Unit 7: Combinations of Functions
Sums & Differences of Functions   *Dec 20/2018*

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.

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

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

— intersection

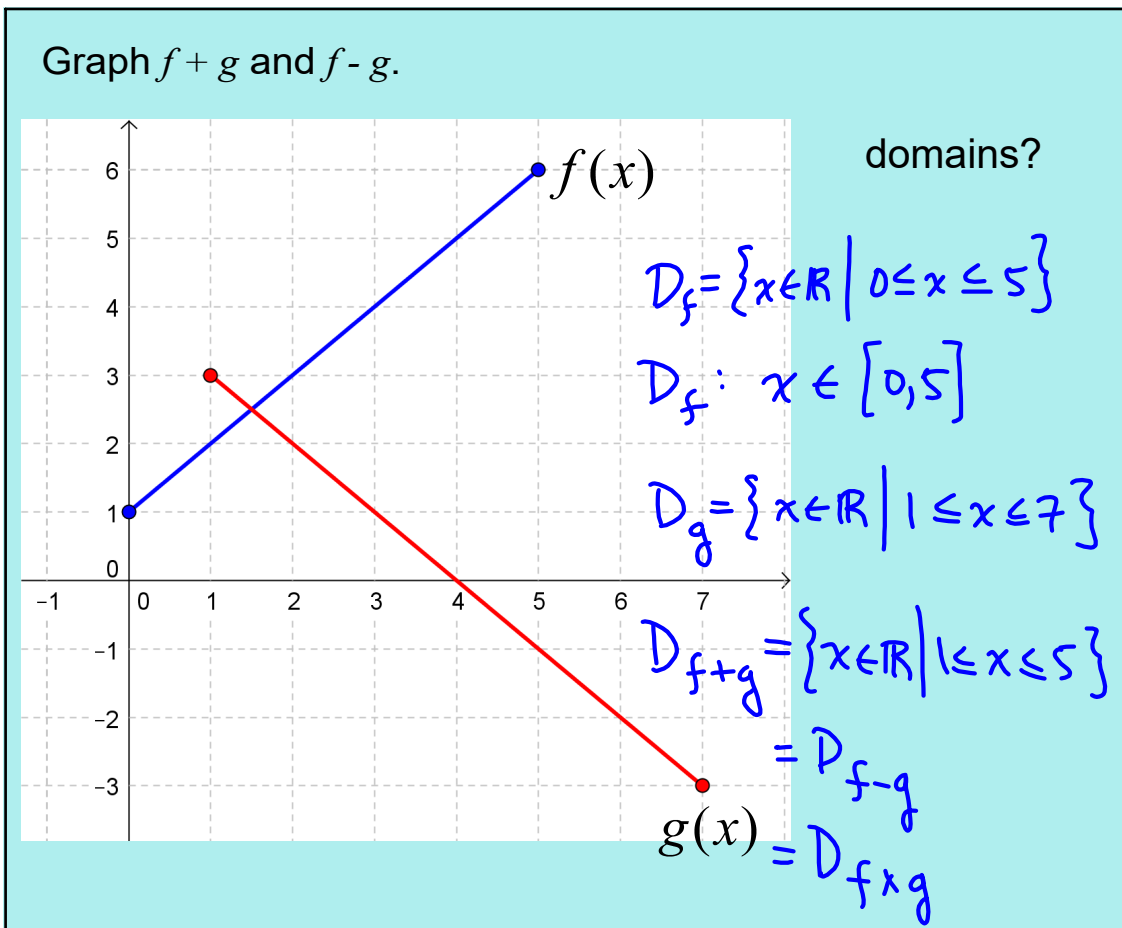Ex.1 Given $f = \{(1,3),(2,-5),(3,7)\}$
$$g = \{(2,-2),(3,3),(4,1)\}$$

(a) determine the domain of each function.
(b) determine the domain of $f + g$.
(c) determine $f + g$.

(a) $D_f = \{1, 2, 3\}$ $D_g = \{2, 3, 4\}$

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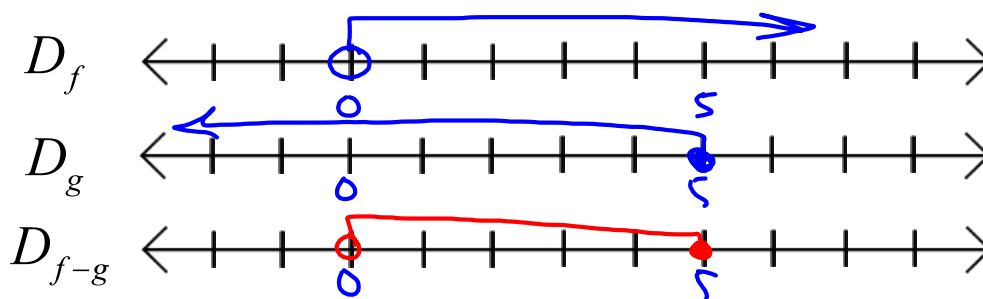
(c) $f + g = \{(2,-7),(3,10)\}$

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Graph $f + g$ and $f - g$.

domains?

$f(x)$

$g(x)$

$D_f = \{x \in \mathbb{R} \mid 0 \le x \le 5\}$

$D_f : x \in [0,5]$

$D_g = \{x \in \mathbb{R} \mid 1 \le x \le 7\}$

$D_{f+g} = \{x \in \mathbb{R} \mid 1 \le x \le 5\}$

$= D_{f-g}$

$= D_{f \times g}$

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

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

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

D_f

D_g

D_{f-g}

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

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

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Recall:

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

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

(2) An <u>odd function</u> has rotational symmetry with respect to the origin.

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

or

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

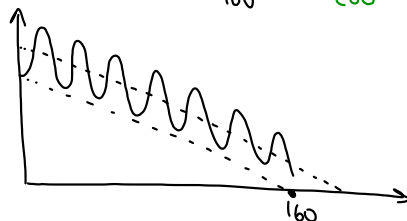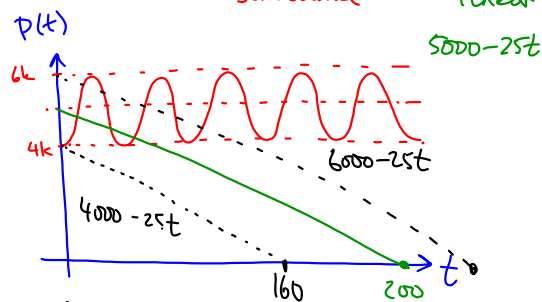Jan 6-10:53 AM

Assigned Work:

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

b

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

sinusoidal   linear

5000−25t

p(t)

6k

4k

4000 − 25t

6000−25t

160   200   t

160

160   160   160

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