MATH 2710

1.1 - 1.4 Portfolio

Question 1:

a) What is a finite set?

b) Give two examples of finite sets.

c) What is a countably infinite set?

d) Give two examples of countably infinite sets.

e) What is an uncountably infinite set?

f) Give two examples of uncountably infinite sets.

Question 2:

Write the inclusions between N, Z, Q and R, the most important sets of real numbers.

Question 3:

a). Write the definition of the interval (a, b) and the definition of the interval (a, ∞).

b). Give two examples of intervals of each of the above types.

Question 4:

a). Write the definition of the cartesian product of two sets and give two examples.

b). Write the definition of the cartesian product of three sets and give two examples.

c). Write the definition of the cartesian product of n sets and give two examples.

Question 5:

Specify the cardinality of each of the cartesian products in the above examples.

Question 6:

a). Write the definition of the equality of two sets A and B.

b). What is the difference between $A \subseteq B$ and $A \subset B$?

Question 7:

a). What is the definition of the power set of a set A?

b). Give two examples of sets and write their power sets.

Question 8:

a). What does the Power Set Theorem state?

b). Write the cardinalities of the power sets in the examples from Question 7.

Question 9:

a). What is the definition of $\binom{n}{k}$? Write it in two different ways.

b). Write the formula for $\binom{n}{k}$ and give two examples that make use of this formula.

Question 10:

a). What does the Binomial Theorem state?

b). Write the expansion of $(2+3)^4$ using the Binomial Theorem.