Math 107 Solutions to Probability Assignment 1

1. 12/52 or 3/13 or $\approx 23\%$

2. ¼ or 25%

3. 20/45 or 4/9 or $\approx 44.4\%$

4. 97.7%

5. 10/15 or 2/3 or $\approx 67\%$

6. 5/15 or 1/3 or $\approx 33\%$

7. a) 190/224 or $\approx 85\%$ b) 410/440 or $\approx 93\%$ c) 190/220 or $\approx 86\%$ d) 410/444 $\approx 92.3\%$

8. sensitivity=285/300, specificity = 420/700, PPV=285/565, NPV = 420/435

9.

	Has disease	Does not have disease	Totals
Test positive	150,000	120,000	270,000
Test negative	50,000	680,000	730,000
Totals	200,000	800,000	1,000,000

10. PPV .49/.79 $\approx 64.5\%$ NPV 2.46/2.54 $\approx 96.9\%$

11. 651/1302 $= 50\%$ so this is not that useful (although a person who tests positive is 7 times more likely to use drugs if they test positive rather than just being chosen from the general population)

12.

	Has disease	Does not have disease	Totals
Test positive	999	999	1998
Test negative	1	998001	998002
Totals	1000	999000	1,000,000

a) 999/1998= 50%

b) 998,001/998002 $\approx 99.9\%$ This test is effective at screening out those who don't have HIV. However, a different test would be needed to determine if someone who tests positive really has HIV.

13. Out of 100 students, 10 have taken a distance learning class, 40 are part time and 8 have are part time and have taken a distance learning class.

a) 8%

b) 80% (of the 10 that have taken distance learning class, 8 are part time)

c) 40%+10% - 8% = 42%