Lesson 0 Homework

4 2 Managers
12 Analysts
20 Techs
34 Total

$\binom{34}{3}$ = 5984 Total Combinations

a) All analysts $\binom{12}{3} = 220$ $\frac{220}{5984} = .03368$

b) Both managers $\binom{2}{2}\binom{32}{1} = 32$ $\frac{32}{5984} = .0053$

c) Two of one job category + one other category

techs $\binom{20}{2}\binom{14}{1} = 190(14) = 2660$

analysts $\binom{12}{2}\binom{22}{1} = 66(22) = 1452$

manager $\binom{2}{2}\binom{32}{1} = 1(32) = 32$

} 4144

$\frac{4144}{5984} = .6925$

d) Atleast 2 from same team

$5984 - \binom{20}{1}\binom{12}{1}\binom{2}{1} \Rightarrow 5984 - 480 = 5504$

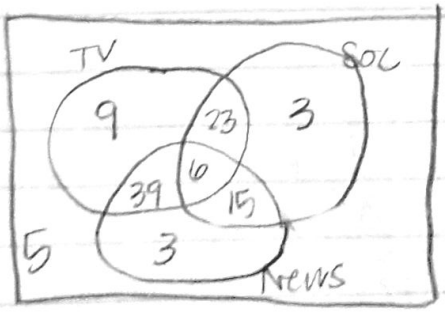
5 a) $0.77 - 0.45 = 0.32$

b) $1 - 0.77 - 0.29 \Rightarrow 1 - 0.48 \Rightarrow 0.52$

c) Just TV $77 - 6 - 39 - 23 = 9$

News $63 - 6 - 15 - 39 = 3$

Social $47 - 6 - 15 - 23 = 3$



$100 - 9 - 23 - 3 - 15 - 3 - 39 - 6 = 5$

None of the sources = 5%.

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	Pos	Neg	
Disease	99%·(100) = 99	1%·(100) = 1	10%·(1000) = 100
No Disease	2%·(900) = 18	98%·(900) = 882	90%·(1000) = 900
	117	883	1000

a) $\frac{99}{1000} = 0.099$ b) $\frac{882}{1000} = 0.882$

test is more reliable for those without the disease. not great at diagnosis.

c)

	P	N	
D	9.9	0.1	10
ND	19.8	970.2	990
	29.7	970.3	1000

$\frac{9.9}{1000} = 0.0099$

d) This test gets less reliable as prevalence decreases. To accurately diagnosis a rare disease, a better test should be used.

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	Defect	No Defect	
A	25.2	604.8	630
B	29.6	340.4	370
	54.8	945.2	1000

a) $\frac{25.2}{1000} = 0.0252$ b) $\frac{54.8}{1000} = 0.0548$

c) $\frac{25.2}{54.8} = 0.4598$

13 a) Discrete b) 0.4 c) 0.6

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16 a) $\int 2x^{-3} \Rightarrow \frac{-1}{x^2} + C$

b) $P(X \leq \theta_p) = F(\theta_p) = \frac{-1}{\theta_p^2} + C$

16 cont'd

b) $F(\theta_{.5}) = \frac{-1}{\theta_{.5}^2} + c$

17 $Var(aX+b) = a^2 Var(X)$ $\quad E(Y) = aE(X) + b$

$Y = aX + b$ $\quad Var(Y) = a^2(Var(X))$