{\frac{-x-4}{2}} + 3$

D: $(-\infty, -4]$

R: $[3, \infty)$

Ex. $f(x) = (x+6)^3 + 7$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

$f(x) = (x+6)^3 + 7$

$f^{-1}(x) = \sqrt[3]{x-7} - 6$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

Ex. $f(x) = \frac{x}{x+3}$

D: $(-\infty, -3) \cup (-3, \infty)$

R: $(-\infty, 1) \cup (1, \infty)$

$f(x) = \frac{x}{x+3}$

$f^{-1}(x) = \frac{-3x}{x-1}$

D: $(-\infty, 1) \cup (1, \infty)$

R: $(-\infty, -3) \cup (-3, \infty)$