

# 9-R

## Probability Quest Review

Review all homework & packets first

Show all SET UPS and FINAL ANSWERS, as a fraction or percent rounded to the nearest

- ONE card is selected randomly from a standard deck of cards
  - The events of drawing a Heart or a Diamond are:      mutually exclusive      not mutually exclusive
  - The events of drawing a 4 or Spade are:      mutually exclusive      not mutually exclusive
  - Odds (Face or Numbered Card)      mutually exclusive      not mutually exclusive
  - P(Heart or Face)      h. Odds (Face)
  - P(Jack | Face)      i. Odds (One-digit number)
  - P(Male | Face)      g. P(Diamond and Numbered)
  
- A bag contains 3 red marbles, 4 yellow marbles, and 5 blue marbles. TWO marbles are selected from the bag without replacement, one at a time.
  - The two events are:      Dependent      Independent
  - P(Y|R)      b. P(R|B)      c. P(Y, then Y)      d. P(B, then Y)
  
- If a couple has 5 children, what is the probability they will have...
  - Only 1 boy      b. At least 1 boy      c. Mostly girls?      d. No girls
  
- If 4 cards are drawn from two well shuffled standard decks with replacement, find the probability of drawing:
  - 4 diamonds      b. 0 diamonds      c. 2 diamonds      d. At least 2 diamonds

5. A survey was given to 10,000:

P(C) =      Odds (C')

P(C ∩ M)      (C ∩ F)

P(C | M)      P(C | F)      P(M | C)      P(F | C)

	Male	Female	Total
Color Blind	420	16	436
Not Color Blind	5580	3984	9564
Totals	6,000	4,000	10,000

6. A quiz has 8 multiple-choice questions, each with 5 choices. Given the following scenarios, calculate the probability of getting....

a. You're clueless and randomly guess at every question.

At least a 75% on the quiz?

A 100% on the quiz?

b. Assuming you paid attention and studied a little, you have a 60% chance of getting each question right.

At least a 75% on the quiz

A 100% on the quiz

7. The probability of Mrs. Serafino staying late any one of the 5 school days is 72%.

a. What is the probability of staying late every day?

b. A "busy week" is when Mrs. Serafino has to stay late at least 3 days in a school week. What is the probability of a week being a "busy week"?

c. In a Marking Period (of 10 weeks), what is the probability of her having at

No busy weeks?

At least 1 busy week?

At least 5 busy weeks?

8. The probability of someone being left-handed is 10%. The probability of being male is 50%. The probability of being male, given that you are left-handed is 60%..

P(Left-handed male)

P(Right-handed Female)

P(Lefthanded, given being male)

P(Lefthanded, given being female)

P(Male, given being lefty)

P(Female, given being a lefty)

P(Female, given being a righty)

9. If the  $P(B) = 3/7$ , the Odds (B) =

If the Odds (A) = 7:2, the Probability (A') =

## 9-R Probability Quest Review

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Show all SET UPS and FINAL ANSWERS, as a fraction or percent rounded to the nearest

1. ONE card is selected randomly from a standard deck of cards
- a. The events of drawing a Heart or a Diamond are: mutually exclusive not mutually exclusive
  - b. The events of drawing a 4 or Spade are: mutually exclusive not mutually exclusive
  - c. Odds (Face or Numbered Card) 12 : 1 mutually exclusive not mutually exclusive
  - d. P(Heart or Face)  $\frac{22}{52}$  11/26
  - e. P(Jack | Face) 1/3
  - f. P(Male | Face) 12/3
  - h. Odds (Face)  $12 : 40 =$  3 : 10
  - i. Odds (One-digit number) 8 : 5
  - g. P(Diamond and Numbered) 9/52

2. A bag contains 3 red marbles, 4 yellow marbles, and 5 blue marbles. TWO marbles are selected from the bag without replacement, one at a time.

- a. The two events are: Dependent Independent
  - b. P(Y|R) 4/11
  - b. P(R|B) 3/11
  - c. P(Y, then Y) 1/11
  - d. P(B, then Y) 5/33
- $\frac{4}{12} \cdot \frac{3}{11} =$  1/11
- $\frac{5}{12} \cdot \frac{4}{11} =$  5/33

3. If a couple has 5 children, what is the probability they will have...

- a. Only 1 boy 15.6%
  - b. At least 1 boy 96.9%
  - c. Mostly girls? 50%
  - d. No girls 3.1%
- $5C_1 (.5)^1 (.5)^4$        $1 - 5C_0 (.5)^0 (.5)^5$        $5C_3 + 5C_4 + 5C_5$  (you know what I mean)       $5C_0 (.5)^0 (.5)^5$

4. If 4 cards are drawn from two well shuffled standard decks with replacement, find the probability of drawing:

- Events are Independent
- a. 4 diamonds 0.39%
  - b. 0 diamonds 31.6%
  - c. 2 diamonds 21.1%
  - d. At least 2 diamonds 26.17%
- $4C_4 (1/4)^4 (3/4)^0$        $4C_0 (1/4)^0 (3/4)^4$        $4C_2 (1/4)^2 (3/4)^2$        $4C_2 + 4C_3 + 4C_4$

5. A survey was given to 10,000:

P(C) = 4.4%      Odds (C) 2391 : 109

$436/10000$        $9564 : 436$

P(C ∩ M) 4.2%      (C ∩ F) 0.16%

$420/10000$        $16/10000$

P(C | M) 7%      P(C | F) 0.4%      P(M | C) 96.3%      P(F | C) 3.7%

$420/6000$        $16/4000$        $420/436$        $16/436$

	Male	Female	Total
Color Blind	420	16	436
Not Color Blind	5580	3984	9564
Totals	6,000	4,000	10,000

\* Be able to put these statistics into words! They're real!

6. A quiz has 8 multiple-choice questions, each with 5 choices. Given the following scenarios, calculate the probability of getting....

a. You're clueless and randomly guess at every question.

At least a 75% on the quiz?  $0.123\%$  A 100% on the quiz?  $2.5 \times 10^{-6}$  or  $8C8 (1/5)^8 (4/5)^0 = 0.00025\%$

$8C6 (1/5)^6 (4/5)^2 + 8C7 + 8C8 \dots$

b. Assuming you paid attention and studied a little, you have a 60% chance of getting each question right.

At least a 75% on the quiz  $20.9\%$  A 100% on the quiz  $1.7\%$

$8C6 (.6)^6 (.4)^2 + 8C7 + 8C8 \dots$   $8C8 (.6)^8 (.4)^0$

7. The probability of Mrs. Serafino staying late any one of the 5 school days is 72%.

a. What is the probability of staying late every day?

$5C5 (.72)^5 (.28)^0 = 19.35\%$

b. A "busy week" is when Mrs. Serafino has to stay late at least 3 days in a school week. What is the probability of a week being a "busy week"?

$5C3 (.72)^3 (.28)^2 + 5C4 + 5C5 = 86.24\%$

c. In a Marking Period (of 10 weeks), what is the probability of her having #

No busy weeks?  $2.43 \times 10^{-9}$  At least 1 busy week?  $99.99\%$  At least 5 busy weeks?  $99.91\%$

$10C0 (.8624)^0 (.1376)^{10}$  *verrry small so 10%* 1 - none (practically 100%)  $10C5 + 10C6 + 10C7 \dots$

8. The probability of someone being left-handed is 10%. The probability of being male is 50%. The probability of being male, given that you are left-handed is 60%..

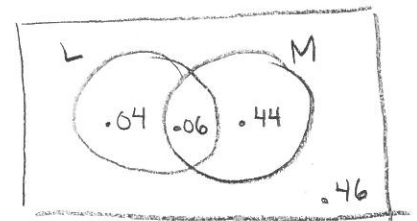
$M|L = \frac{M \cap L}{L} \cdot 6 = \frac{x}{.1} \cdot x = .06$

P(Left-handed male)  $6\%$

P(Right-handed Female)  $46\%$

P(Lefthanded, given being male)  $.06 / .5 = 12\%$

P(Lefthanded, given being female)  $.04 / .5 = 8\%$



P(Male, given being lefty)  $.06 / .1 = 60\%$

P(Female, given being a lefty)  $.04 / .1 = 40\%$

P(Female, given being a righty)  $.46 / .9 = 51.1\%$

9. If the  $P(B) = 3/7$ , the Odds (B) =  $3:4$

If the Odds (A) = 7:2, the Probability (A') =  $\frac{2}{9}$