

1)  $30/7 = 4 \text{ weeks} + 2 \text{ days}$

The month must start on a Monday or Tuesday

$$2/7 = .2857 = 28.57\%$$

2) a)  $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = 1/216$

b)  $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = 1/216$

c)  $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = 1/8$

3) a)  $10+40+50 \quad 40/50 = 4/5$

b) The outcome of the second trial is independent because the results of the second trial did not rely on the first

4) a)  $1/(25+50) = 1/75$

b)  $(25-1)/(25+50) = 24/75$

c) I don't see any issues. Obviously no false negatives would be better but if only  $1/200$  students is affected this is a lot of resources dedicated to something that affect very few students.

5) a)  $G > S = 1/2 \quad G > B = 1/3$

if  $S < G < B$ , 1 case  
 $\frac{1}{2} \cdot \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$

if  $S$  and  $B < G$ , 6 cases  
 $\frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$

if  $B < G < S$ , 2 cases  
 $\frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$

if  $S$  and  $B > G$ , -3 cases  
 $\frac{1}{2} \cdot \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$

Cases	$P(x)$	$x^2$	$x^2 \cdot P(x)$
1	$1/3$	1	$1/3$
2	$1/6$	4	$2/3$
6	$1/6$	36	6
-3	$1/3$	9	3
$E(x) = 2/3$		$E(x^2) = 10$	

$$\sigma^2 = E(x^2) - [E(x)]^2$$

$$\sigma = \sqrt{\sigma^2}$$

$$\text{Var} = 10 - (2/3)^2$$

$$\text{Std dev} = \sqrt{10 - (2/3)^2}$$

$$= 3.09$$

b) If there is football and beer involved, we're probably already drunk meaning our judgement is impaired and everything seems like a good idea. In addition, any good friend winning a bet like this would share the beers.

6) a) No. Believing that global warming is independent of political affiliation.

b)  $.2 + .6 - .18 = .62$

c)  $.18/.2 = .9$

d)  $.11/.33 = 1/3$

e) They are not fully independent but conservatives frequently choose to ignore science while democrats listen to people with degrees

f)  $.06/.31 = .176$

7)

	Grad	Asst grad	Total
male	19	41	60
female	12	28	40
Total	31	69	100

a)  $19/100 = .19$   
Joint probability

b)  $60/100 = .6$

c)  $31/100 = .31$   
marginal probability

d)  $28/69 = .405$   
conditional probability

8)  $X = 22 \quad E(x) = 1.8 \quad SD = 1.2$

a)  $SD = \sqrt{22 \cdot 1.2^2} \quad \text{mean} = 22 \cdot 1.8$   
 $= 5.63 \quad = 39.6$

b)  $SD = 5.63 \cdot 1000 \quad \text{mean} = 39.6 \cdot 1000$   
 $= 5630 \quad = 3960$

9) mean = 72 SD = 12  $\rightarrow$  exam 70% of grade  
mean = 95 SD = 4  $\rightarrow$  project 30% of grade

$$\text{Mean} = (.7 \cdot 72) + (.3 \cdot 95) = 78.9$$

$$SD = 4^2 + 12^2 = 12.649$$

10) mean = 74 SD = 9 n = 36

$$\text{mean} = 74$$

$$SD = 6/\sqrt{n} = 9/\sqrt{36} = 9/6 = 1.5$$