HW1-8:

① look at the graph and analyze points:

$f \circ g(x)$ or $f+g(x)$ or $\frac{f}{g}(x)$

② $f(x) = 5e^x$; $g(x) = x^8$

$f \circ g(1) = 5e^{x^8} \rightarrow 5e^1$

$g \circ f(1) = (5e^x)^8 \rightarrow 5^8 e^8$

$f \circ g(x) = 5e^{x^8}$

$g \circ f(x) = (5e^x)^8$

$f(t)g(t) = 5e^t t^8$

⑤ $f(x) = \sqrt{2x-5}$ & $g(x) = 7x^2-6$

ⓐ $f \circ g(x) = \sqrt{14x^2-12-5}$

$14x^2 - 17 = 0$; then $x = \sqrt{\frac{17}{14}}$

$D: x \in (-\infty, -\sqrt{\frac{17}{14}}] \cup [\sqrt{\frac{17}{14}}, \infty)$

ⓑ $g \circ f(x) = 7(2x-5)-6$

$14x - 35 - 6 \Rightarrow \boxed{14x - 41}$

$D_f: x \in [\frac{5}{8}, \infty)$; $D_g: x \in \mathbb{R}$

$D_{g \circ f} = x \in [\frac{5}{2}, \infty)$

ⓒ $f \circ f(x) = \sqrt{2\sqrt{2x-5}-5}$

$2\sqrt{2x-5} = 5$; $\sqrt{2x-5} = (\frac{5}{2})^2 + 5$

$2x = \frac{25}{4} + \frac{20}{4} = \frac{45}{4} = \frac{45}{8}$

$D: x \in [\frac{45}{8}, \infty)$

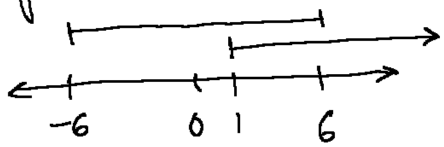
ⓓ $g \circ g(x) = 7(7x^2-6)^2 - 6$

domain has to be $x \in \mathbb{R}$ or $\{x \in \mathbb{R} \mid x \neq 0\}$

⑥ $f(x) = \sqrt{1-x}$ & $g(x) = \sqrt{36-x^2}$

$x \in [1, \infty)$ and $x \in [-6, 6]$

ⓐ $f+g(x) = \sqrt{1-x} + \sqrt{36-x^2}$



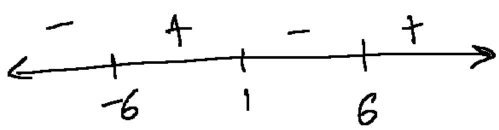
* $f+g(x)$ find not common area

ⓑ $f-g(x) = \sqrt{1-x} - \sqrt{36-x^2}$

Same domain: $x \in [6, 1]$

ⓒ $f \cdot g(x) = \sqrt{(1-x)(36-x^2)}$

where $x \neq 1, -6, 6$



then domain: $x \in [-6, 1]$

(2) $f \div g(x) = \frac{\sqrt{1-x}}{\sqrt{36-x^2}}$

The bottom can't be
$x \in (-6,6)$ while
top can't be $\in [1,\infty)$

then $D: x \in (-6,1]$
all domain are same

(7) $y=x^2$; Analyzing the translations

(8) $f(x) = \sqrt{3x-x^2}$

Translations:

$g(x) = 2\sqrt{3(x-1)-(x-1)^2}$

$h(x) = -2\sqrt{3(x+3)(x+3)^2}+2$

(9) Make $F(x)$ match the following ↑ same as (10)

(3) $f(-x) = -f(x)$; $f(-x) = f(x)$

$h(x) = g \circ f(x)$

it is evaluation