

Maths 190 Assignment 1 Solutions

August 20, 2009

Due:

1. (4 marks) Smallest number with three distinct prime factors is $2 \times 3 \times 5 = 30$. Smallest number with four distinct prime factors is $2 \times 3 \times 5 \times 7 = 210$.

2. (3 marks) The sequence is

$$1, 1, 2, 4, 7, 13, 24, 44, 81, 149, 274, 504, 927, 1705, 3136$$

The ratios are (to 3d.p.):

$$1, 2, 2, 1.75, 1.857, 1.846, 1.833, 1.841, 1.840, 1.839, 1.839, 1.839, 1.839, 1.839$$

The ratios converge to 1.839....

3. (6 marks) My ordering is:

- The number of seconds you will spend studying for Maths 190.
10 hours a week for 12 weeks = $10 \times 60 \times 60 \times 12 = 432,000$
- The number of mobile phones in New Zealand.
Approximately 4 million residents, so number of phones $\approx 10^6$.
- The number of golf balls that will fit in MLT3:
Size of room is approx $15m \times 20m \times 4m = 1200m^3$
Size of a golf ball: radius 2.5cm, so volume is about $65cm^3$. One cubic metre could contain about $10^6 \times 0.7/65 \approx 11,000$ golf balls. So total number is about $1.1 \times 10^4 \times 1.2 \times 10^3 \approx 1 \times 10^7$

Note: there are many other correct answers!

4. (6 marks)

- (a) $38,500 \times 4/2500 = 61.6$ Therefore there will be one class with at least 62 students.
- (b) $m = 4$ (all students could take the same 4 courses).
- (c) Number of possible choices of schedule is $(2500 \times 2499 \times 2498 \times 2497)/(4 \times 3 \times 2)$ which is much greater than 38,500, so the answer is no.

5. (6 marks) The flaw in the reasoning is adding the 'skimmed off' \$2 to the \$27, when it should have been subtracted. There were \$27 put in, in total by the band. \$25 of these went to the motel, and \$2 of these went into Milly's pocket.