CCGPS Analytic Geometry Probability Test Review I

1. Your school is selling sports packages with tickets to games for all of your favorite Atlanta teams. You have the option of choosing between 6 Falcons games, 4 Hawks games, and 9 Braves games. How many different packages could you create?

2. The math club is electing new officers. There are 3 candidates for president, 4 candidates for vice-president, 4 candidates for secretary, and 2 candidates for treasurer. How many different combinations of officers are possible?

3. A piggybank contains 2 quarters, 3 dimes, 4 nickels, and 5 pennies. One coin is removed at random.

   a) What is the probability that the coin is a dime?

   b) What is the probability that the coin is a dime **or** a nickel?

   c) What is the probability that you choose a dime **and** then a penny? (no replacement)

   d) What is the probability that the coin is not a dime?

   e) Are the two events, selection of a dime and selection of a nickel, mutually exclusive? Explain.

4. Each of the letters of the word "GEOMETRY" is on a separate card. The cards have been mixed and placed in a box. If you select one card at random, what is the probability that its letter will be "E"?

5. A card is randomly selected from a standard deck of 52 cards. Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

   a) P(Jack)

   b) P(Ace or a Diamond)

   c) P(Red and King)

   d) P(Black card or Numbered card)

6. Two cards are randomly selected from a standard deck of 52 cards (WITH REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack and Heart)

b) P(Diamond and Diamond)

c) P(Red and King)

d) P(Black card and Numbered card)

7. Two cards are randomly selected from a standard deck of 52 cards (**WITHOUT** REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack of Hearts and Heart)

b) P(Ace and Ace)

d) P(Black Card and Red King)

d) P(Black Jack and Numbered card)

8) The probability that a student with blue eyes is 35%. The probability that a student is over 6 feet tall and have blue eyes is 24%. What is the probability that a student is over 6 feet tall?

For #9 - 13, refer to the following table.

	Male	Female	Subtotal
Blue Eyes	10	30	
Green Eyes	20	60	
Subtotal			

9) P (Female) =

10. P (Blue Eyes) =

11.P(Blue Eyes | Female) =

12. P(Female | Blue Eyes) =

13. Are the events Female and Blue eyes independent? Explain.

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Key

1. Your school is selling sports packages with tickets to games for all of your favorite Atlanta teams. You have the option of choosing between 6 Falcons games, 4 Hawks games, and 9 Braves games. How many different packages could you create?

$6 \cdot 4 \cdot 9 = 216$

2. The math club is electing new officers. There are 3 candidates for president, 4 candidates for vice-president, 4 candidates for secretary, and 2 candidates for treasurer. How many different combinations of officers are possible?

$3 \cdot 4 \cdot 4 \cdot 2 = 96$

3. A piggybank contains 2 quarters, 3 dimes, 4 nickels, and 5 pennies. One coin is removed at random.

total: 14

a) What is the probability that the coin is a dime?

$\frac{3}{14}$

b) What is the probability that the coin is a dime **or** a nickel?

addition

$\frac{3}{14} + \frac{4}{14} = \frac{7}{14} = \boxed{\frac{1}{2}}$

c) What is the probability that you choose a dime **and** then a penny? (no replacement)

$\frac{3}{14} \cdot \frac{5}{13} = \boxed{\frac{15}{182}}$

d) What is the probability that the coin is not a dime?

$\boxed{\frac{11}{14}}$

e) Are the two events, selection of ~~a dime~~ and selection of a nickel, mutually exclusive? Explain.

yes mutually exclusive, b/c no coin can be both dime and nickel.

4. Each of the letters of the word "GEOMETRY" is on a separate card. The cards have been mixed and placed in a box. If you select one card at random, what is the probability that its letter will be "E"?

$\frac{2}{8} = \boxed{\frac{1}{4}}$

5. A card is randomly selected from a standard deck of 52 cards. Find the indicated probability.
Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.

a) P(Jack) $\frac{4}{52} = \frac{1}{13}$

b) P(Ace or a Diamond)

$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$

c) P(Red and King) ← overlap

$\frac{2}{52} = \boxed{\frac{1}{26}}$

d) P(Black card or Numbered card)

$\frac{26}{52} + \frac{36}{52} - \frac{18}{52} = \boxed{\frac{11}{13}}$

$\frac{}{52} \cdot \frac{}{52}$

6. Two cards are randomly selected from a standard deck of 52 cards (WITH REPLACEMENT). Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack and Heart)

$\frac{4}{52} \cdot \frac{13}{52} = \frac{1}{52}$

b) P(Diamond and Diamond)

$\frac{13}{52} \cdot \frac{13}{52} = \frac{1}{16}$

c) P(Red and King)

$\frac{26}{52} \cdot \frac{4}{52} = \frac{1}{26}$

d) P(Black card and Numbered card)

$\frac{26}{52} \cdot \frac{36}{52} = \frac{9}{26}$

7. Two cards are randomly selected from a standard deck of 52 cards (**WITHOUT** REPLACEMENT). $\frac{}{52} \cdot \frac{}{51}$ Find the indicated probability. **Hint: There are 4 jacks, 4 queens, 4 kings, 4 aces, 13 diamonds, 13 spades, 13 clubs, 13 hearts, 36 numbered cards, 26 red cards, and 26 black cards.**

a) P(Jack of Hearts and Heart)

$\frac{1}{52} \cdot \frac{12}{51} = \frac{12}{2652} = \frac{1}{221}$

b) P(Ace and Ace and Ace)

$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} = 0.00018$ $\frac{24}{132600}$

d) P(Black Card and Red King)

$\frac{26}{52} \cdot \frac{2}{51} = \frac{1}{51}$

d) P(Black Jack and Numbered card)

$\frac{2}{52} \cdot \frac{36}{51} = \frac{6}{221}$

0.35

8) The probability that a student with blue eyes is 35%. The probability that a student is over 6 feet tall and have blue eyes is 24%. What is the probability that a student is over 6 feet tall?

0.24

$P(\text{6ft and blue}) = P(\text{6 ft}) \cdot P(\text{blue})$

$0.24 = P(6) \cdot 0.35$

$\frac{0.24}{0.35} = \frac{P(6) \cdot 0.35}{0.35}$

$\frac{0.24}{0.35} = P(6)$

$P(6) = 0.686$

For #9 - 13, refer to the following table.

	Male	Female	Subtotal
Blue Eyes	10	30	40
Green Eyes	20	60	80
Subtotal	30	90	120

9) P (Female) = $\frac{90}{120} = \frac{3}{4}$

10. P (Blue Eyes) = $\frac{40}{120} = \frac{1}{3}$

denominator

11. P(Blue Eyes | Female) = $\frac{30}{90} = \frac{1}{3}$

12. P(Female | Blue Eyes) = $\frac{30}{40} = \frac{3}{4}$

13. Are the events Female and Blue eyes independent? Explain. No

$P(B|F) \neq P(F|B)$