

Lesson 2: Conditional Prob.

1)

1,1	1,2	1,3	1,4	1,5	1,6
2,1	2,2	2,3	2,4	2,5	2,6
3,1	3,2	3,3	3,4	3,5	3,6
4,1	4,2	4,3	4,4	4,5	4,6
5,1	5,2	5,3	5,4	5,5	5,6
6,1	6,2	6,3	6,4	6,5	6,6

9 times where
BOTH are
odd....
of those, 3
are doubles

$$\frac{3}{9} = \frac{1}{3} \Rightarrow \text{C}$$

4) "A" $P(T) = .6 = \frac{60 \text{ tacos}}{100 \text{ total}}$

40 H

"B" $P(MS) = .6 = \frac{60 \text{ MS}}{100 \text{ total}}$

60 M

100 total

60 T \rightarrow 24 H
 \rightarrow 36 M

To check for independence when it's not obvious... $P(A \& B) = P(A) \cdot P(B)$

$$P(T \& MS) = P(T) \cdot P(MS)$$

$$\frac{36 \text{ MS \& T}}{100 \text{ total}} = .6 \cdot .6$$

$$.36 = .36$$

INDEPENDENT!

$$P(T|MS) = \frac{36 \text{ tacos}}{60 \text{ MS}} = \frac{3}{5}$$

$$P(MS|T) = \frac{36 \text{ MS}}{60 \text{ tacos}}$$

$$\therefore P(T|MS) = P(MS|T) = \frac{3}{5}$$

C

5) $P(E) = 0.4$

$P(E \& F) = 0.32$

$\frac{P(E \& F)}{P(E)} = \frac{0.32}{0.4} = .8 \Rightarrow 80\%$

(d)

6)

	A	B	C	
M	15	20	25	60 M
F	20	15	15	50 F
	35	35	40	110 total
	A	B	C	

$P(M|B) = \frac{\text{male store B}}{\text{store B}} = \frac{20}{35} = \frac{4}{7}$ (d)

7)

	S	M	L	
Thin	20	15	25	60
Thick	20	25	15	60
	40	40	40	120 total

$P(\text{Thin}) = \frac{60}{120}$
 $P(S) = \frac{40}{120}$

Check for independence $\rightarrow P(A \& B) = P(A) \cdot P(B)$

$P(\text{Thin} \& S) = P(\text{Thin}) \cdot P(S)$

$\frac{20}{120} = \frac{60}{120} \cdot \frac{40}{120}$

$\frac{1}{6} = \frac{1}{6}$

✓ INDEPENDENT!

$P(\text{Thin}|S) = \frac{20}{40} = \frac{1}{2}$
 $P(S|\text{Thin}) = \frac{20}{60} = \frac{1}{3}$
 $\frac{1}{2} > \frac{1}{3} \therefore$ (d)

8)

	M	A	
C	30	20	50
E	15	20	35
L	15	20	35
	60	60	120 total

$$P(C) = \frac{50}{120}$$

$$P(A) = \frac{60}{120}$$

Check for independence $\rightarrow P(A \& B) = P(A) \cdot P(B)$

$$P(C \& A) = P(C) \cdot P(A)$$

$$\frac{20}{120} = \frac{50}{120} \cdot \frac{60}{120}$$

$$\frac{1}{6} = \frac{5}{24}$$

DEPENDENT!

$$P(C|A) = \frac{20}{60} = \frac{1}{3}$$

$$\frac{1}{3} > \frac{2}{5} \therefore \text{a}$$

$$P(A|C) = \frac{20}{50} = \frac{2}{5}$$

9)

	B	PL	CS	
E	8	8	4	20
W	6	6	8	20
C	11	1	8	20
	25	15	20	60 total

$$a) P(C) = \frac{20}{60} = \frac{1}{3} = 0.\overline{33}$$

$$b) P(W|CS) = \frac{8}{20} = \frac{2}{5} = .40$$

$$c) P(E|B) = \frac{8}{25} = .32$$

$$d) P(B|W) = \frac{6}{20} = \frac{3}{10} = .30$$