Problems

In the first four graphing problems below, you already graphed the given functions in the exercises for Section 4.6. Here I'm asking you to graph the inverse function.
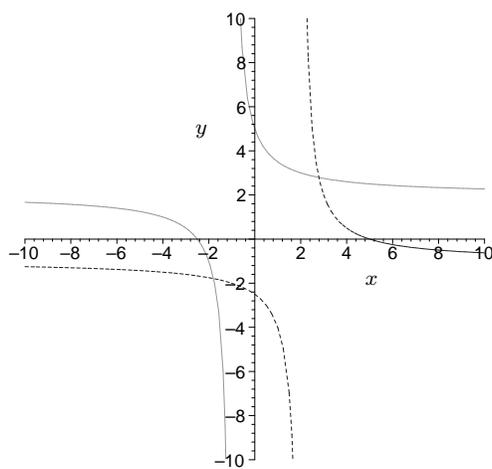
1. Graph $f(x) = \dfrac{3}{x-2} - 1$ and its inverse.

2. Graph $f(x) = 1 + \sqrt{2 - x}$ and its inverse.

3. Graph $f(x) = \dfrac{1}{x+1} + 2$ and $f^{-1}(x)$.

4. Graph $f(x) = (x-1)^3 + 2$ and $f^{-1}(x)$.

5. Does $f(x) = \dfrac{-3}{(x+4)^4}$ have an inverse? Explain.

6. Does $f(x) = (x-2)^{-5} + 1$ have an inverse? Explain.

For the following functions $f(x)$ find $f^{-1}(x)$, the domain of f and the range of f:

1. $f(x) = \dfrac{x+4}{2x-7}$.

2. $f(x) = (2 - 5x)^{-1/3}$.
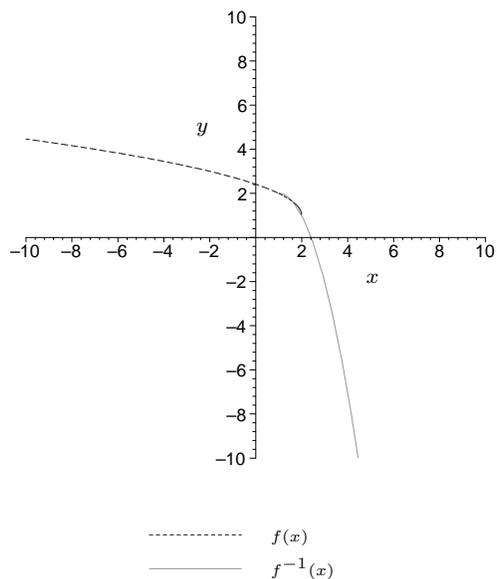
3. $f(x) = \dfrac{6 - 7x}{1 + 3x}$.

Answers

1.

PSfrag replacements

$f(x)$
$f^{-1}(x)$

2.

$$---------- \quad f(x)$$
$$———— \quad f^{-1}(x)$$

PSfrag replacements

3.

$$---------- \quad f(x)$$
$$———— \quad f^{-1}(x)$$

PSfrag replacements

4.

PSfrag replacements

- - - - - - - - - - - - $f(x)$

——————— $f^{-1}(x)$
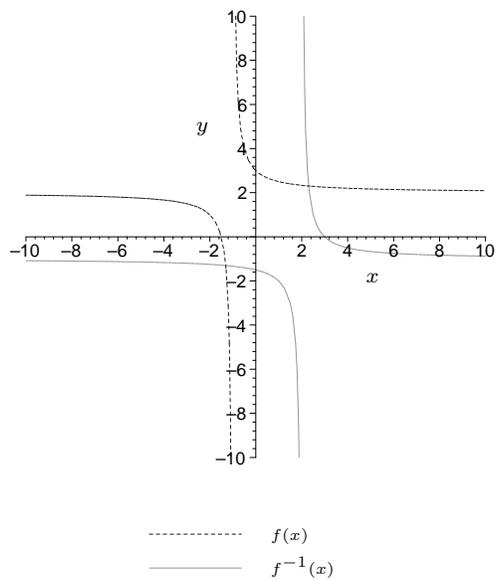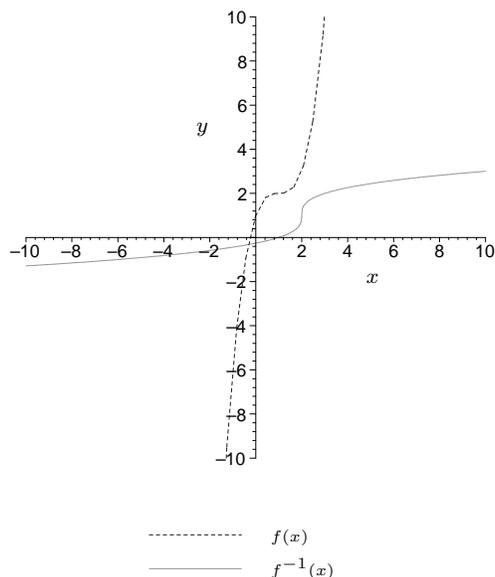
5. No; fails horizontal line test.

6. Yes; passes horizontal line test.

7. $f^{-1}(x) = \dfrac{7x + 4}{2x - 1}$; all real $x \neq 7/2$; all real $y \neq 1/2$.

8. $f^{-1}(x) = \dfrac{2}{5} - \dfrac{1}{5x^3}$; all real $x \neq 2/5$; all real $y \neq 0$.

9. $f^{-1}(x) = -\dfrac{x - 6}{3x + 7}$; all real $x \neq -1/3$; all real $y \neq -7/3$.