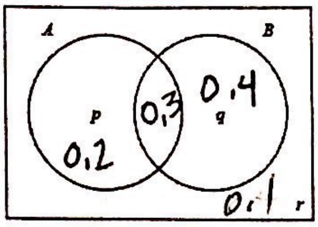
# SL 1 PROBABILITY REVIEW #3

NAME______________________________ HR:__

## ONE: <u>NON CALCULATOR</u> FOUNDATIONAL

Consider the events $A$ and $B$, where $P(A) = 0.5$, $P(B) = 0.7$ and $P(A \cap B) = 0.3$.

The Venn diagram below shows the events $A$ and $B$, and the probabilities $p$, $q$ and $r$.




(a) Write down the value of

(i) $p$; $0.2$

(ii) $q$; $0.4$

(iii) $r$. $0.1$

(b) Find the value of $P(A \mid B')$. $= \dfrac{P(A \cap B')}{B'} = \dfrac{0.2}{0.3}$ 66%

(c) Hence, or otherwise, show that the events $A$ and $B$ are not independent.

INDEPENDANT: $P(A) \cdot P(B) = P(A \cap B) \rightarrow (0.5) \cdot (0.7) \neq (0.3)$

$\therefore$ DEPENDANT

## TWO: <u>NON CALCULATOR</u> FOUNDATIONAL

There are 20 students in a classroom. Each student plays only one sport. The table below gives their sport and gender.

| | Football | Tennis | Hockey |
|---|---|---|---|
| Female | 5 | 3 | 3 |
| Male | 4 | 2 | 3 |

(a) One student is selected at random.

(i) Calculate the probability that the student is a male or is a tennis player. $\dfrac{12}{20} = 60\%$

(ii) Given that the student selected is female, calculate the probability that the student does not play football. $\dfrac{6}{11} \approx 54.5\%$

(b) Two students are selected at random. Calculate the probability that neither student plays football.

$\dfrac{11}{20} \cdot \dfrac{10}{19} = \dfrac{110}{380} \approx 29\%$

## THREE: <u>NON CALCULATOR</u> FOUNDATIONAL

Consider the events $A$ and $B$, where $P(A) = \dfrac{2}{5}$, $P(B') = \dfrac{1}{4}$ and $P(A \cup B) = \dfrac{7}{8}$.

(a) Write down $P(B)$. $\dfrac{3}{4}$

(b) Find $P(A \cap B)$.

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\dfrac{7}{8} = \dfrac{2}{5} + \dfrac{3}{4} - P(A \cap B)$

$\dfrac{35}{40} = \dfrac{16}{40} + \dfrac{30}{40} - P(A \cap B)$

$\dfrac{11}{40}$

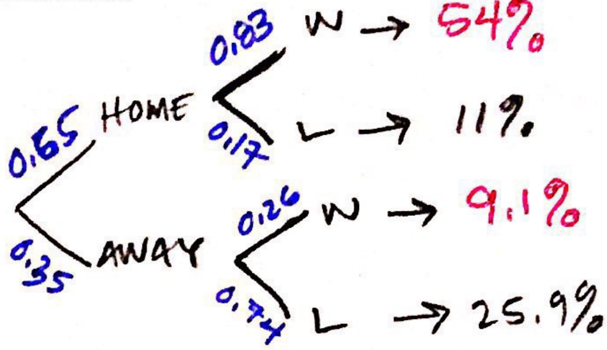
(c) Find $P(A \mid B)$.

$= \dfrac{\frac{11}{40}}{\frac{30}{40}}$

$= \dfrac{11}{\cancel{40}} \cdot \dfrac{\cancel{40}}{30} = \dfrac{11}{30}$

**FOUR:** **WITH CALCULATOR** FOUNDATIONAL

In any given season, a soccer team plays 65 % of their games at home.
When the team plays at home, they win 83 % of their games.
When they play away from home, they win 26 % of their games.




The team plays one game.

(a) Find the probability that the team wins the game. $\boxed{63\%}$

(b) If the team does not win the game, find the probability that the game was played at home.

$\frac{11}{36.9} \approx \boxed{29.8\%}$

| | H | A |
|---|---|---|
| W | 54 | 9.1 |
| L | 11 | 25.9 |

← THIS IS GIVEN

**FIVE:** **WITH CALCULATOR** FOUNDATIONAL

Jan plays a game where she tosses two fair six-sided dice. She wins a prize if the sum of her scores is 5.

(a) Jan tosses the two dice once. Find the probability that she wins a prize. (2,3) (3,2) (4,1) (1,4)

$\frac{4}{36} \approx \boxed{11.1\%}$

(b) Jan tosses the two dice 8 times. Find the probability that she wins 3 prizes.

EIGHTH ROW 1 8 28 56 70 56 28 8 1

0 FIVES, 1 FIVE, 2 FIVES, 3 FIVES

# OF REARRANGMENTS

$56\left(\frac{4}{36}\right)^3 \cdot \left(\frac{32}{36}\right)^5 \approx \boxed{4.26\%}$

**SIX:** **WITH CALCULATOR** MODERATE

Evan likes to play two games of chance, A and B.

For game A, the probability that Evan wins is 0.9. He plays game A seven times.

USE: 1 7 21 35 35 21 7 1

(a) Find the probability that he wins exactly four games. $35(0.9)^4(0.1)^3 \approx \boxed{2.3\%}$

For game B, the probability that Evan wins is $p$. He plays game B seven times.

(b) Write down an expression, in terms of $p$, for the probability that he wins exactly four games. $35(P)^4(1-P)^3$

(c) Hence, find the values of $p$ such that the probability that he wins exactly four games is 0.15.

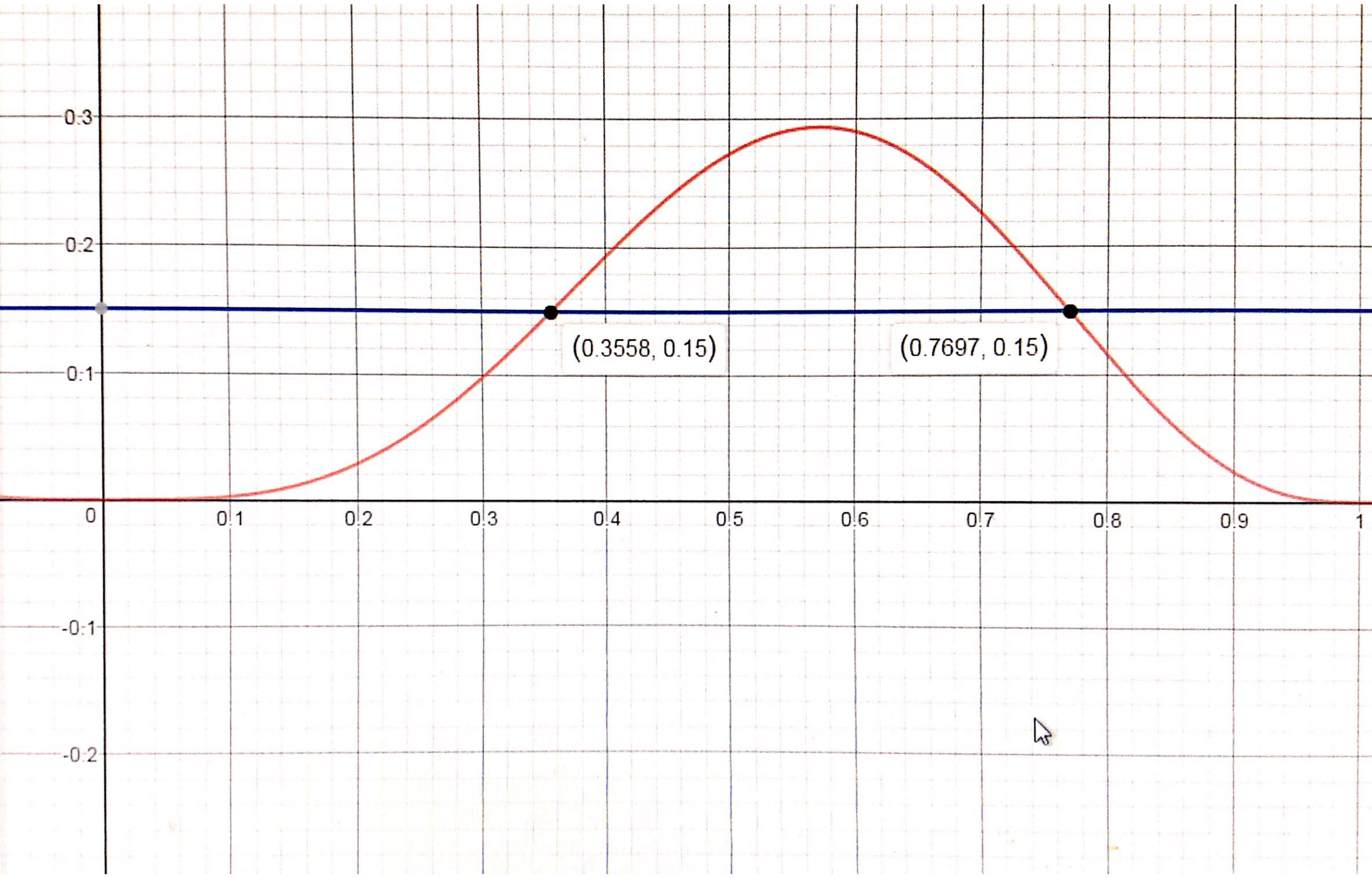
$35(P)^4(1-P)^3 = 0.15$ SOLVE FOR P

GRAPH THIS $Y = 35 \cdot x^4 \cdot (1-x)^3$

$Y = 0.15 \quad \{x \mid 0 < x < 1\}$

$X = 35.6\%$ OR $77\%$

https://goo.gl/6W8sqz



0.3
0.2
0.1
0
-0.1
-0.2
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
(0.3558, 0.15)
(0.7697, 0.15)