Pre-calc Revisiting Sections 1.4,1.5 Name (Key)

1. **Given the following graph, find:**

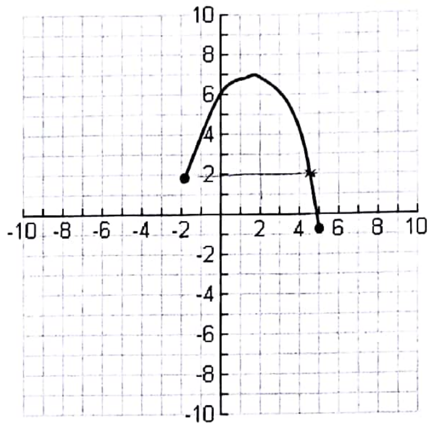
a. $f(0) =$ 6

b. Find x if $f(x) = 2$ $x = -2, \; x = 4.5$

c. Domain: $[-2, 5]$

d. Range: $[-1, 7]$

e. Intervals of x where the function is increasing $(-2, 1.9)$



2. For the function, $f(x) = \sqrt{x+7}$, answer the following questions.

a) What is the domain of f(x) (use interval notation)? $[-7, \infty)$

b) What is the range of f(x) (use interval notation)? $[0, \infty)$

c) Find the inverse of the function, $f^{-1}(x)$

$y^2 = \sqrt{x+7}^{\,2}$

$y^2 = x + 7$

$y^2 - 7 = x$

$f^{-1}(y) = y^2 - 7$

$f^{-1}(x) = x^2 - 7$

d) What is the domain of the inverse of the function, $f^{-1}(x)$?

$\rightarrow$ range of f

$[0, \infty)$

3. Find the inverse of the function, $f^{-1}(x)$ if $f(x) = \dfrac{5x+2}{x-1}$.

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

$y(x-1) = 5x + 2$

$xy - y = 5x + 2$

$xy - 5x = y + 2$

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

$x = \dfrac{y+2}{y-5}$

$f^{-1}(y) = \dfrac{y+2}{y-5}$

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

4. Find f(g(x)) and find g(f(x)) using the functions,

$f(x) = x^2 - 5$ $g(x) = \sqrt{x+3}$

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

$\sqrt{x+3}^{\,2} - 5 = x + 3 - 5 = \boxed{x - 2}$

$g(f(x))$

$g(x^2 - 5) = \sqrt{x^2 - 5 + 3} = \boxed{\sqrt{x^2 - 2}}$

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* Domain of f^{-1} is Range of f

5. Find the domain of each function. Then, solve each equation for x. Once each equation is solved for x, write the inverse of the function using proper function notation. Find the domain of the inverse.

a) $y = 3x - 6$ D: $(-\infty, \infty)$

$y + 6 = 3x$

$\frac{y+6}{3} = x$

$f^{-1}(y) = \frac{y+6}{3}$

D of f^{-1} $(-\infty, \infty)$

b) $y = x^2 - 6$ D: $(-\infty, \infty)$ R: $[-6, \infty)$

$y + 6 = x^2$

$\sqrt{y+6} = x$

$f^{-1}(y) = \sqrt{y+6}$

D of f^{-1} $[-6, \infty)$

c) $y = \frac{4x-3}{x+2}$

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

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

D of f^{-1}

$y(x+2) = 4x - 3$

$xy + 2y = 4x - 3$

$xy - 4x = -2y - 3$

$x(y-4) = -2y - 3$

$x = \frac{-2y-3}{y-4}$

$f^{-1}(y) = \frac{-2y-3}{y-4}$

d) $y = \frac{2x+1}{x-4}$

D: $(-\infty, 4) \cup (4, \infty)$

$y(x-4) = 2x + 1$

$xy - 4y = 2x + 1$

$xy - 2x = 4y + 1$

$x(y-2) = 4y + 1$

$x = \frac{4y+1}{y-2}$

$f^{-1}(y) = \frac{4y+1}{y-2}$

D of f^{-1}

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

e) $y = \frac{4x+3}{3x-1}$ D $(-\infty, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$

$y(3x-1) = 4x + 3$

$3xy - y = 4x + 3$

$3xy - 4x = y + 3$

$x(3y-4) = y + 3$

$x = \frac{y+3}{3y \cancel{+} 4}$

$f^{-1}(y) = \frac{y+3}{3y-4}$

D of f^{-1}

$(-\infty, \frac{4}{3}) \cup (\frac{4}{3}, \infty)$

f) $y = \sqrt{x+3}^{\,2}$ D: $[-3, \infty)$

$y^2 = x + 3$

$y^2 - 3 = x$

$f^{-1}(y) = y^2 - 3$

D of f^{-1} = $[0, \infty)$

(Range of f)