

3.3 Identify, Constant, and Inverse Functions NOTES

Identity Function: a function whose output is identical to the input

$$f(x) = x \quad \text{or} \quad y = x \quad \text{or} \quad S(r) = r$$

Constant Function: a function whose output values are the same for all elements of the functions domain

$$f(x) = 32 \quad \text{or} \quad y = 3 \quad \text{or} \quad g(x) = 7$$

Ex 1: The family fun center has a special birthday offer for children under the age of 18. The birthday child gets the same number of game tokens as his or her age for free. Write a function to model this situation. Describe the type of function.

$g(x)$: total coins
 x : age (under 18)

$$g(x) = x \quad \text{Identity function}$$

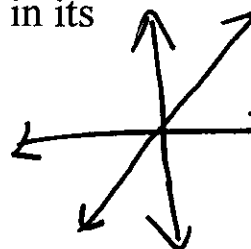
Practice: The atmospheric pressure at sea level is about 14.7 psi. Write a function to model the atmospheric pressure. Describe the type of function.

$$p(x) = 14.7 \quad \text{Constant function}$$

Inverse Function: if f maps an element a from its domain to an element b in its range, then f^{-1} maps back from b to a .

So, the domain of f is the range of f^{-1}
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*the graph of a function and its inverse will be symmetric across the line $y=x$



Ex 2: Find the inverse of $V = \frac{4}{3}\pi r^3$. Then use the inverse to approximate the radius of a soccer ball that has a volume of 8580 cm^3 .

Practice: Find the inverse of the function $y=5x+1$

Try...

① $x = 5y + 1$

②
$$\frac{x-1}{5} = \frac{5y}{5}$$

$$y = \frac{x}{5} - \frac{1}{5}$$

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

a)
$$g(x) = \sqrt[3]{x} - 3$$

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

b)
$$f(x) = \frac{7x+18}{2}$$

$$y = \frac{7x+18}{2}$$

Steps to find an inverse:

① flip x and y

② solve for y

③ Rewrite using inverse notation