Math 1312 – Final Exam Review – Some Sample Problems

1. Definitions – fill in the blank:

union, intersection, universal set, complement, subset –

The ________________ of sets A and B is the set that contains all of the objects in the universal set U, such that the objects are in A, in B, or in both A and B.

2. # in sets:

a) If  A = { a, b, c, ... z }  and  B = { 1, 2, 3, 4, 5, a, e, i, o, u }

Find

\[ A \cap B = \ ]

\[ n ( A \times B ) = \]

# of subsets of B. _______________

b) If  A = { a, b, c }  and  B = { a, e }, then find

\[ A \cup B = \]

\[ B \times A = \]

c) A box contains five red marbles, three green, and four black ones. Select one marble. What is the probability that the marble is red.

d) There are 20 students that drive to school, 40 that showed up in class, and 8 that drove to school and showed up to class. How many students drove to school or showed up to class?

If one student is selected at random, what is the probability that the student showed up to class and did not drive to school?

3. Find the to the left of -2.00 under a normal curve with \( \mu = 0 \) and \( \sigma = 1 \). ____________

4. If the # of bad fruit from an orchard is normally distributed with a mean of 20 lbs and variance of 9, then find

a) the # that correspond to the inflection points.

b) if an orchard is selected at random, then what is the probability that the orchard has more than 17 lbs of bad fruit.
4. Which function is continuous?

5. Find the domain of the given function.
   
   a) \( f(x) = \frac{2}{x + 4} \)

6. Find the range of the function \( f(x) = -x^2 + 2x \)

7. Given \( f(x) = \frac{3x + 1}{x + \sqrt{2}} \), find
   
   a) \( f(0) = \) \[ \quad \]  
   b) the y-intercept = \[ \quad \]  
   c) the x-intercept____
   
   \[ \lim_{x \to \sqrt{2}} f(x) = \] \[ \quad \]


9. Find the derivative of the following functions.

10. Find the integral.
    
    \[ \int_{1}^{3} (2x - 3) \, dx = \] \[ \quad \]  
    \[ \int_{1}^{3} 4 \, dx = \] \[ \quad \]
11. Sketch the graph of ( #21 test 4 )

12. A department has three female members and 7 male members. 1 female and three males have a college degree.

a) One person is selected at random.
   What is the probability that the person selected is female? __________
   female and has a college degree? __________

b) two members are selected.
   What is the probability that both have a college degree? ______________

13. What is the probability that if three cards are selected from a standard deck – two will be diamonds and the other card will not?

   \[ 4! + 3! + 2! + 1! + 0! = \]

   \[\frac{301!}{300!} = \]