

Operations with Functions

Sept 22/2014

Two functions with the same domain can be added, subtracted, or multiplied to create a new function. The new function will have the same domain, but other properties may change.

- (1) Given a graph, or points, match x-values and perform the arithmetic operation on the y-values.
- (2) Given an equation, apply the operation algebraically, and simplify where possible.

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Recall:

(1) An even function has reflective symmetry with respect to the y-axis.

$$f(x) = f(-x)$$

(2) An odd function has rotational symmetry with respect to the origin.

$$f(x) = -f(-x)$$

or

$$-f(x) = f(-x)$$

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Ex. 3. f is even, g is odd.

(a) same as Ex. 1.

(b) $h(x) = f(x) + g(x)$

$$\begin{aligned} h(-x) &= \underbrace{f(-x)}_{\text{even}} + \underbrace{g(-x)}_{\text{odd}} \longrightarrow \begin{array}{l} g(x) = -g(-x) \\ \text{OR} \\ g(-x) = -g(x) \end{array} \\ &= f(x) + [-g(x)] \\ &= f(x) - g(x) \\ &\neq h(x) \Rightarrow \text{not even} \end{aligned}$$

$$\begin{aligned} -h(-x) &= -[f(x) - g(x)] \\ &= -f(x) + g(x) \end{aligned}$$

$$\neq h(x) \Rightarrow \text{not odd}$$

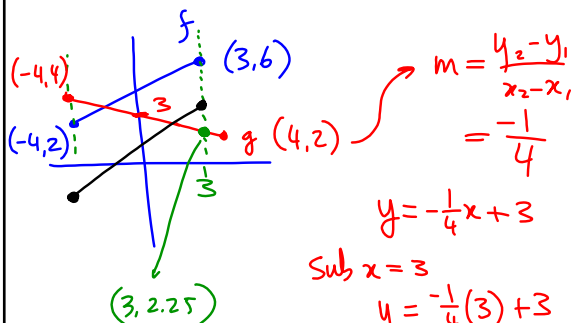
\therefore even + odd (or odd + even)
is neither.

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Assigned Work:

p.57 # 2, 3, 4, 5, 6
b b c

3(b) $f - g$
y-values for the same x



$$y = -\frac{1}{4}x + 3$$

Sub $x = 3$

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

$$\begin{aligned} f - g: (3, 6 - 2.25) &= 2\frac{1}{4} \\ &= (3, 3.75) = \frac{9}{4} \end{aligned}$$

$$(-4, 2 - 4) = (-4, -2)$$

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