Analysis 2013/14 $_iC_u$ to take this quiz: [redacted] period D

27 ..

No calculators. [27 pts total]

There is no need to calculate an answer. Leave answers in factorial or "choose" form.

1. My daughter's 5th grade class has 30 students. How many ways can their teacher line them up if:

a) They make a straight line $30!$ [1] ✓

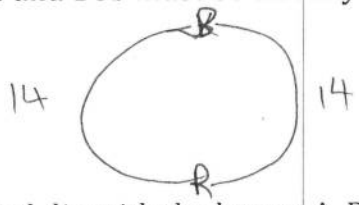
b) They make a straight line, but Emily, Megan and Audrey must be next to each other

EMA XXXXX ...

$3! \cdot 28!$ [2] ✓

c) They make a circle and Bob must be directly across from Rob $\binom{28}{14} \cdot 14! \cdot 14!$ [2]

AKA 28! ..



2. Wilfred has a 4 sided die with the letters A, B, C, and D on it. He rolls the die 12 times, and records the sequence of letters.

a) How many different letter arrangements are possible? [1]

4^{12} ✓

A B C D

b) How many of these arrangements include exactly two "A's"? [2]

$\binom{12}{2} \cdot 3^{10}$ ✓

A A B C D ...

c) How many ways can Wilfred get **at least one** "A"? [2]

$4^{12} - 3^{12}$ ✓

B C D ...

3. There are 5 nominees for homecoming queen and 5 for homecoming king. How many different Homecoming courts (5 king/queen couples) can be formed? [2]

$5!$ ✓

K_1 Q_1
K_2 Q_2
K_3 Q_3
K_4 Q_4
K_5 Q_5

$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 5!$

-0

4. Carlos has a collection of 100 baseball cards, 20 of which are Houston Astros. [2 each]

a) If he randomly pulls out three cards without replacement, what is the probability that they are all Houston Astros cards?

$$\frac{\binom{20}{3}}{\binom{100}{3}}$$

✓

Pulling 3 Astros cards: $\binom{20}{3}$

Pulling 3 random cards: $\binom{100}{3}$

b) If he randomly pulls out TWO cards what is the probability exactly 1 is an Astro?

$$\frac{1600}{\binom{100}{2}}$$

✓

Pulling 1 Astros card: $20 \cdot 80 = 1600$

Pulling 2 random cards: $\binom{100}{2}$

5. Bert and June are playing Dungeons and Dragons. If they roll 2 different 20-sided dice, (one green and one red) what is the probability of .....

a) both red and green land on 17? $\frac{1}{400}$ [1] ✓ $\frac{1}{20} \cdot \frac{1}{20} = \frac{1}{400}$

b) them adding to a number less than 5? $\frac{3}{200}$ [2] ✓ 2, 3, 4 — $\frac{2}{1,1}$ $\frac{3}{1,2}$ $\frac{3}{2,1}$ $\frac{4}{1,3}$ $\frac{4}{2,2}$ $\frac{4}{3,1}$ $\frac{6}{400} = \frac{3}{200}$

c) them both being odd? $\frac{1}{4}$ [1] $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

6. Pizza Mind (bad pun alert) has 6 meat toppings and 7 veggie toppings. How many different pizzas can be made with:

a) Any amount of toppings (including zero)? 2^{13} [1] ✓

b) Three toppings total $\binom{13}{3}$ [1] $\binom{13}{3}$ ← total toppings, ← choosing three toppings ✓

c) Three meat toppings and two veggie toppings? $\binom{6}{3} \cdot \binom{7}{2}$ [2]

$$\binom{6}{3} \cdot \binom{7}{2}$$

✓

7. You are dealt 7 cards out of a standard deck of 52. What is the probability that you have a flush? (exactly 5 cards of the same suit, and two cards not of that suit). [3]

$$\frac{4 \cdot \binom{13}{5} \cdot \binom{39}{2}}{\binom{52}{7}}$$

✓

Flush: $4 \cdot \binom{13}{5} \cdot \binom{39}{2}$

Pulling 7 cards: $\binom{52}{7}$

-0