

Work on as many problems as you can together with your group members. Towards the end of lecture your group will be asked to present problems correctly to receive classwork points.

1. Find the domains of the following functions.

(a)  $f(x) = \frac{2}{x-13}$

(b)  $f(x) = \frac{25}{x^2-3x-88}$

(c)  $f(x) = \frac{1}{\frac{6}{x+5}-2}$

(d)  $f(x) = \frac{1}{\sqrt{x+7}}$

(e)  $f(x) = \frac{\sqrt{x-4}}{x-5}$

2. Find  $f+g$ ,  $f-g$ ,  $fg$  and  $\frac{f}{g}$ , then determine the domain for each function.

(a)  $f(x) = 3x^2 + 1$ ,  $g(x) = x + 3$

(b)  $f(x) = 4x^2 + 16x$ ,  $g(x) = x + 4$

(c)  $f(x) = 4x^2 + 25x + 25$ ,  $g(x) = x + 5$

(d)  $f(x) = x^2 + 13x + 42$ ,  $g(x) = x + 6$

(e)  $f(x) = x^2 - 49$ ,  $g(x) = x + 7$

3. Find  $(f \circ g)(x)$  and  $(g \circ f)(x)$ . What is  $(f \circ g)(3)$  and  $(g \circ f)(3)$ ?

(a)  $f(x) = 4x$ ,  $g(x) = x + 5$

(b)  $f(x) = 2x$ ,  $g(x) = x - 3$

(c)  $f(x) = 5x$ ,  $g(x) = x + 2$

(d)  $f(x) = 7x$ ,  $g(x) = x - 4$

(e)  $f(x) = 6x$ ,  $g(x) = x + 1$

4. Find  $(f \circ g)(x)$  and state the domain of this function.

(a)  $f(x) = \frac{4}{x+3}, g(x) = \frac{1}{x}$

(b)  $f(x) = \frac{3}{x+4}, g(x) = \frac{1}{x}$

(c)  $f(x) = \frac{5}{x+7}, g(x) = \frac{1}{x}$

(d)  $f(x) = \frac{1}{x+6}, g(x) = \frac{1}{x}$

(e)  $f(x) = \frac{6}{x+2}, g(x) = \frac{1}{x}$

5. Find two (non-identity) functions  $f$  and  $g$  such that  $h(x) = (f \circ g)(x)$ , where

(a)  $h(x) = (2x - 1)^8$

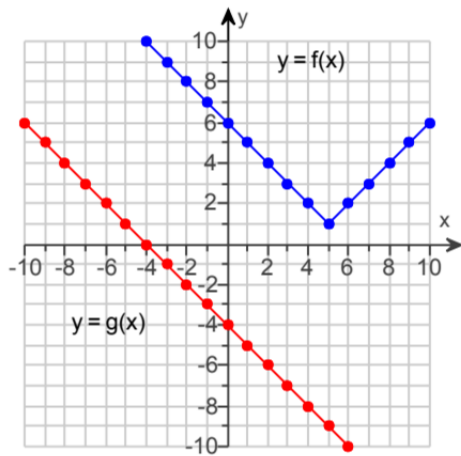
(b)  $h(x) = \sqrt[3]{3x - 4}$

(c)  $h(x) = \sqrt{3x^3 - 4x + 7}$

(d)  $h(x) = \frac{1}{2x - 3} + 1$

(e)  $h(x) = |4x + 5|$

6. Consider the following graph of  $f$  and  $g$ .



(a) Find  $(f \circ g)(0)$

(b) Find  $(f \circ g)(-6)$

(c) Find  $(g \circ f)(3)$

(d) Find  $(g \circ f)(6)$

(e) Find  $(f \circ f)(0)$