Stats 10
Homework 4
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1A

5 ~~2. a. 5 5 1 8 5 7 4 8 3 4 8 1~~
~~C C M C C C M C M M C M~~

~~1 7 2 8 9 2 8 1~~
~~M C M C C M C M~~

~~b. 9 ÷ 20 = 45%~~
~~∴ 45% are assigned to the music group.~~

~~c. Yes, because in this way, there are still 5 numbers for music group and 5 number for control group, so the theoritical probability of assigning to either group is still 50%, so it remains the same.~~

4. This is an example of empirical probability, because it is obtained directly from observations of a real-life process.

6. This is a theoretical probability, because it is from concepts instead of real life processes. $P = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

10. a. because it is larger than 100%.
c. because it is negative.

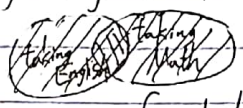
12. a. $P_a = \frac{26}{52} = \frac{1}{2} = 50\%$
b. $P_b = \frac{13}{52} = \frac{1}{4} = 25\%$
c. $P_c = \frac{12}{52} = \frac{3}{13} \approx 0.23$
d. $P_d = \frac{4}{52} = \frac{1}{13} \approx 0.077$
e. $P_e = \frac{8}{52} = \frac{2}{13} \approx 0.15$

16. a. $P_a = \frac{1}{8} = 0.125$
b. $P_b = \frac{3}{8} = 0.375$
c. $P_c = \frac{3}{8} = 0.375$
d. $P_d = \frac{1}{8} = 0.125$
e. $P_a + P_b + P_c + P_d = 0.125 + 0.375 + 0.375 + 0.125 = 1$
The sum is 1 because the four probabilities have covered all outcomes and they are also disjoint.

22. $P = \frac{56}{1275} \approx 0.0439$

26. $P = \frac{722}{1275} + \frac{101}{1275} - \frac{45}{1275} = \frac{778}{1275} \approx 0.61$

40. a. The group of students who are currently taking English is larger.



students taking English and Math
students taking English or Math

b. The group of students who are taking English OR Math is larger.

46. a. $P_a = 1 - 0.23 - 0.41 = 0.36$
b. $P_b = 0.36 + 0.41 = 0.77$
c. $P_c = 0.23 + 0.41 = 0.64$
d. P_a and P_c are complement, because $P_a + P_c = 0.36 + 0.64 = 1$ and the events they consider are disjoint while cover all outcomes.

52. ~~P(left-handed) = P(left-handed|man) + P(left-handed|woman)~~
They are ~~P(left-handed|man)P(man) + P(left-handed|woman) P(woman)~~ associated. ~~19% · 50%~~
because knowing ~~19% · 50% 9.5% 81%~~ the gender of the person gives us information about the event of being left-handed, since left-handness has different probabilities in men and women.

64. $P(A) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{64} = 0.15625$

$P(B) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{64} = 0.15625$

$\therefore P(A) = P(B)$ They are equally likely.

66. a. $P_a = 95\% \times 95\% = 90.25\%$

b. $P_b = (1-95\%) \times (1-95\%) = 0.25\%$

c. $P_c = 95\% \times (1-95\%) + (1-95\%) \times 95\%$

$= 9.5\%$