

Mathematics 1350H – Linear algebra I: Matrix algebra

TRENT UNIVERSITY, Summer 2013

ASSIGNMENT #1

Due on Wednesday, 22 May, 2013.

Petty Cash

“Base is the slave that pays.”

“AUNT MATTIE!”

“My child?”

“*Would* you mind writing it down at once? I shall be quite *certain* to forget it if you don’t!”

“My dear, we really must wait till the cab stops. How can I possibly write anything in the midst of all this jolting.”

“But *really* I shall be forgetting it!”

Clara’s voice took the plaintive tone that her aunt never knew how to resist, and with a sigh the old lady drew forth her ivory tablets and prepared to record the amount that Clara had just spent at the confectioner’s shop. Her expenditure was always made out of her aunt’s purse, but the poor girl knew, by bitter experience, that sooner or later “Mad Mathesis” would expect an exact account of every penny that had gone, and she waited, with ill-concealed impatience, while the old lady turned the tablets over and over, till she had found the one headed “PETTY CASH.”

“Here’s the place,” she said at last, “and here we have yesterday’s luncheon duly entered. *One glass lemonade* (Why can’t you drink water like me?) *three sandwiches* (They never put in half mustard enough. I told the young woman so, to her face; and she tossed her head—like her impudence!) *and seven biscuits*. *Total one-and-two-pence*.* Well, now for to-day’s?”

“One glass of lemonade——” Clara was beginning to say, when suddenly the cab drew up, and a courteous railway-porter was handing out the bewildered girl before she had time to finish her sentence.

Her aunt pocketed the tablets instantly. “Business first,” she said: “petty cash—which is a form of pleasure, whatever *you* may think—afterwards.” And she proceeded to pay the driver, and to give voluminous orders about the luggage, quite deaf to the entreaties of her unhappy niece that she would enter the rest of the luncheon account. “My dear, you really must cultivate a more capacious mind!” was all the consolation she vouchsafed to the poor girl. “Are not the tablets of your mind wide enough to contain the record of one single luncheon?”

“Not wide enough! Not half wide enough!” was the passionate reply.

The words came in aptly enough, but the voice was not that of Clara, and both ladies turned in some surprise to see who it was that had so suddenly struck into their conversation. A fat little old lady was standing at the door of a cab, helping the driver to extricate what seemed an exact duplicate of herself: it would have been no easy task to decide which was the fatter, or which looked the more good-humoured of the two sisters.

“I tell you the cab-door isn’t half wide enough!” she repeated, as her sister finally emerged, somewhat after the fashion of a pellet from a pop-gun, and she turned to appeal to Clara. “Is it, dear?” she said, trying hard to bring a frown into a face that dimpled all over with smiles.

“Some folks is too wide for ’em,” growled the cab driver.

“Don’t provoke me, man!” cried the little old lady, in what she meant for a tempest of fury. “Say another word and I’ll put you into the County Court, and sue you for a *Habeas Corpus!*” The cabman touched his hat, and marched off, grinning.

“Nothing like a little Law to cow the ruffians, my dear!” she remarked confidentially to Clara. “You saw how he quailed when I mentioned the *Habeas Corpus*? Not that I’ve any idea what it means, but it sounds very grand, doesn’t it?”

“It’s very provoking,” Clara replied, a little vaguely.

“Very!” the little old lady eagerly repeated. “And we’re very much provoked indeed. Aren’t we, sister?”

“I never was so provoked in all my life!” the fatter sister asserted, radiantly.

* A note for American [and modern] readers: In British currency, a shilling contains twelve pence. The phrase “One and two-pence” (written 1 s. 2 d.) means “one shilling and two-pence.”

By this time Clara had recognized her picture-gallery acquaintances, and, drawing her aunt aside, she hastily whispered her reminiscences. “I met the first in the Royal Academy—and they were very kind to me—and they were lunching at the table next to us, just now, you know—and they tried to help me find the picture I wanted—and I’m sure they’re dear old things!”

“Friends of your, are they?” said Mad Mathesis. “Well, I like their looks. You can be civil to them, while I get the tickets. But try and arrange your ideas a little more chronologically!”

And so it came to pass that the four ladies found themselves seated side by side on the same bench waiting for the train, and chatting as if they had known one another for years.

“Now this I call a remarkable coincidence!” exclaimed the smaller and more talkative of the sisters—the one whose legal knowledge had annihilated the cab-driver. “Not only that we should be waiting for the same train, and at the same station—*that* would be curious enough—but actually on the same day, and the same hour of the day! That’s what strikes *me* so forcibly!” She glanced at the fatter and more silent sister, whose chief function in life seemed to be to support the family opinion, and who meekly responded—

“And me too, sister!”

“Those are not *independent* coincidences —” Mad Mathesis was just beginning, when Clara ventured to interpose.

“There’s no jolting here,” she pleaded meekly. “*Would* you mind writing it down now?”

Out came the ivory tablets once more. “What was it, then?” said her aunt.

“One glass of lemonade, one sandwich, one biscuit—Oh dear me!” cried poor Clara, the historical tone suddenly changing to a wail of agony.

“Toothache?” said her aunt calmly, as she wrote down the items. The two sisters instantly opened their reticules and produced two different remedies for neuralgia, each marked “unequaled.”

“It isn’t that!” cried poor Clara. “Thank you very much. It’s only that I *can’t* remember how much I paid!”

“Well, try and make it out, then,” said her aunt. “You’ve got yesterday’s luncheon to help you, you know. And here’s the luncheon we had the day before—the first day we went to that shop—*one glass lemonade, four sandwiches, ten biscuits. Total, one-and-fivepence.*” She handed the tablets to Clara, who gazed at them with eyes so dim with tears that she did not at first notice that she was holding them upside down.

The two sisters had been listening to all this with the deepest interest, and at this juncture the smaller one softly laid her hand on Clara’s arm.

“Do you know, my dear,” she said coaxingly, “my sister and I are in the same predicament! Quite identically the very same predicament! Aren’t we, sister?”

“Quite identically and absolutely the very——” began the fatter sister, but she was constructing her sentence on too large a scale, and the little one would not wait for her to finish it.

“Yes, my dear,” she resumed; “we were lunching at the very same shop as you were—and we had two glasses of lemonade and three sandwiches and five biscuits—and neither of us has the slightest idea what we paid. Have we, sister?”

“Quite identically and absolutely——” murmured the other, who evidently considered that she was now a sentence in arrears, and that she ought to discharge one obligation before contracting any fresh liabilities; but the little lady broke in again, and she retired from the conversation a bankrupt.

“*Would* you make it out for us, my dear?” pleaded the little old lady.

“You can do Arithmetic, I trust?” her aunt said, a little anxiously, as Clara turned from one tablet to another, vainly trying to collect her thoughts. Her mind was a blank, and all human expression was rapidly fading out of her face.

A gloomy silence ensued.

1. Clara is asked to solve a mathematical problem. Solve it, and give a complete explanation of your solution. [10]