11.3 Probability in Society

Ex 1: Use a sample to Predict Population

Ruth wants to know the most common eye colour. All grade 12 students at 5 of the 7 local high schools were surveyed (2300 students)

Eye Colour	Total
Brown	1656
Blue	483
Green	115
Other	46

a) From the results, predict how many students (7200) from the local college will have brown eyes.

b) Is the prediction reasonable? Why or why not?

a) Brown Eyes % $= \frac{1656}{2300} \times 100$

$= 72\%$

$0.72 \times 7200 = 5184$

b) Depends on town. Colleges tend to attract other nationalities where as H.S. are local.

SYK. a) Blue eyes in college

b) Green eyes in college

Ex 2: Avoid Making False Predictions

Mr. Krutz gave an exam. The first 5 he graded had the following marks, 20, 15, 18, 19, 18. He was concerned his class did not do well.

a) Based on the first 5 marks, what is the average?

b) The marks for all 30 exams are:

13	15	15	16	17	18	18	19	19	19
20	20	20	21	22	22	22	23	24	24
24	24	24	24	25	27	28	28	28	30

Why was his prediction wrong?

a) $20+15+18+19+18$

$= 90 \div 5$

$= 18/30 \rightarrow 60\%$

b) Mean: (average) $\rightarrow \frac{\pm}{30} = 21.6 \rightarrow 22$ (73%)

Mode: (common) $\rightarrow$ 24 (80%)

Median: (middle) $\rightarrow$ 22 (73%)

SYK: 2: 13, 28, 22, 24, 20

Ex 3: Make Decisions Based on Probability

A youth association surveys its 400 members about there preferred activity. The table shows the results.

Group	Swimming	Rock Climbing	Movies	Bowling	Total
Red	14	9	40	37	100
Blue	11	19	59	11	100
Green	27	12	57	4	100
Yellow	13	24	44	19	100
	65				

a) What is the probability that any one group would choose swimming? (Theoretical Probability)

b) Based on the theoretical probability, what percentage of the 400 would theoretically choose swimming?

c) What assumption would you make?

d) Based on the survey, what probability of people will choose swimming? (Experimental Probability)

e) Compare a) and d).

a) Theoretical $\rightarrow \frac{\#\text{ of wanted}}{\#\text{ of options}} = \frac{1}{4} = 25\%$

b) $0.25 \times 400 = 100$ people

c) Assumed every option was as likely.

d) Experimental: $\frac{\#\text{ choosen}}{\#\text{ survey}} = \frac{65}{400} = 16.25\%$

e) Theoretical had a higher percentage than who actually chose swimming.

SYK: 3: Experimental Probability of Movies? of bowling?