

Mth 30, Homework 2 on sections 1.4, 1.5, 1.6

Due by Wed, Feb 14.

Write all your working out and answers on your own notepaper. Please use lots of space and as many pages as you want, so I can include corrections or comments - otherwise I will ask you to redo it. You do not need to write the questions, but it is very important that you show clearly any work you had to do to get your answers. Questions are worth 3 points each.

(1) For the functions $f(x) = x^2 - 4$, $g(x) = 3x + 2$, compute and simplify

(a) $(f - g)(x)$

(b) $(fg)(x)$

(Remember that $(f - g)(x)$ means $f(x) - g(x)$ and part (b) is similar with a product.)

(2) For the same functions $f(x) = x^2 - 4$, $g(x) = 3x + 2$, find and simplify the compositions

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

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

(Your first line for part (a) should start: $f(g(x)) = f(3x + 2) = (3x + 2)^2 - 4 = \dots$)

(3) If $f(4) = 5$, $f(5) = 0$, $f(3) = 5$, $g(0) = 4$ and $g(5) = 3$ then find

$$(g \circ f)(5)$$

(4) Let $f(x) = |x|$ and $g(x) = 6x - 4$. Compute

(a) $f(g(x))$

(b) $g(f(x))$

(5) Starting with the graph of $f(x)$, how far and in which direction must you move it to get the graph of $f(x + 20)$?

(6) (a) Sketch the graph of the square root function $y = \sqrt{x}$. Make a neat and careful picture - label and mark off numbers on the x and y axes.

(b) On the same picture draw the graph of $2 + \sqrt{x - 3}$

(c) On the same picture draw the graph of $-\sqrt{x}$?

(Remember the transformations we looked at in section 1.5 such as moving left, right, up, down and reflecting.)

(7) Let $g(x) = x^3 - 5x$.

(a) Explain why $g(-x) = -x^3 + 5x$.

(b) Compute $-g(x)$.

(c) Is $g(-x) = g(x)$ or $g(-x) = -g(x)$ or neither?

(d) Decide from this if g is even, odd or neither.

(Use this method to test any function for evenness or oddness.)

(8) Solve the absolute value equality $|x + 3| = 10$

(You should find two solutions. Check they do work.)

(9) Solve the inequality $|2x - 5| < 7$ and give the answer in interval notation.

(Recommended method: solve the equality $|2x - 5| = 7$ first, to get two numbers. Then decide if you need solutions between these numbers or on each side of them for the inequality.)

(10) Solve the inequality $|3x + 6| + 1 \geq 4$ and give the answer in interval notation.

(If the solutions have two parts, use the union notation \cup)

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Mon 12:00 - 1:00, Wed 12:00 - 1:00 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.