

Mathematics 110 – Calculus of one variable

TRENT UNIVERSITY, 2002-2003

Assignment #1

Due: Friday, 20 September, 2002

A RIDDLE

Three travelers decide to stay for a night at the Puzzle Motel. They rent a room for thirty minae; each contributes ten minae. A couple of hours later, the manager realizes that the three have been overcharged for their room – it should have cost twenty-five minae instead of thirty – and sends Bee the bellhop to return the extra five minae. Bee, unable to figure out how to split five minae evenly among three people, decides to keep two minae himself and returns one mina to each of the three travelers.

The three travelers have paid out a net of nine minae each for the room, for a total of twenty seven, and Bee the bellhop has kept two more, for a grand total of twenty nine minae. However, the travelers originally paid thirty minae for the room. What happened to the extra mina?

1. Answer the riddle and provide a complete explanation of what is going on. [3]

EXCELSIOR.

“Goblin, lead them up and down.”

The ruddy glow of sunset was already fading into the sombre shadows of night, when two travellers might have been observed swiftly — at a pace of six miles an hour — descending the rugged side of a mauntain; the younger bounding from crag to crag with the agility of a fawn, while his companion, whose aged limbs seemed ill at ease in the chain mail armour habitually worn by tourists in that district, toiled on painfully at his side.

As is always the case under such circumstances, the younger knight was the first to break the silence.

“A goodly pace, I trow!” he exclaimed. “We sped not thus in the ascent!”

“Goodly, indeed!” the other echoed with a groan. “We clomb it but at three miles in the hour.”

“And on the dead level our pace is—?” the younger suggested; for he was weak in statistics, and left all the details to his aged companion.

“Four miles in the hour,” the other wearily replied. “Not an ounce more,” he added, with that love of metaphor so common in old age, “and not a farthing less!”

“’Twas three hours past high noon when we left our hostelry,” the younger man said, musingly. “We shall scarce be back by supper-time. Perchance mine host will roundly deny us all food!”

“He will chide our tardy return,” was the grave reply, “and such a rebuke will be meet.”

“A brave conceit!” cried the other, with a merry laugh. “And should we bid him bring us yet another course, I trow his answer will be tart!”

“We shall but get our deserts,” sighed the elder knight, who had never seen a joke in his life, and was somewhat displeased at his companion’s untimely levity. “’Twill be nine of the clock,” he added in an undertone, “by the time we regain our hostelry. Full many a mile shall we have plodded this day!”

“How many? How many?” cried the eager youth, ever athirst for knowledge.

The old man was silent.

“Tell me,” he answered, after a moment’s thought, “what time it was when we stood together on yonder peak. Not exact to the minute!” he added hastily, reading a protest in the young man’s face. “An’ thy guess be within one poor half-hour of the mark, ’tis all I ask of thy mother’s son! Then will I tell thee, true to the last inch, how far we shall have trudged betwixt three and nine of the clock!”

A groan was the young man’s only reply; while his convulsed features and the deep wrinkles that chased each other across his manly brow, revealed the abyss of arithmetical agony into which one chance question had plunged him.

2. Set up the “arithmetical” problem as an equation or equations to be solved. [3]
3. Solve the arithmetical question. (With or without the equations from question 2.) Include a complete explanation of *why* your solution is correct. [4]

Bonus. Who wrote this tale? Where does it appear? [1]