Geometry
Putting It All Together

Name: Key
Date: _____ Period: _____

1. You randomly draw **a** card. Find the following probabilities and state if they are mutually exclusive or overlapping. "OR" means Add

A. P(red or Ace) = $\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} = \boxed{\frac{7}{13}}$ overlapping

B. P(4 or Jack) = $\frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \boxed{\frac{2}{13}}$ Mutually Exclusive

C. P(face card or Club) overlapping $\frac{12}{52} + \frac{13}{52} - \frac{3}{52} = \frac{22}{52} = \boxed{\frac{11}{26}}$

D. P(even card or queen) = $\frac{20}{52} + \frac{4}{52} = \frac{24}{52} = \boxed{\frac{6}{13}}$ Mutually Exclusive

2. You randomly draw **TWO** cards, **WITH** replacement. (these are independent events!) Find the following probabilities. "AND" means multiply

A. P(red and then red) = $\frac{26}{52} \cdot \frac{26}{52} = \boxed{\frac{1}{4}}$

B. P(red and then ace) = $\frac{26}{52} \cdot \frac{4}{52} = \boxed{\frac{1}{26}}$

C. P(4 and then 5) = $\frac{4}{52} \cdot \frac{4}{52} = \boxed{\frac{1}{169}}$

D. P(face card and then heart) = $\frac{12}{52} \cdot \frac{13}{52} = \boxed{\frac{3}{52}}$

3. You randomly draw **TWO** cards, **WITHOUT** replacement. (these are dependent events!) Find the following probabilities.

A. P(red and then red) = $\frac{26}{52} \cdot \frac{25}{51} = \boxed{\frac{25}{102}}$

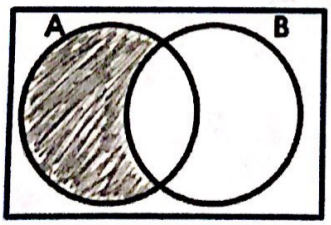
B. P(red and then black) = $\frac{26}{52} \cdot \frac{26}{51} = \boxed{\frac{13}{51}}$

C. P(4 and then 5) = $\frac{4}{52} \cdot \frac{4}{51} = \boxed{\frac{4}{663}}$

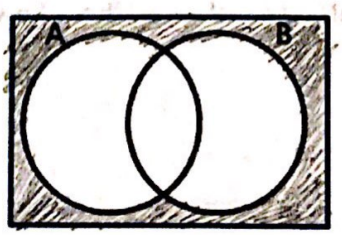
D. P(face card and then a 2) = $\frac{12}{52} \cdot \frac{4}{51} = \boxed{\frac{4}{221}}$

4. Shade in the appropriate area of the Venn Diagram.

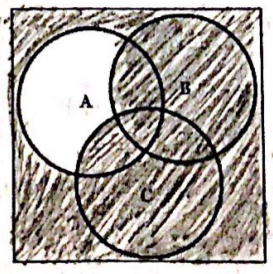
A. $(A \cap B')$



B. $(A \cup B)'$



C. $(A' \cup B \cup C)$

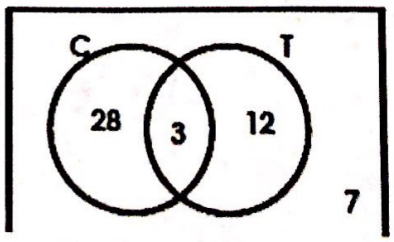


5. The Venn Diagram given shows the number of students in theatre (T) and in chorus (C).

A. P(T) = $\frac{15}{50} = \boxed{\frac{3}{10}}$

B. P(C ∩ T) = $\boxed{\frac{3}{50}}$

C. P(C') = $\boxed{\frac{19}{50}}$



Total # of Students = 50

6. A random survey was taken to gather information about grade level and car ownership status of students at a school. This table shows the results of the survey. Write your answer as a reduced fraction.

Car Ownership by Grade

	Owns a Car	Does Not Own a Car	TOTAL
Junior	6	10	16
Senior	12	8	20
TOTAL	18	18	36

Joint A. Is the number 10 a joint or marginal frequency?

$\frac{18}{36} = \frac{1}{2}$ B. Find the probability that a randomly selected student owns a car.

$\frac{6}{18} = \frac{1}{3}$ C. Find the probability that a randomly selected student will be a junior, given that the student owns a car.

$\frac{6}{16} = \frac{3}{8}$ D. P(owns a car | junior) "Prob. a student owns a car given that they are a junior."

7. Determine whether the following probabilities are mutually exclusive (ME), overlapping (O), independent (I), or dependent (D). Use the following scenario. You have a bag of 20 marbles: 6 red, 10 yellow, and 4 purple.

I $\frac{1}{25}$ A. You draw two marbles, with replacement. What is the probability you draw two purple marbles? $\frac{4}{20} \cdot \frac{4}{20} = \frac{1}{25}$

ME $\frac{4}{5}$ B. What is the probability that you draw one marble that is a yellow or a red? $\frac{10}{20} + \frac{6}{20} = \frac{16}{20} = \frac{4}{5}$

D $\frac{3}{19}$ C. You draw two marbles, without replacement. What is the probability that you draw a yellow marble and then a red marble? $\frac{10}{20} \cdot \frac{6}{19} = \frac{3}{19}$

Use the following scenario for numbers 8 & 9. You have a bag of marbles. There are 10 pink marbles, 5 green marbles, 2 yellow, 8 orange, and 5 purple marbles. Total marbles = 30

8. You randomly draw TWO marbles, WITH replacement. Find the following probabilities.

$\frac{1}{9}$ A. P(pink and then pink) $\frac{10}{30} \cdot \frac{10}{30} = \frac{1}{9}$

$\frac{2}{45}$ B. P(green and then orange) $\frac{5}{30} \cdot \frac{8}{30} = \frac{2}{45}$

9. You randomly draw TWO marbles, WITHOUT replacement. Find the following probabilities.

$\frac{3}{29}$ A. P(pink and then pink) $\frac{10}{30} \cdot \frac{9}{29} = \frac{3}{29}$

$\frac{4}{87}$ B. P(green and then orange) $\frac{5}{30} \cdot \frac{8}{29} = \frac{4}{87}$

10. The probability that a student at Pope High School plays soccer is 0.20. The probability that a student plays basketball is 0.25. The probability that students play both soccer and basketball is 0.05. **Are playing soccer and playing basketball independent?** $P(S \cap B) = P(S) \cdot P(B)$

$.05 \stackrel{?}{=} .2 \cdot .25$

$.05 = .05$ ✓ → Playing soccer + basketball are independent