

5.3 #1s 63, 65, 67, 69, 71

(63) (A) $P(\text{almost certain given male}) =$
$$\frac{P(A \cap B)}{P(B)} = \frac{P(\text{almost certain and male})}{P(\text{male})} = \frac{597}{2459}$$

Formula on Green Sheet $= .2428$ or about 24.3%

(B) $P(\text{Female} \mid \text{some chance but probably not}) = \frac{P(\text{Female and Some Chance})}{P(\text{some chance})} = \frac{426}{712}$
 $= .5983$ or about 59.8%

(65) (a) $P(\text{a good chance} \mid \text{female}) = \frac{663}{2367} = .2801$

(b) $P(\text{a good chance}) = \frac{1421}{4826} = .2944$

(c) The events "a good chance" and female are NOT independent, since the two probabilities are NOT EQUAL $.2801 \neq .2944$.

(67) (a) $P(D \mid F) = \frac{P(D \text{ and } F)}{P(F)} = \frac{13}{13+4} = \frac{13}{17} = .7647$

This means that approximately 76% OF THE FEMALES ARE Democrats

(b) $P(F \mid D) = \frac{P(D \text{ and } F)}{P(D)} = \frac{13}{47+13} = \frac{13}{60} = .2167$

This means approximately 22% of the democrats are female

5.3

$$(69) \quad P(D) = \frac{47+13}{100} = \frac{60}{100} = .60 \neq P(D|F) = .7647 \quad (\text{from \#67})$$

Since these 2 probabilities are not the same,
Democrat and Female are NOT independent.

$$(71) \text{ [A]} \quad P(\text{is studying other than English}) = 1 - P(\text{None}) \\ = 1 - .59 = .41$$

$$\text{[B]} \quad P(\text{Spanish} \mid \text{other than English}) = \frac{.26}{.41} = .6341$$

5.3 75, 77, 79, 83, 85, 87, 91, 95, 99, 104-106

75 Roll 2 6 sided Dice HAS 36 OUTCOMES

EVENTS:
Sum is 7
and
Green die
is a 4

$$P(\text{Sum is 7}) = (1,6) (2,5) (3,4) (4,3) (5,2) (6,1) = \frac{6}{36} = \frac{1}{6}$$

$$P(\text{GREEN DIE SHOWS A 4}) = (1,4) (2,4) (3,4) (4,4) (5,4) (6,4) = \frac{6}{36}$$

$$P(\text{Sum 7} | \text{GREEN 4}) = \frac{1}{6}$$

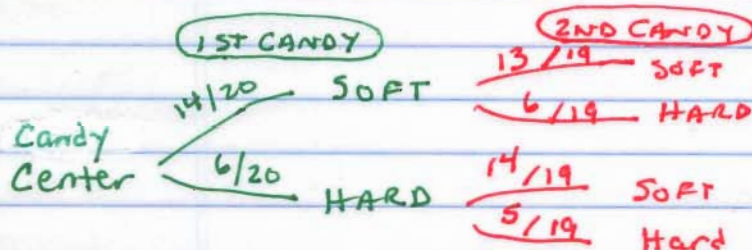
Therefore:

$$P(\text{Sum is 7}) = P(\text{Sum 7} | \text{GREEN 4})$$

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

since these are EQUAL THE EVENTS ARE INDEPENDENT.

77 a



$$b) P(\text{one soft} \cap \text{one hard}) = \left(\frac{14}{20}\right)\left(\frac{6}{19}\right) + \left(\frac{6}{20}\right)\left(\frac{14}{19}\right) = 0.442$$

79 $P(\text{download music}) = .29$

$$P(\text{don't care} | \text{download music}) = .67$$

General multiplication Rule $P(A \cap B) = P(A) \cdot P(B|A)$
make sure you know how to get this formula on the green sheet

$$P(\text{download music} \cap \text{don't care}) = P(\text{download}) \cdot P(\text{don't care} | \text{download})$$

$$= (.29)(.67) = 0.1943$$

5.3

(83) Notice: the problem gives conditional probabilities

Customer	$\frac{.88}{.02}$ REGULAR	$\frac{.28}{.72}$ credit = $(.88)(.28) = .2464$ no cc = $.6336$
	Mid Grade	$\frac{.34}{.66}$ credit = $(.02)(.34) = .0068$ no cc = $.0132$
	$\frac{.10}{.58}$ Premium	$\frac{.42}{.58}$ credit = $(.10)(.42) = .0420$ no cc = $.0580$

$$P(\text{credit card}) = .2464 + .0068 + .0420 = .2952$$

CONCLUSION (IN CONTEXT): About 29.5% of customers use their credit card to pay for their gas.

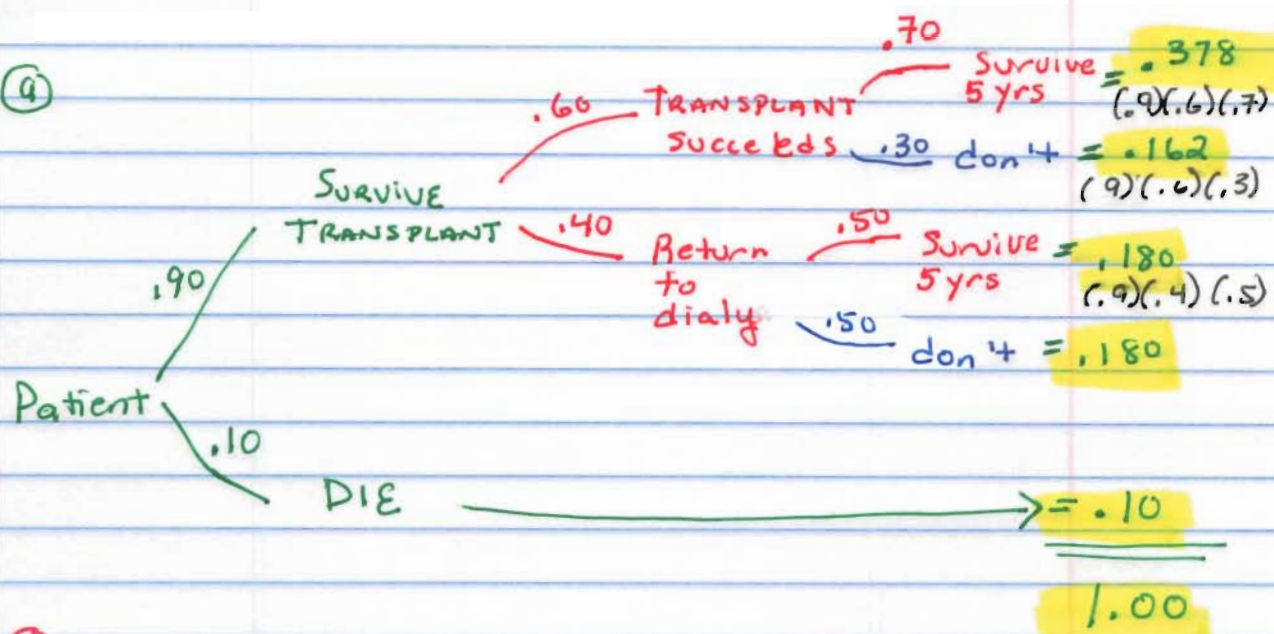
$$(85) P(\text{Premium Gas} | \text{credit card}) = \frac{P(\text{premium gas} \cap \text{credit card})}{P(\text{credit card})}$$

about 14% bought premium gas given they paid with a credit card

$$= \frac{.0420}{.2952} = .1423$$

5.3

(87) (a)



(b) $P(\text{SURVIVE 5 YEARS}) = .378 + .180 = .558$

(91) $P(\text{at least 1 universal donor}) = 1 - P(\text{none are universal donors})$

Known
 $P(O \text{ Negative}) = .072$
 $P(\text{Not } O^-) = .928$
 $P(\text{NONE are } O^- \text{ out 10}) = .928^{10} = .474$
 $1 - .474 = .526$

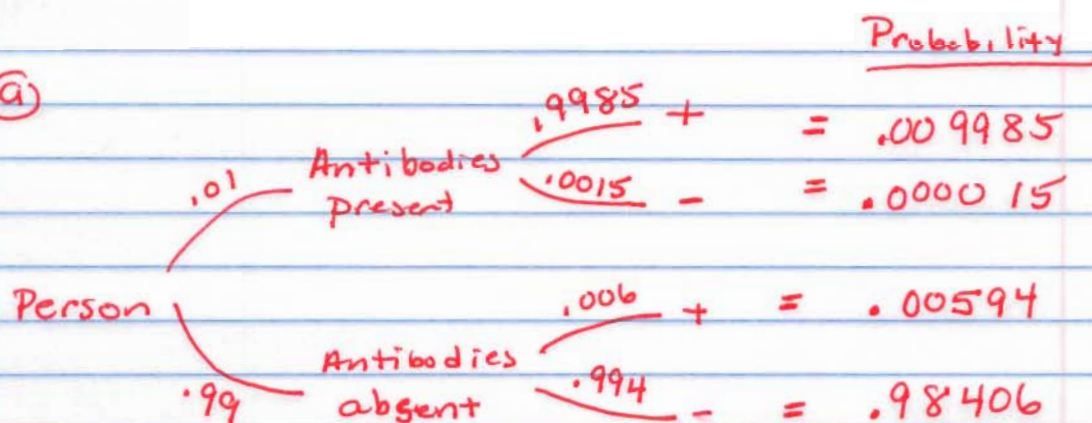
Conclude: There is about a 53% Chance that at least one of the 10 blood donors in a universal donor (O^-)

(95) $P(\text{My Space} | \text{Facebook}) = \frac{P(\text{FB} \cap \text{MS})}{P(\text{FB})} = \frac{.42}{.85} = .494$

Given
 $P(\text{FB}) = .85$
 $P(\text{MS}) = .54$
 $P(\text{FB} \cap \text{MS}) = .42$
 AP GREEN SHEET: $P(B|A) = \frac{P(A \cap B)}{P(A)}$

5.3

99 a)



b) $P(\text{POSITIVE TEST RESULT}) = .009985 + .00594$
 $= \boxed{.015925}$

c) $P(\text{ANTIBODY} | \text{POSITIVE}) = \frac{P(\text{antibody} \cap \text{positive})}{p(\text{positive})}$
 $= \frac{.009985}{.015925} = \boxed{.627}$

104 c)

	A	NOT A	
B			.8 ← P(B)
NOT B		$(.2 \times .1) = .02$	.2
	.9 ↑ P(A)	.1	1.0

$P(\text{Neither}) = .02$

Events are independent so can multiply events

5.3

105 (e)

exam all 50 w/ food poisoning
random sample 200 at conference who did not
have food poisoning
40% of 50 w/ food poisoning went to party
10% of conference attendees went to party

Prob describe 40% of people went to party

A = attend party
F = food poisoning

$$.40 = P(A | F)$$

↑ None of the choices

106 (d)

$$P(1 \text{ Given } 000) = \frac{P(1 \cap 000)}{P(000)} = \frac{.3}{.3 + .1 + .1} = .6$$