

G9: Probability B Level Test Review

Determine if events A and B are independent.

1) $P(A) = \frac{7}{20}$ $P(B) = \frac{2}{5}$ $P(A \text{ and } B) = \frac{7}{50}$

$\frac{7}{20} \cdot \frac{2}{5} = \frac{14}{100} = \frac{7}{50}$ Independent

2) $P(A) = \frac{1}{4}$ $P(B) = \frac{3}{4}$ $P(A \text{ and } B) = \frac{3}{20}$

$\frac{1}{4} \cdot \frac{3}{4} = \frac{3}{16}$ not indep \therefore dependent

Events A and B are independent. Find the missing probability.

3) $P(B) = \frac{7}{20}$ $P(A \text{ and } B) = \frac{91}{400}$ $P(A) = ?$

$\frac{7}{20} \cdot X = \frac{91}{400}$

$X = \frac{91}{20 \cdot 7} = \frac{91}{140} = \frac{13}{20} = P(A)$

4) $P(B) = \frac{2}{5}$ $P(A \text{ and } B) = \frac{3}{10}$ $P(A) = ?$

$\frac{2}{5} \cdot X = \frac{3}{10}$

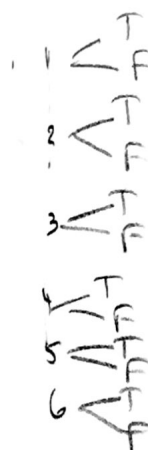
$X = \frac{3}{10 \cdot \frac{2}{5}} = \frac{3}{4} = P(A)$

Use a tree diagram or area model to represent the sample space for this experiment.

- 5) A spinner can land on either red, blue, green, or yellow. You flip a coin and then spin the spinner.

	A	T
R	RA	RT
B	BA	BT
G	GA	GT
Y	YA	YT

- 6) A math quiz has six true/false questions.



	T	F
1	1T	1F
2	2T	2F
3	3T	3F
4	4T	4F
5	5T	5F
6	6T	6F

Determine if the scenario involves mutually exclusive events.

- 7) A cooler contains ten sports drinks: six lemon-lime and four orange. Four of the lemon-lime and two of the orange drinks are cold. The others are still warm. You randomly grab a bottle. It is orange flavored or cold.

not mutually exclusive

- 8) A litter of kittens consists of two gray kittens, two black kittens, and two mixed-color kittens. You randomly pick one kitten. The kitten is gray or mixed-color.

mutually exclusive



There are eleven shirts in your closet, four blue and seven green. Two of the blue shirts and five of the green shirts fit well. The others are too big. You randomly select a shirt to wear.

- 9) Find the probability that it is green AND fits well.

	F	NF	
BS	2	2	4
GS	5	2	7
	7	4	11

$P(G \text{ and } F) = \frac{5}{11}$

- 10) Find the probability that it is blue OR too big.

$P(B \text{ or } NF) = P(B) + P(NF) - P(B \text{ and } NF)$
 $= \frac{4}{11} + \frac{4}{11} - \frac{2}{11} = \frac{6}{11}$

There are four nickels and eight dimes in your pocket. You randomly pick two coins out of your pocket, one at a time.

11) Are these independent or dependent events?

dependent

12) What is the probability that you get a dime and then a nickel? Is this different than getting a nickel and then a dime? Why or why not?

$$P(\text{Dime, then nickel}) = \frac{8}{12} \cdot \frac{4}{11} = .242 = 24.2\%$$

$$P(\text{Nickel, then dime}) = \frac{4}{12} \cdot \frac{8}{11} = .2424 = 24.24\%$$

A basket contains seven nectarines and five peaches. You randomly select a piece of fruit, but it's not what you want so you put it back. Then you randomly select another piece of fruit.

13) Are these independent or dependent events?

independent

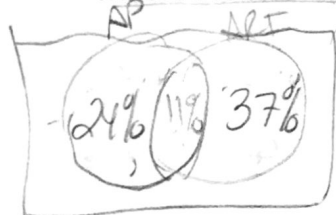
14) What is the probability that you selected two nectarines? Is this different than selecting two peaches? Why or why not?

$$P(N \text{ and } N) = \frac{7}{12} \cdot \frac{6}{11} = .318 = 31.8\%$$

$$P(P \text{ and } P) = \frac{5}{12} \cdot \frac{4}{11} = .1515 = 15.15\%$$

At a high school, 35% of students are taking an AP class, 48% are taking an art class, and 11% are taking both AP classes and art classes.

15) What percent of students are taking AP classes but NOT art classes?



$$.35 - .11 = .24$$

24%

16) What percent of students are taking neither AP classes nor art classes?

$$P(\text{AP}' \text{ or } \text{ART}') = 1 - P(\text{AP or ART})$$

$$P(\text{AP or ART}) = P(\text{AP}) + P(\text{ART}) - P(\text{A and B})$$

$$(.35) + (.48) - (.11) = .72$$

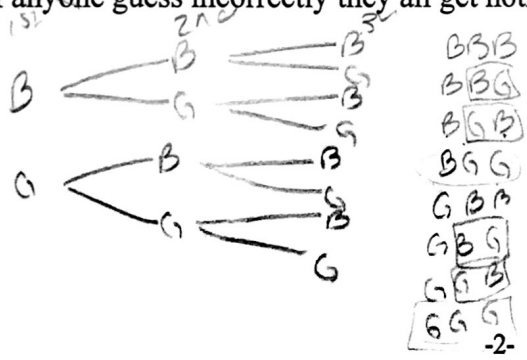
$$P(\text{AP}' \text{ or } \text{ART}') = 1 - .72 = .28$$

Challenge problem:

17) Three people enter a room and have a green or blue hat placed on their head. They cannot see their own hat, but can see the other hats. The color of each hat is purely random. They could all be green, or blue, or any combination of green and blue.

They need to guess their own hat color by writing it on a piece of paper, or they can write 'pass'. They cannot communicate with each other in any way once the game starts. But they can have a strategy meeting before the game. If at least one of them guesses correctly they win \$50,000 each, but if anyone guess incorrectly they all get nothing. What is the best strategy?

not done



$$P(BBB) = \frac{1}{8} \quad P(GGG) = \frac{1}{8}$$

$$P(BBB \text{ or } GGG) = \frac{2}{8} = \frac{1}{4}$$

PC