You MUST use good notation and show appropriate work.

Math 102

(Section 13.1/13.2)

Name _____

13.1 - Basics of Probability / 13.2 - Complements and Unions of Events

1. Consider the following: "Three children are born to a family and the order of the births with respect to gender are noted."

   a) Write out a sample space where one outcome is BBG (meaning the oldest child is a boy, the middle child is a boy, and the youngest child is a girl.)

   b) Write out, using proper set notation, each of the following events.

      i) A is the event of having more girls than boys.

      ii) B is the event that exactly two children are boys.

      iii) C is the event that all children are of the same gender.

      iv) D is the event that the oldest child is a girl and the youngest child is a boy.

   c) Using the events defined in part b) and assuming births of boys and girls to be equally likely, determine each of the following probabilities. (In parts v and vi, first determine events $A \cap D$ and B'.)

      i) $P(A) =$ _____

      ii) $P(B) =$ _____

      iii) $P(C) =$ _____

      iv) $P(D) =$ _____

      v) $P(A \cap D) =$ _____

      vi) $P(B') =$ _____

2. If a nickel, a dime, and a quarter are tossed, find the probability of obtaining

a) no heads a)_____

b) at least one head b)_____

c) exactly 2 heads c)_____

3. Assume an urn contains 5 white chips and 10 black chips.

a) If you draw 1 chip randomly from the urn determine the probability that the chip

i) is white i)_____

ii) is not white ii)_____

b) If 5 chips are drawn, all at one time, (or without replacement), determine the probability that

i) exactly 2 are white and 3 are black i)_____

ii) all 5 drawn chips are black ii)_____

4. Suppose you roll a die and note the total. Let A be the event "that the total showing is a multiple of 3".

i) Calculate the ***odds against*** event A. i)_____

ii) Calculate $P(A)$ ii)_____

5. The probability of winning a door prize at an event is $\frac{3}{100}$. What is the probability of **not** winning a prize?

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6. Assume you draw one card from a standard deck of cards. Let H be the event of drawing a heart and J be the event of drawing a "jack". Calculate each of the following probabilities.

a) $P(H) =$ a)_____

b) $P(J) =$ b)_____

c) $P(H \cap J) =$ **c)**_____

d) $P(H \cup J) =$ d)_____

e) Does $P(H \cup J) = P(H) + P(J)$? Why are why not?