

October 16, 2015

$$f(x) = x^3 + x^2$$

$$f(-x) = (-x)^3 + (-x)^2$$

$$= (-x)(-x)(-x) + (-x)(-x)$$

$$= -x^3 + x^2$$

$$= - (x^3 - x^2)$$

neither even or odd!

① If Even: $\rightarrow f(x)$

② If odd: $-f(x)$

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Inverse Functions

* Not all functions have inverses!

one-to-one

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$$f(x) = x^2 - 4$$

$$0 = (x+2)(x-2)$$

① $x = -2$

② $x = +2$

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$$f(x) = 5 - 4x^3$$

$$y = 5 - 4x^3$$

$$x = 5 - 4y^3$$

$$\frac{x-5}{-4} = \frac{-4y^3}{-4}$$

$$\sqrt[3]{\frac{x-5}{-4}} = \sqrt[3]{y^3}$$

$$\sqrt[3]{-\frac{x-5}{4}} = y$$

$$y = \sqrt[3]{-\frac{x-5}{4}}$$

$$f^{-1}(x) = \sqrt[3]{-\frac{x-5}{4}}$$

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$$f(x) = \frac{1}{x+2}$$

$x \neq -2$

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

$$x = \frac{1}{y+2} \text{ solve for } y$$

$$\frac{(y+2) \cdot x}{1} = \frac{1}{y+2} \cdot \frac{y+2}{1}$$

$$\frac{(y+2)x}{x} = \frac{1}{x}$$

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

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

$$f^{-1}(x) = \frac{1}{x} - 2; x \neq 0$$

$$= \frac{1-2x}{x}$$

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$$f(x) = 3x \quad \& \quad g(x) = \frac{x}{3}$$

Are they inverses
of each other?

$$(f \circ g)(x) = \frac{3 \cdot \frac{x}{3}}{1} = x$$

$$(g \circ f)(x) = \frac{3x}{3} = x$$

equal

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$$f(x) = 2x - 5 \quad \& \quad g(x) = \frac{x+5}{2}$$

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