Analysis H 2018-19 – Deggeller / Gleason / Hahn
Probability Quiz 2
No Calculators!

22/22

Odds-on-Favorite: Timothy
Period: F

1. Out of 60 students surveyed, 42 use Facebook (F), and 33 use Instagram (G). 12 students use neither. Find...

a) $P(F \cap G)$

48

60 − 12

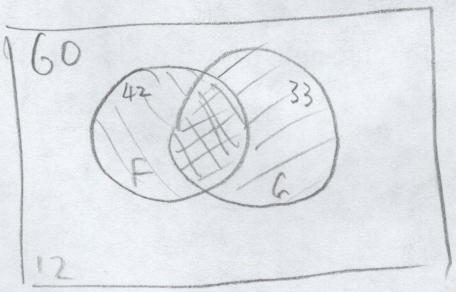
48/60

42 + 33 − 48

= 75 − 48

$= \boxed{\frac{27}{60}}$

Make a diagram here!



48 − 42

b) $P(F' \cap G)$

33 − 27

$= \boxed{\frac{6}{60}}$

c) $P(F' \cup G')$

$= 1 - P(F \cap G) = 1 - \frac{27}{60} = \boxed{\frac{33}{60}}$

2. Assume that the survey results from #1 are perfectly representative of all the teenagers in America. If I select 100 random American teenagers...

a) what is the probability that 80 of them are Facebook users?

$$\boxed{\binom{100}{80}\left(\frac{42}{60}\right)^{80}\left(1-\frac{42}{60}\right)^{20}}$$

which ones — exactly they have — chance they don't

b) how many of them would you expect to be Facebook users?

$$\boxed{\frac{42}{60} \cdot 100}$$

-0

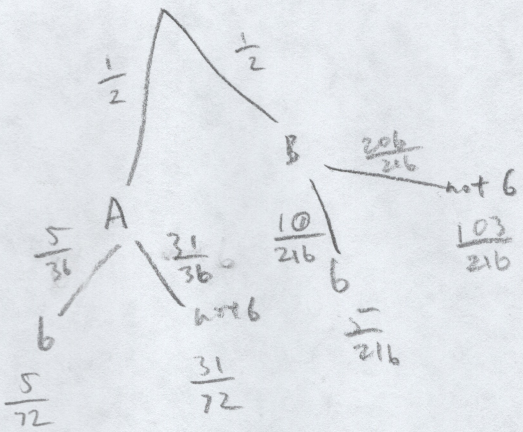
3. Each of the dice in this problem is a regular, 6-sided die. Box A contains 2 dice, and Box B contains 3 dice. If I pick a box at random and then roll all the dice in the box and record the sum of the dice. Find...

a) P (The sum of the dice is 6 | I picked box A) =

3,3 2,4 1,5 4,2 5,1

$\frac{5}{36}$

Make a diagram here!



b) P (The sum of the dice is 6 | I picked box B) =

1,2,3 → 6 ways 1,1,4 → 3 ways 2,2,2 → 1 way

$\frac{10}{6^3} = \frac{10}{216}$

c) P (The sum of the dice is 6) =

$\frac{1}{2}\cdot(a) + \frac{1}{2}\cdot(b) = \frac{5}{72} + \frac{5}{216}$

$= \frac{15}{216} + \frac{5}{216} = \frac{20}{216}$

d) P (I picked box B | The sum of the dice is 6) =

$$\frac{\frac{10}{216}}{\frac{10}{216} + \frac{5}{36}}$$