inverse of a fcn

$$f(x) = \{ (3,1), (2,5), (-6,1) \}$$

$$f^{-1}(x) = \{ (1,3), (5,2), (1,-6) \}$$

$$f(x) = 3x + 5$$

$$y = 3x + 5$$

$$x = 3y + 5$$

$$x - 5 = 3y$$

$$\frac{x-5}{3} = y \rightarrow f^{-1}(x) = \frac{x-5}{3}$$

$f(x) = x^2 + 3$ $\qquad x \geq 0$

$y = x^2 + 3$

$x = y^2 + 3$

$x - 3 = y^2$

$\pm\sqrt{x-3} = y$ $\qquad y \geq 0$

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

$$f(x) = \frac{2x-3}{x+5}$$

$$y = \frac{2x-3}{x+5}$$

$$\frac{x}{1} = \frac{2y-3}{y+5}$$

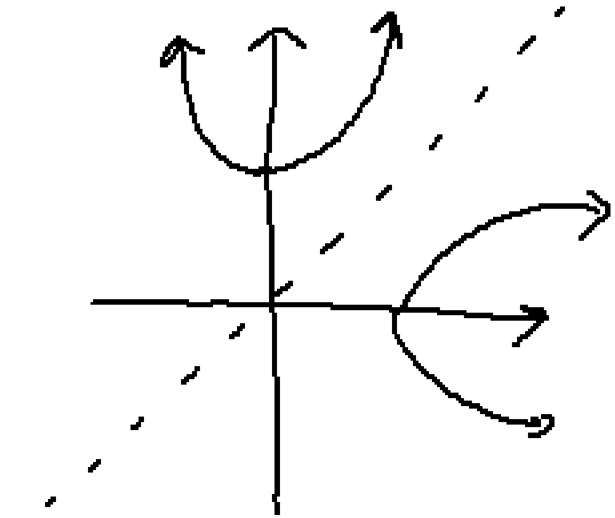
$$x(y+5) = 2y-3$$

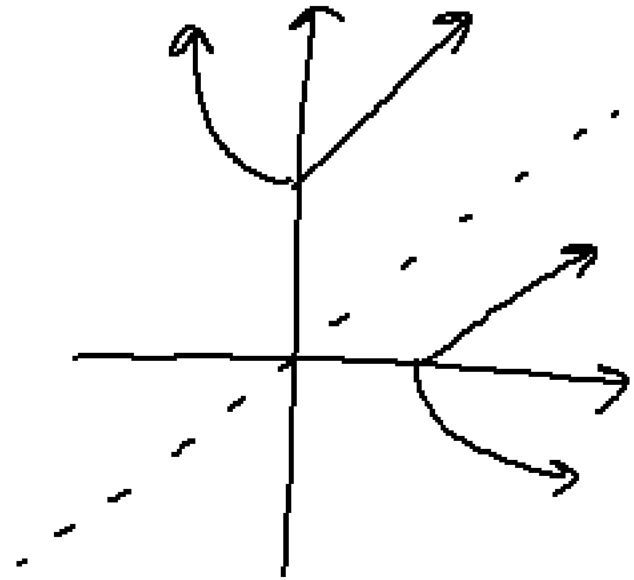
$$xy + 5x = 2y - 3$$

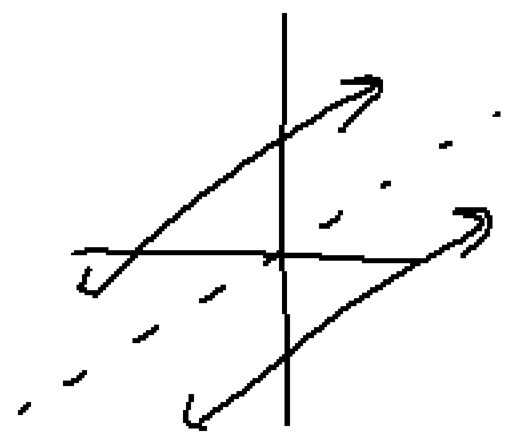
$$xy - 2y = {}^{-}5x - 3$$

$$y(x-2) = {}^{-}5x - 3$$

$$y = \frac{{}^{-}5x-3}{x-2}$$







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

$$y = \sqrt{x-2}$$

$$x = \sqrt{y-2}$$

$$x^2 = y-2$$

$$x^2 + 2 = y$$

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

$$\left(f^{-1}(x)\right)' = 2x$$

$$(f^{-1})'(2) = 2(2) = 4$$

Find $(f^{-1})'(2)$

"the theorem"

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

$$\sqrt{x-2} - 2 = 0$$

$$f(x) = (x-2)^{1/2} \qquad x = 6$$

$$f'(x) = \tfrac{1}{2}(x-2)^{-1/2}$$

$$= \frac{1}{2(x-2)^{1/2}} \text{ or } \frac{1}{2\sqrt{x-2}}$$

$$f'(6) = \frac{1}{2\sqrt{6-2}} = \frac{1}{4}$$

4

$f(x) = x^5 - x^3 + 2x$ find $(f^{-1})'(2)$

$$x^5 - x^3 + 2x = 2$$
$$x^5 - x^3 + 2x - 2 = 0$$
$$x = 1$$

$$f'(x) = 5x^4 - 3x^2 + 2$$

$$f'(1) = 4$$

$$\frac{1}{4}$$

$f(x) = 2x + \cos x$ find $(f^{-1})'(1)$

$2x + \cos x - 1 = 0$

$x = 0$

$f'(x) = 2 - \sin x$

$f'(0) = 2 - 0 = 2$

$\frac{1}{2}$

6.24 E -15

6.24×10^{-15}

p347 #15, 19, 29, 37, 71, 75