Math 480   Quiz 1 fall 2018   Name_____
YOU ARE BEING GRADED FOR WORK, NOT JUST THE FINAL ANSWER

# of hits in a region	0	1	2	3	4 or more
probability	0.40	0.37	0.16	0.06	?

$?_{.01}$

1) When Germany bombed London in World War II, a rumor was spread that the bombs were guided. To test this claim, intelligence divided London into 576 regions of 0.25 square kilometers each. If the bombs were hitting at random, then the number of hits would have the probabilities given above. (It turned out that the bombs were indeed falling at random.) What was the probability of a region getting 3 or more hits?

$.06 + .01 = \boxed{0.07} = 1 - .4 - .37 - .16$

2) Compute $\binom{13}{3}$.
$= \dfrac{13!}{3! \, 10!} = \dfrac{13 \cdot 12 \cdot 11}{3 \cdot 2 \cdot 1} = \boxed{286}$

3) In how many ways can a committee consisting of three full professors and two associate professors be chosen from a group of ten full professors and five associate professors? Simplify.

$\underset{F}{\binom{10}{3}} \quad \underset{A}{\binom{5}{2}} = \dfrac{10!}{3! \, 7!} \; \dfrac{5!}{3! \, 2!} = \dfrac{10 \cdot 9 \cdot 8}{3 \cdot 2} \quad \dfrac{5 \cdot 4}{2}$

$= 120 \, (10) = \boxed{1200}$

ordered $10 \cdot 9 \cdot 8 \cdot 5 \cdot 4 = 14400$ overcounts

prob $\dfrac{\binom{10}{3}\binom{5}{2}}{\binom{15}{5}} \approx 0.4$

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e 4) A bowl contains ten marbles. Three are red, 2 are white, and 5 are blue. Suppose that a marble is selected at random from the bowl. What is the probability that the marble obtained is white?

$$\frac{2}{3+2+5} = \frac{2}{10} = \left(\frac{1}{5} = 0.2\right) = \frac{(3)}{(10)}$$

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5) The serial number on a dollar bill consists of a letter followed by 8 digits and another letter (e.g., A 43557890 B).

*use exp
notation
like 2.423*
10

a) How many serial numbers are possible (if letters and digits may be repeated)?

$$\underset{L}{\frac{26}{\quad}}\ \underset{}{\frac{10}{\quad}}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \frac{10}{\quad}\ \underset{L}{\frac{26}{\quad}} = (26)^2 (10)^8$$

$$= 676 (10)^8 = 6.76 (10^{10})$$

b) How many serial numbers are possible if neither letters nor digits may be repeated?

$$\underset{L}{\frac{26}{\quad}}\ \frac{10}{\quad}\ \frac{9}{\quad}\ \frac{8}{\quad}\ \frac{7}{\quad}\ \frac{6}{\quad}\ \frac{5}{\quad}\ \frac{4}{\quad}\ \frac{3}{\quad}\ \frac{25}{\quad} = \boxed{26(25)\ \frac{10!}{2!}}$$

$$= P^{26}_2\ P^{10}_8 \qquad = \frac{26!}{24!}\ \frac{10!}{2!} \qquad \boxed{= 1,179,360,000}$$

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6) A 5 sided die is rolled twice and the **product** of the resulting two tosses is taken. $\approx 1.179 \times 10^9$
a) List all possibilities in the table below.)

pairs
x

2nd roll	1st roll				
	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

b) What is the chance that the **product** of the two rolls is four?

$$\boxed{\frac{3}{25} = 0.12}$$

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