

Written Homework 12

MATH 126

Solve each of the following problems. Work out your problems on scratch paper first, then write your solutions neatly on the pages you plan to turn in. Write the problems in assigned order, with each problem clearly labeled. Use words to clearly explain your work and methods. The reader should never have to guess or infer your intentions.

For a brief guide to writing homework solutions, see *Writing Mathematics Well* from Harvey Mudd College.

Scan or photograph your solutions and submit them (as a single file) to the Written Homework 12 assignment on Moodle.

1. Find parametric equations for each of the following lines.

- (a) The line that includes the point $(3, 0, 2)$ and is parallel to the vector $\mathbf{u} = \langle 3, 2, -5 \rangle$.
- (b) The line that passes through the points $(4, 1, -2)$ and $(1, 5, 3)$.

2. Find an equation of the plane passing through the points $(2, 3, -1)$, $(3, 4, 2)$, and $(1, -2, 0)$.

3. Find any two vectors that are parallel to the plane defined by

$$2x + 3y - z = 5,$$

making sure your two vectors are not parallel with each other.

4. The wave height $h(v, t)$ in the open sea depend on the speed v of the wind and the duration of time t that the wind has been blowing at that speed. Values of the function $h(v, t)$ are recorded (in units of feet) in the following table.

		t wind duration (hours)						
		5	10	15	20	30	40	50
v wind speed (knots)	10	2	2	2	2	2	2	2
	15	4	4	5	5	5	5	5
	20	5	7	8	8	9	9	9
	30	9	13	16	17	18	19	19
	40	14	21	25	28	31	33	33
	50	19	29	36	40	45	48	50
	60	24	37	47	54	62	67	69

- (a) Use the table to estimate the values of $h_v(30, 15)$ and $h_t(30, 15)$.
- (b) What are the “real-life” interpretations of $h_v(30, 15)$ and $h_t(30, 15)$? Make sure your explanation is understandable to someone who has never taken calculus.