

Unit 7: Combinations of FunctionsSums & Differences of Functions

Dec. 14

Sum: $h(x) = f(x) + g(x)$

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

"f plus g of x"

Difference: $(f - g)(x) = f(x) - g(x)$

"f minus g of x"

To graph, pick an x-value and determine y-values for each function, then add or subtract the y-values.

Algebraically, combine the two functions, simplifying where possible.

Jan 5-8:11 PM

Functions can only be combined for x-values which are valid for both functions. This is where the domains of both functions overlap, which is called the intersection of the domains.

$$D_{f+g} = D_f \cap D_g$$

↖ "intersects"

Ex.1 Given $f = \{(1, 3), (2, -5), (3, 7)\}$

$$g = \{(2, -2), (3, 3), (4, 1)\}$$

(a) determine the domain of each function.

(b) determine the domain of $f + g$.

(c) determine $f + g$.

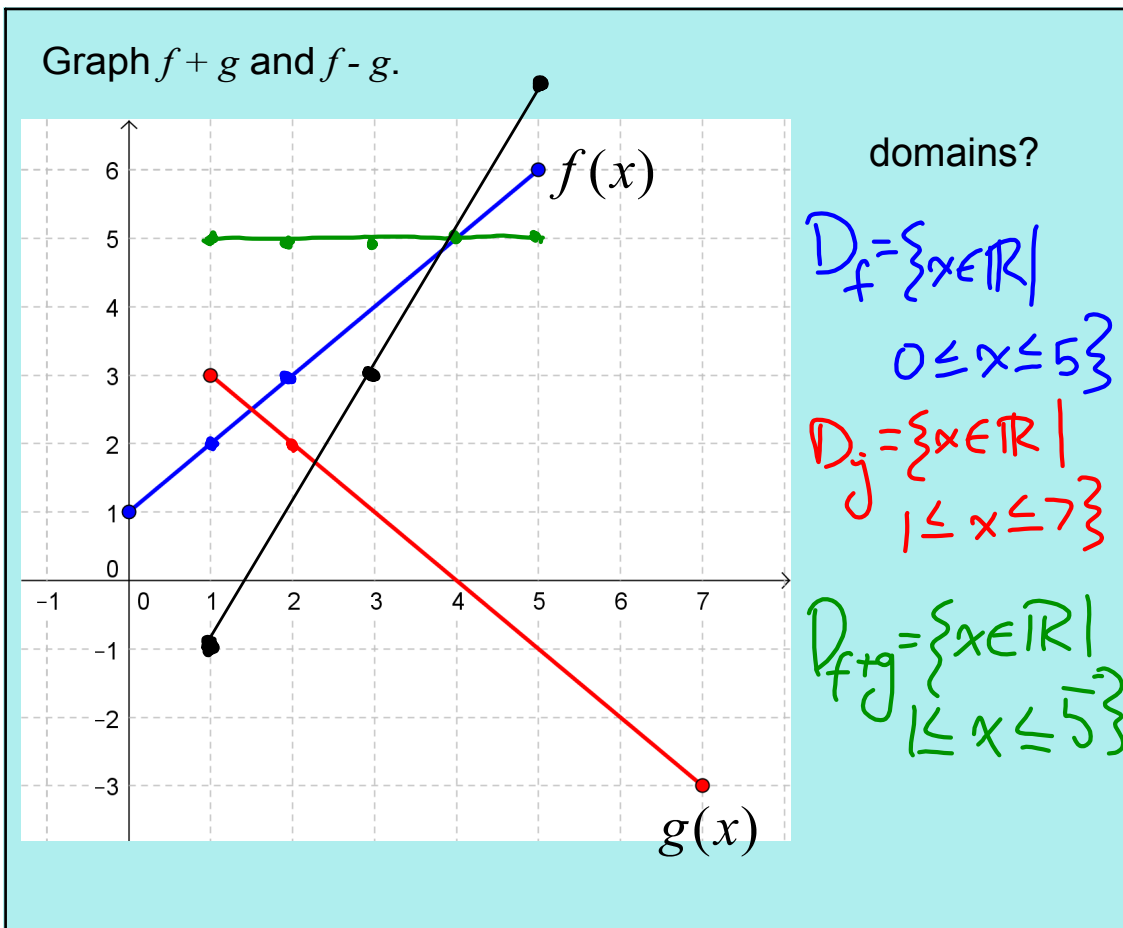
$$D_f = \{1, 2, 3\}$$

$$D_g = \{2, 3, 4\}$$

$$D_{f+g} = \{2, 3\}$$

$$(f+g) = \{(2, -7), (3, 10)\}$$

Jan 6-8:57 AM



Ex.2 Given $D_f = \{x \in \mathbb{R} \mid x > 0\}$

$D_g = \{x \in \mathbb{R} \mid x \leq 5\}$

(a) represent each domain on a number line.

(b) represent the domain of $f - g$ on the same line.

(c) represent the domain of $f - g$ using set notation.

$D_{f-g} = \{x \in \mathbb{R} \mid 0 < x \leq 5\}$

$= x \in (0, 5]$

Jan 6-10:45 AM

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

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

Jan 6-10:53 AM

Assigned Work:

p.528 # 1ace, 2, 3, 5, 7, 9acef, 10, 11

$$10.(a) \quad \underbrace{f(x) = f(-x)}_{\text{even}} \quad \underbrace{g(x) = g(-x)}_{\text{even}}$$

$$\text{define: } h(x) = f(x) + g(x)$$

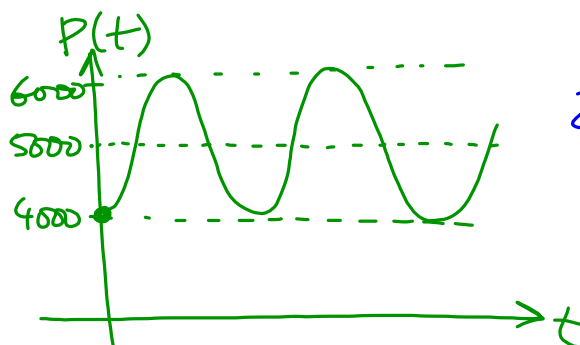
$$\begin{aligned} h(-x) &= f(-x) + g(-x) \\ &= f(x) + g(x) \\ &= h(x) \end{aligned}$$

$\therefore h(x)$ is even

Jan 6-9:35 AM

$$11. (a) P(t) = 5000 - 1000 \cos\left(\frac{\pi}{6}t\right) - 25t$$

(b) set $P(t) = 0$, solve for t

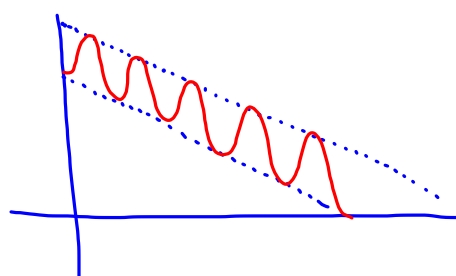


$$25t = 4000$$

$$t = \frac{4000}{25}$$

$$t = 160$$

time for
it to be
possible
to have
extinction



Dec 19-12:39 PM