

Mth 21, Homework 3 on sections 2.5, 4.1

Due by Wed, Sept 27.

Please use lots of space and explain your answers, showing clearly any work you had to do. Each question is worth 3 points.

(1) The sets A and B are given by

$$A = \{2, 4, 6, 8, \dots, 362\}$$

$$B = \{3, 6, 9, 12, \dots, 549\}.$$

Are these sets equivalent?

(Hint: To be equivalent there must be a one-to-one correspondence between them. You could try n in A corresponding to $3n/2$ in B .)

(2) Define the infinite sets

$$S = \{2, 4, 6, 8, \dots\}$$

$$T = \{3, 6, 9, 12, \dots\}.$$

(a) Are S and T equivalent? Explain.

(b) What does countable mean exactly?

(c) Are S and T countable or uncountable? Explain.

(3) We saw in class that the following table can be used to show that all the positive fractions are countable:

$\frac{1}{1}$	$\frac{2}{1}$	$\frac{3}{1}$	$\frac{4}{1}$	$\frac{5}{1}$	$\frac{6}{1}$...
$\frac{1}{2}$	$\frac{2}{2}$	$\frac{3}{2}$	$\frac{4}{2}$	$\frac{5}{2}$	$\frac{6}{2}$...
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}$	$\frac{4}{3}$	$\frac{5}{3}$	$\frac{6}{3}$...
$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$	$\frac{5}{4}$	$\frac{6}{4}$...
$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$	$\frac{6}{5}$...
.....						

Use the diagonal pattern we saw to continue this list of fractions $\frac{1}{1}, \frac{1}{2}, \frac{2}{1}, \frac{3}{1}, \frac{1}{3}$ as far as $\frac{1}{5}$. (Don't forget to leave out any fractions like $\frac{2}{2}$ that reduce to an earlier fraction.)

- (4) A survey asked 30 people how many books they had read in the last two weeks. The results were

2 3 0 0 1 5 1 2 4 0
3 0 2 1 1 2 3 4 2 2
2 2 3 4 5 2 0 1 2 1

- (a) Make a frequency distribution table showing frequency and relative frequency.
(b) Draw a histogram.
(c) Draw a pie chart.
- (5) The police checked speeds on a highway and got these results for 20 cars (in mph):

59 72 55 67 81 63 59 80 71 68
65 70 74 77 67 50 73 68 72 60

- (a) Group the data into 4 categories and make a frequency distribution table showing frequency and relative frequency.
(b) Draw a histogram - it should have 4 bars.
- (Hint: Subtract the lowest speed from the highest and then divide by 4 to get the size of each category.)
- (6) From your answers in Question 5, what percentage of drivers were going over the speed limit of 65?

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Mon 11:30 - 12:30, Wed 11:30 - 12:30 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.