

①  $f(x) = 6x$        $f(f^{-1}(x)) = 6\left(\frac{x}{6}\right) = x$   
 $f^{-1}(x) = \frac{x}{6}$        $f^{-1}(f(x)) = \frac{6x}{6} = x$

41  
49  
53  
§ 1.9

③  $f(x) = x + 9$        $f(f^{-1}(x)) = (x-9) + 9 = x$   
 $f^{-1}(x) = x - 9$        $f^{-1}(f(x)) = (x+9) - 9 = x$

⑬  $f(x) = 2x$        $g(x) = \frac{x}{2}$   
 $f(g(x)) = 2\left(\frac{x}{2}\right) = x$   
 $g(f(x)) = \frac{2x}{2} = x$

⑮  $f(x) = 7x + 1$        $g(x) = \frac{x-1}{7}$   
 $f(g(x)) = 7\left(\frac{x-1}{7}\right) + 1 = x$   
 $g(f(x)) = \frac{(7x+1)-1}{7} = x$

⑰  $f(x) = \frac{x^3}{8}$        $g(x) = \sqrt[3]{8x}$   
 $f(g(x)) = \frac{(\sqrt[3]{8x})^3}{8} = x$   
 $g(f(x)) = \sqrt[3]{8\left(\frac{x^3}{8}\right)} = \sqrt[3]{x^3} = x$

⑲  $f(x) = \sqrt{x-4}$        $g(x) = x^2 + 4$   
 $f(g(x)) = \sqrt{(x^2+4)-4} = \sqrt{x^2} = x$   
 $g(f(x)) = (\sqrt{x-4})^2 + 4 = x$

21)  $f(x) = 9 - x^2, x \geq 0$      $g(x) = \sqrt{9-x}, x \leq 9$

$f(g(x)) = 9 - (\sqrt{9-x})^2 = 9 - (9-x) = x$

$g(f(x)) = \sqrt{9 - (9-x^2)} = \sqrt{x^2} = x$

23)  $f(x) = \frac{x-1}{x+5}$      $g(x) = -\frac{5x+1}{x-1}$

$f(g(x)) = \frac{\left(-\frac{5x+1}{x-1}\right) - 1}{\left(-\frac{5x+1}{x-1}\right) + 5} = \frac{-5x-1-x+1}{-5x-1+5x-5} = \frac{-6x}{-6} = x$

$g(f(x)) = -\frac{\left(5\left(\frac{x-1}{x+5}\right) + 1\right)}{\left(\frac{x-1}{x+5}\right) - 1} = \frac{-5x+5-x-5}{x-1-1-5} = \frac{-6x}{-6} = x$

25) NO, not 1-1

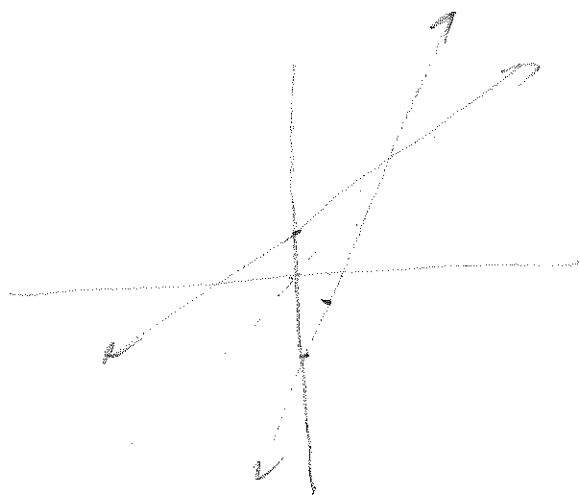
29) YES

31) NO

39)  $f(x) = 2x - 3$

$x = 2y - 3$

$\frac{x+3}{2} = y$



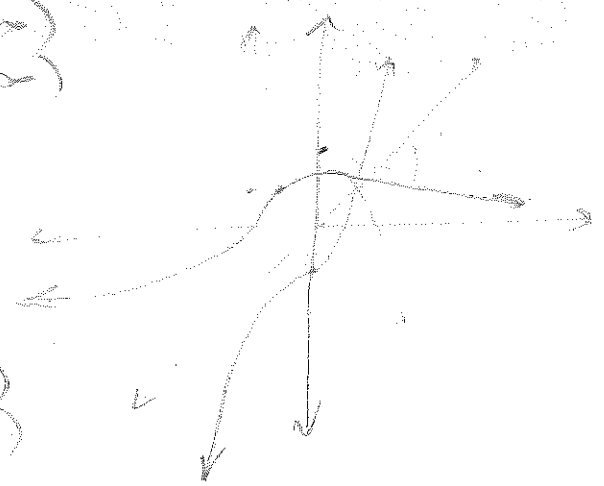
$f(x)$  D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

$f^{-1}(x)$  D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

41)  $f(x) = x^5 - 2$      $D: (-\infty, \infty)$   
 $R: (-\infty, \infty)$

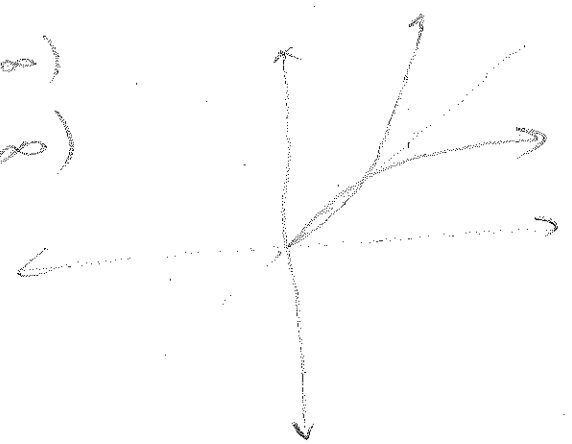
~~$x = y^5 - 2$~~   
 ~~$y^5 = x + 2$~~   
 ~~$f^{-1}(x) = \sqrt[5]{x+2}$~~

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



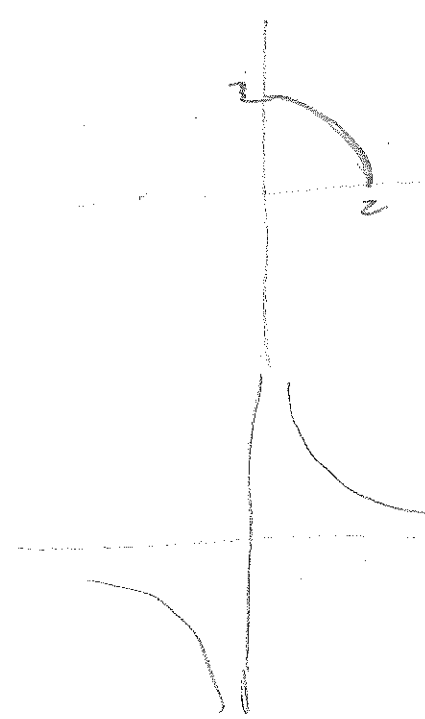
43)  $f(x) = \sqrt{x}$      $D: [0, \infty)$   
 $R: [0, \infty)$

$x = y^2$   
 $f^{-1}(x) = x^2, x \geq 0$   
 $D: [0, \infty)$   
 $R: [0, \infty)$



45)  $f(x) = \sqrt{4-x^2}, 0 \leq x \leq 2$

$x = \sqrt{4-y^2}$   
 $y^2 = 4-x^2$   
 $f^{-1}(x) = \sqrt{4-x^2}, 0 \leq x \leq 2$



47)  $f(x) = \frac{9}{x} \{x|x \neq 0\}$

$x = \frac{9}{y}$   
 $f^{-1}(x) = \frac{9}{x} \{x|x \neq 0\}$



$$(49) f(x) = \frac{x+1}{x-2} \quad \{x | x \neq 2\}$$

~~$$x = \frac{y+1}{y-2}$$~~

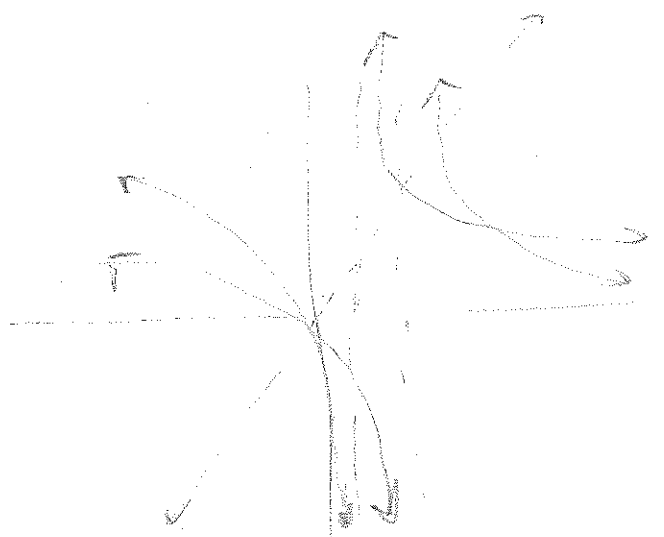
$$x(y-2) = y+1$$

$$xy - 2x = y+1$$

$$xy - y = 2x+1$$

$$y(x-1) = 2x+1$$

$$f^{-1}(x) = \frac{2x+1}{x-1} \quad \{x | x \neq 1\}$$

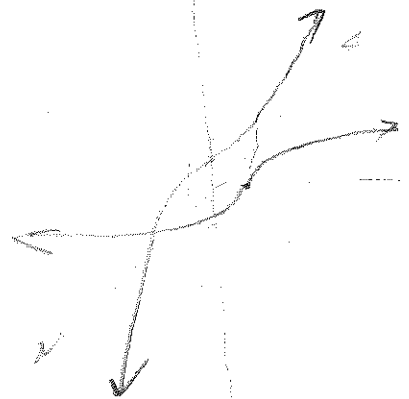


$$(51) f(x) = \sqrt[3]{x-1} \quad \{x | x \in \mathbb{R}\}$$

$$x = \sqrt[3]{y-1}$$

$$x^3 = y-1$$

$$f^{-1}(x) = x^3 + 1 \quad \{x | x \in \mathbb{R}\}$$



$$(53) f(x) = \frac{6x+4}{4x+5} \quad \{x | x \neq -\frac{5}{4}\}$$

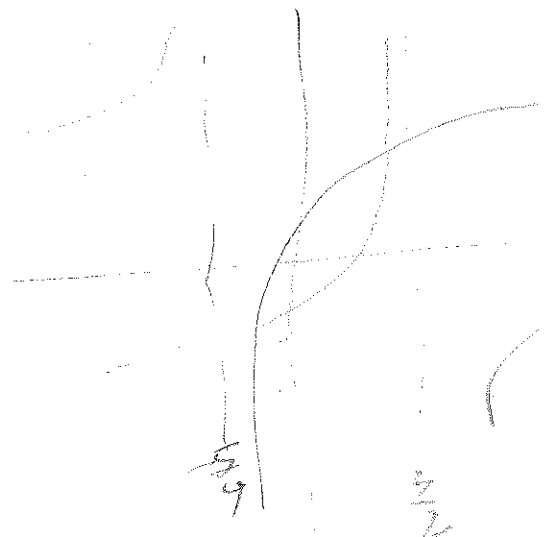
~~$$x = \frac{6y+4}{4y+5}$$~~

$$4xy + 5x = 6y + 4$$

$$4xy - 6y = 4 - 5x$$

$$f^{-1}(x) = \frac{4-5x}{4x-6}$$

$$\{x | x \neq \frac{3}{2}\}$$



55)  $f(x) = x^4$  NO inverse not 1-1

57)  $g(x) = \frac{x}{8}$

$x = \frac{y}{8}$

$g^{-1}(y) = 8x$

65)  $h(x) = -\frac{4}{x^2}$  NO inverse not 1-1

67)  $f(x) = \sqrt{2x+3}$   $D: \{x \mid x \geq -\frac{3}{2}\}$   
 $R: \{x \mid x \geq 0\}$

$x = \sqrt{2y+3}$

$2y = x^2 - 3$

$f^{-1}(y) = \frac{x^2 - 3}{2}, x \geq 0$