Lab CC 3.1 Networks

Name _____

Date _____ Period _____

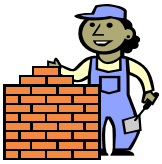
Clever Counting Unit

Materials: Pencil and paper

Key Learning: To analyze the number of paths in a network.

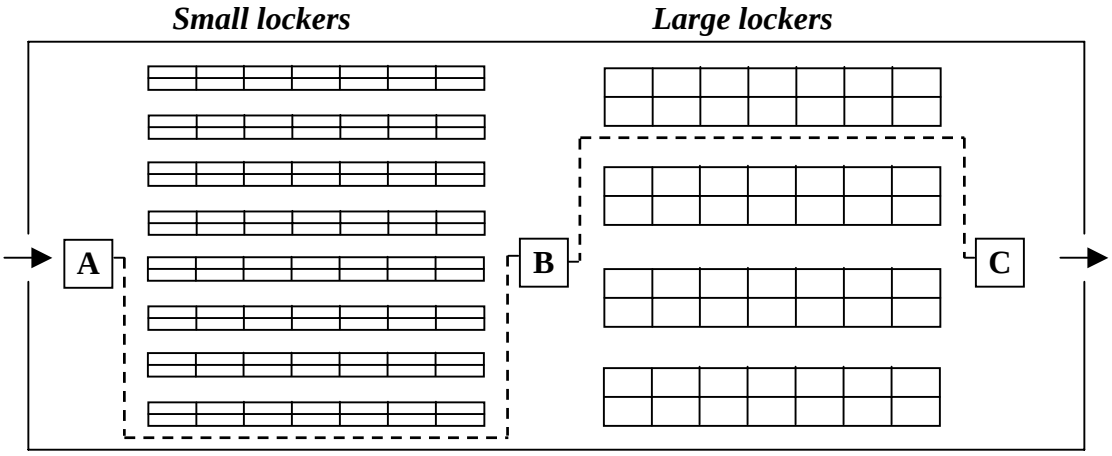
To understand network terminology and compare network problems with other counting combination problems.

Guided Directions



this is an
INDIVIDUAL ACTIVITY

1. The floor plan of a storage warehouse is shown below. The section on the left contains narrow rows of small lockers, while the section on the right contains wider rows of large lockers. A security guard enters the warehouse at checkpoint A, walks through one row of small lockers to get to checkpoint B, and then selects a row of large lockers to get to checkpoint C. One possible path is shown in the diagram.

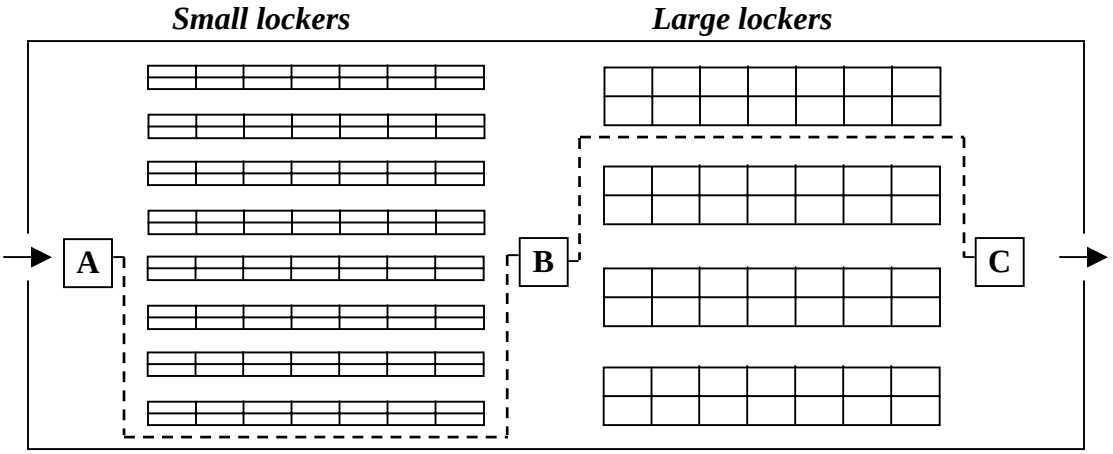


a) How many paths are there from A to B? _____ How many from B to C? _____

b) How many different paths are there from checkpoint A to C through B? _____
Show your work and explain your reasoning.

c) If you rent a small locker, how many of the paths from A to C will pass by your locker?

d) If you rent a large locker, how many of the paths from A to C pass by your locker?

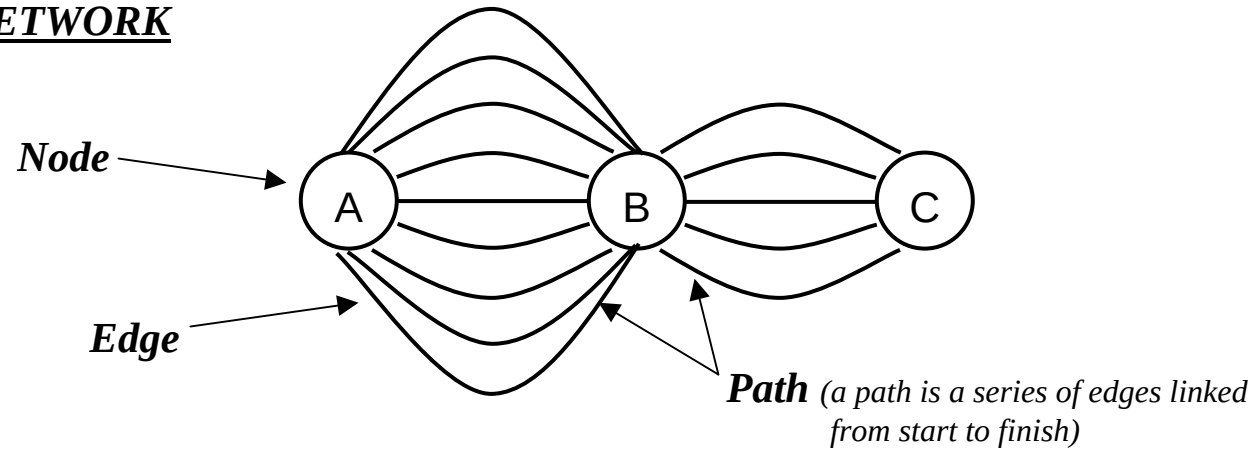


e) If you rent a **small locker**, what is the probability that the guard will **NOT** pass your locker on one of his rounds?

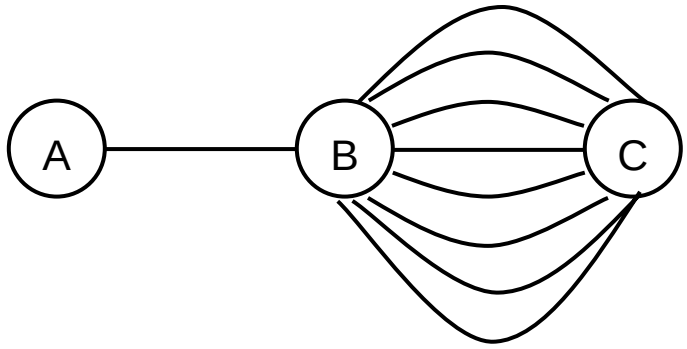
f) If you rent a **large locker**, what is the probability that the guard will **NOT** pass your locker on one of his rounds?

The diagram below is a model of the floor plan of the warehouse. It is called a ***NETWORK***. A network is made up of ***NODES*** and ***EDGES***. In the network below, the nodes A, B, and C represent the warehouse checkpoints, and the edges connecting the nodes represent the aisles between the rows of lockers. A ***PATH*** from node A to node C consists of an edge from node A to node B followed by an edge from node B to node C.

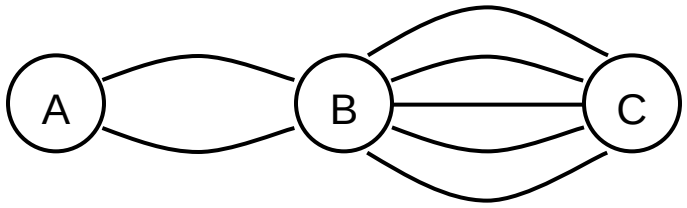
NETWORK



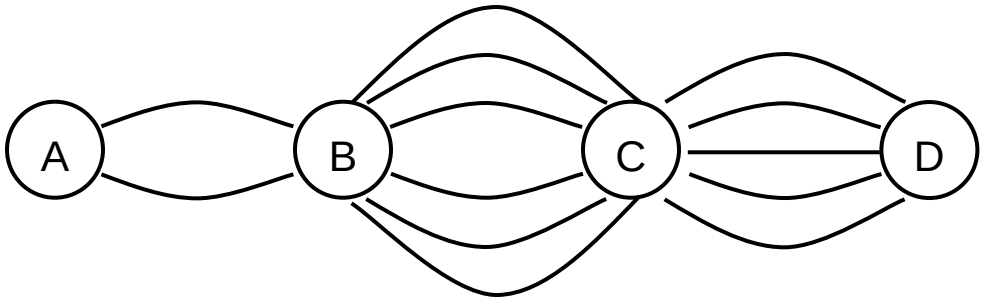
2. a) In this network diagram, a single edge connects node A to node B, and eight edges connect node B to node C. How many paths are there from node A to node C that pass through node B?



b) In this network diagram, two edges connect node A to node B, and five edges connect node B to node C. How many paths are there from node A to node C that pass through node B?



c) In this network diagram, how many paths are there from node A to node D that pass through nodes B and C?



d) A network diagram similar to the one above, has 12 edges from node A to node B, 15 edges from node B to node C and 32 edges from node C to node D. How many paths are there from node A to node D that pass through nodes B and C?

3. Design several networks (below) that contain exactly 12 edges from node A to node D. Count the total paths for each network.

Which network has the fewest number of paths?

Which network has the greatest?

Extension: Can you relate your findings to the volumes of various rectangular prisms?