MATH 20C
WINTER 2020
SECTION D00 (MANNERS)

Homework – week 2

Due by 2359 (11:59 PM) on Sunday January 19. Hand in via Gradescope.

For problem 0, credit is awarded for any honest response, not for the amount of work undertaken.

For problems 1,2 and 3, you *must* give a fully written-out solution showing all your working and justification. Stating the correct answer, by itself, will earn no credit.

0. Do the following textbook problems. *Do not turn them in*, but provide a list here of those for which you wrote down solutions.

§1.2: 1, 3, 9, 13, 15, 23, 29

(*1 points*)

1. Three points A, B, C in 3D space have corresponding position vectors

$$\vec{a} = (1, 2, 7)$$
$$\vec{b} = (3, -1, -2)$$
$$\vec{c} = (-2, 0, 9).$$

Compute all three of the angles in the triangle ABC.

(*6 points*)

2. The infinite straight line L passes through the points $(3, 2, 1)$ and $(7, 6, 5)$. The point A is at $(1, -2, 13)$. Find:—

- the closest point on L to A; and
- the distance from A to that point.

[**Hint:** The formula for orthogonal projection may be useful for this question. However, you have to be careful what you apply it to, because the line L does not go through $(0, 0, 0)$ as it did in lectures.]

(*6 points*)

3. Find a vector $\vec{v} = (x, y, z)$ that is orthogonal to both $(1, 2, 3)$ and $(-2, 1, 0)$, and has length 1.

(*6 points*)