Probability WS

Name:

- 1. What is the probability that a random arrangement of CCELORRTY will spell "CORRECTLY?
- 6. Five boys and five girls are randomly assigned a seat. Find the probability that the boys are seated together.

- 2. A family has 3 children. What is the probability 2 are boys?
- 7. Six fair dice are tossed. What is the probability that at least two of them show the same face?

- 3. If five boys and five girls sit in a row in a random order, what is the probability that no two children of the same sex sit together?
- 8. Many games (hearts, spades, bridge) deal all 52 cards to 4 players. If you are dealt a hand of 13 cards, and then the cards are shuffled and redealt, what is the odds that you get the same cards?

- 4. Your locker has 12 books, one is a novel. If you randomly pick out one, what is the probability it is the novel?
- 9. The dice game Farkle starts with throwing 6 six sided dice. A 1 is worth 100, a 5 is worth 50. What is the probability that at least one die is a one or a five?

- 5. If you randomly arrange the letters AFRICA, what is the probability that you get an arrangement where begins and ends with an "A"?
- 10. If 5 (six sided) dice were rolled, what is the probability that they would be the same (all one's, all two's, etc.)?

- 11. Marbles of equal size and weight are randomly 14. If you toss a fair coin 10 times, what is the probchosen from a bag. There are 5 red, one white, and 4 blue marbles. If you were to randomly choose two with replacement,
 - (a) List the possible outcomes (the sample space).
 - (b) What is the probability that two reds are selected?
 - (c) What is the probability that two blues are selected?
 - (d) What is the probability that two whites are selected?
 - (e) What is the probability that a white and a red are selected (order doesn't matter)?
- 12. Only 2 of eight blocks are red. If they are stacked randomly, what is the probability that the top 2 are red?
- 13. A standard poker deck has 52 cards, 13 of each suit and 4 suits. A poker hand is made by choosing 5 of the 52 cards.
 - (a) How many poker hands are possible?
 - (b) How many ways can you get a straight (5 cards in order... Ace can be low or high, so for example $A \spadesuit, 2\heartsuit, 3\diamondsuit, 4\clubsuit, 5\heartsuit$ is a straight and $A \diamondsuit, K \clubsuit, Q \diamondsuit, J \heartsuit, 10 \bigstar$ is a also a straight)?
 - (c) How many ways can you get a flush? (all 5 cards the same suit)?

ability that you get heads exactly 5 times?

15. Find the probability that in a family of five, at least two were born on the same day of the week (Presume there are 7 days in a week, and that it is equally likely to be born on any particular day of the week).

Answers: (1) $\frac{1}{90.720}$ (2) $\frac{3}{8}$ (3) ways of sitting boy-girl $= \frac{2*5!*5!}{10!} = \frac{1}{126}$ (two, either start alternating with boy first or girl first) (4) $\frac{1}{12}$ (5) $\frac{4!}{6!/2!} = \frac{1}{15}$ (6) $\frac{6*5!5!}{10!} = \frac{1}{42}$ (six ways: start with 0 girls on the left of boys, on up to 5 girls on left of boys) 0 girls on the left of boys, on up to 5 girls on left of boys) (7) 2 or more matching is same as 1-P(none match) $= 1 - \frac{6!}{6^6} = \frac{319}{324} (8) \frac{1}{5_2 C_{13}} = \frac{1}{635,013,559,600}$ (9) same as 1-P(none are 1 or 5)= $1 - (\frac{4}{6})^6 = \frac{665}{729}$ (10) $\frac{6}{6^5} = \frac{1}{7,776}$ (11a) {RR, RW, RB, WW, WR, WB, BB, BR, BW} (11b) $\frac{5}{10} * \frac{5}{10} = \frac{1}{4} (11c) \frac{4}{25} (11d) \frac{1}{100}$ (11e) $\frac{504}{100} + \frac{1*55}{100} = \frac{1}{10} (12) \frac{6!}{8!} = \frac{5}{56} (13a) (\frac{52}{5}) = 2,598,960$ (13b) $\frac{10*4^5}{2,598,960} = \frac{5,148}{2508,960}$ (this includes 40 straight flushes) (14) $\frac{10C_5}{2^{10}} = \frac{5}{2598,960}$ (this includes 40 straight flushes) (14) $\frac{10C_5}{2^{10}} = \frac{63}{256}$ (15) same as 1-P(five different)= $1 - \frac{7^{P_5}}{7^5} = \frac{2041}{2401}$