

7.3. Basic Counting Principles

Goals: ① Solve problems using a Venn Diagram
② Multiplication Principle.

① Counting using Venn Diagrams.

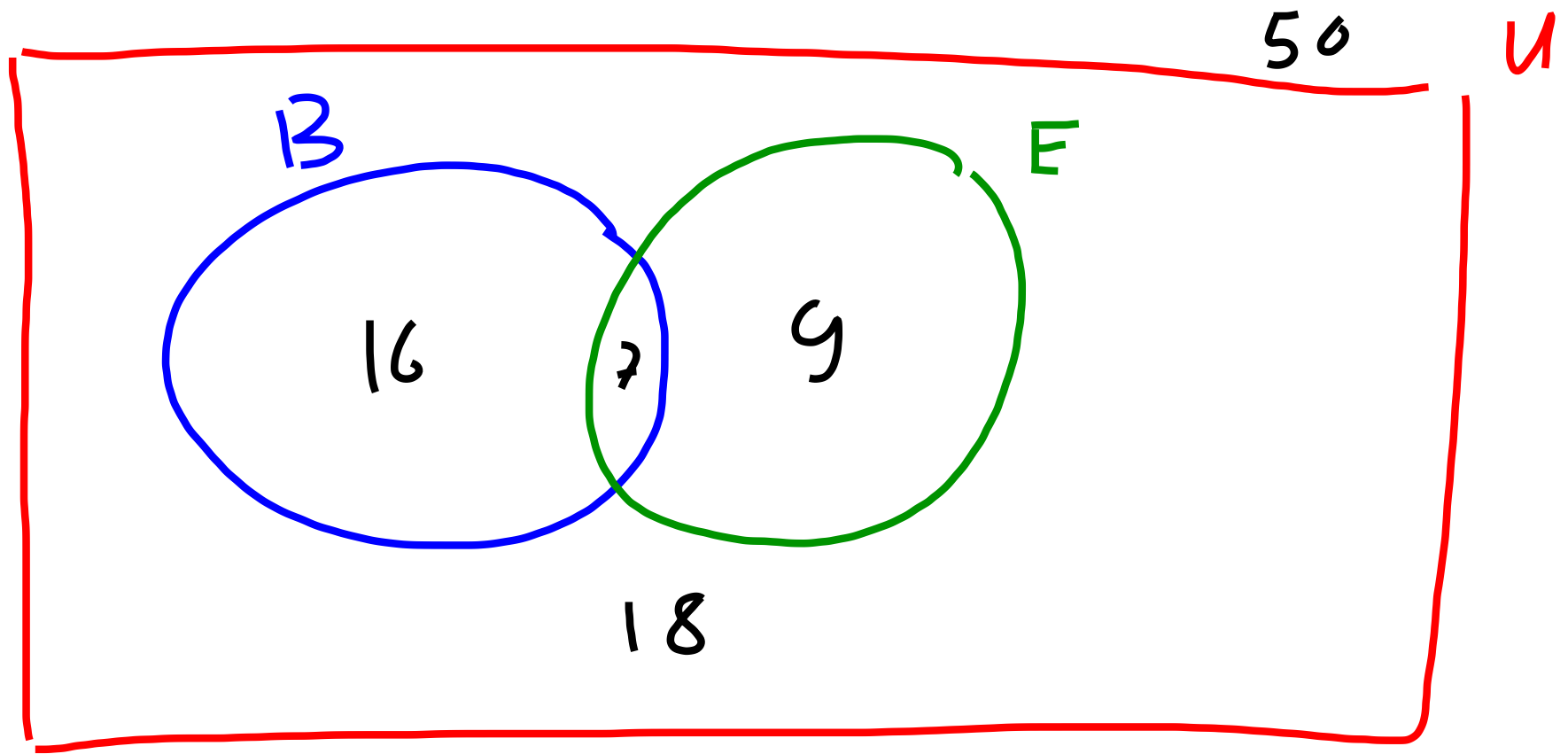
E.g. 1324 class: 50 students

23 majors in business

16 majors in engineering

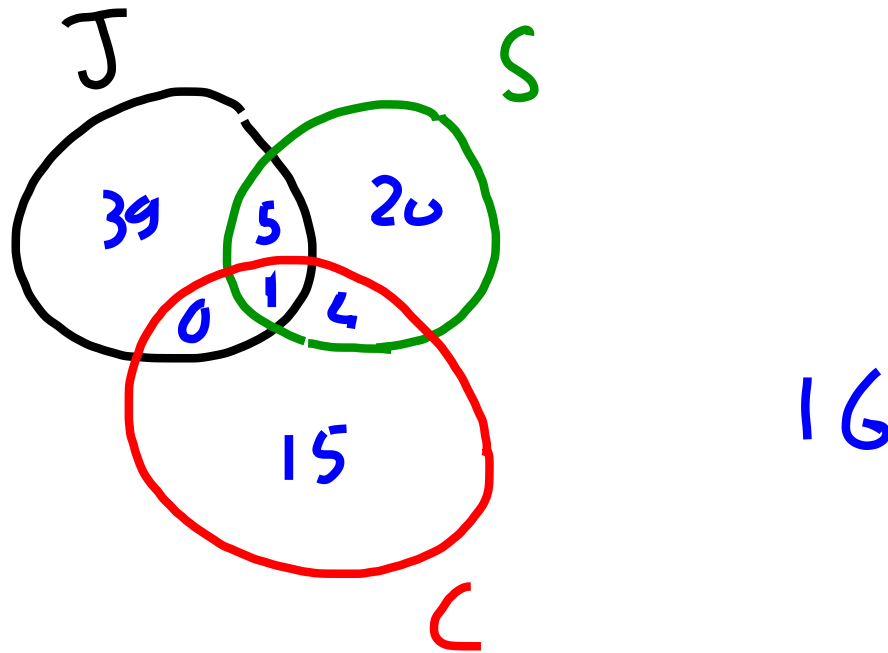
7 major in both

Q: How many students major in neither subject?
How many students major in business alone?



E.g. Survey of 100 college students
 45 jog, 30 swim, 20 cycle, 6 jog and swim
 1 jog and cycle, 5 swim and cycle, 1 does all.
 How many don't exercise?

$$n(U) = 100$$



$$100 - (39 + 5 + 1 + 4 + 20 + 15) = 16$$

Counting using the Multiplication Principle.

E.g.

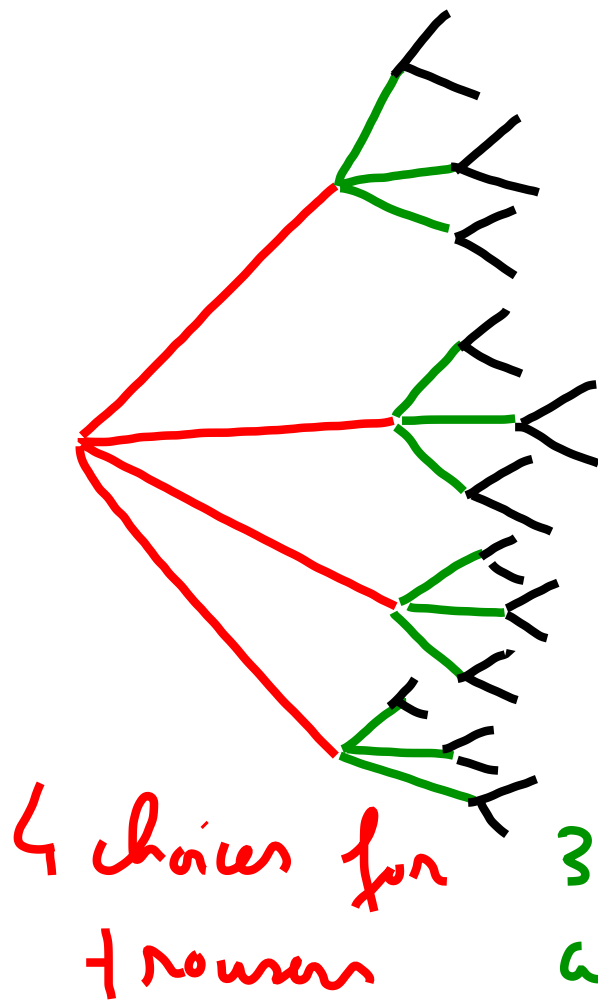
Suppose you have 4 different pairs of trousers

3 different shirts

2 different pairs of shoes.

How many different ways you can dress.

$$4 \cdot 3 \cdot 2 = 24$$



2 choices for shoes
for each choice of
trousers and
shirt

3 choices for shirts
after choosing trousers

4 choices for
trousers

E.g. Sport team: 28 players

Q: How many different ways can you select a captain and an assistant captain.

$$28 \cdot 27 = 756$$