Math 206 - Test 1

February 11, 2015

Name _____

Score _____

Show all work to receive full credit. Supply explanations where necessary.

1. (3 points) Without using your calculator or using long division, write $\frac{13}{125}$ in decimal form.

2. (3 points) Without attempting to actually compute the decimal value of $\frac{49}{350}$, determine whether the fraction has a terminating or repeating decimal form. Explain your reasoning.

3. (2 points) Without attempting to actually compute the decimal value of $\frac{9}{19}$, explain why its decimal form cannot be $0.\overline{4736842105263157894}$.

4. (2 points) Give the decimal form of an irrational number between 8.34 and 8.345.

5. (2 points) Is $\sqrt{145}$ rational or irrational? Explain how you know.

6. (3 points) Write $0.\overline{5}$ as a fraction in lowest terms.

7. (3 points) The odds **against** Jasper's Gem winning the horse race are 5 to 2. What is the probability that the horse wins?

8. (3 points) A single letter is selected at random from the work *bumfuzzle*. Let E be the event of selecting the letter e, and let V be the event of selecting a vowel. Compute each of the following.

   (a) $P(E|V)$

   (b) $P(E|\overline{V})$

   (c) $P(V|E)$

9. A letter is selected at random from the first box and placed into the second box. Then a letter is selected at random from the second box and placed into the third box. Then a letter is selected at random from the third box.

O	O	O	O	X

O	O	X	X

O	O

(a) (1 point) How many stages does this experiment have?

(b) (5 points) Sketch the complete tree diagram for this experiment. Include the probabilities of each path.

(c) (1 point) What is the probability that the letter O is selected from box 3?

(d) (1 point) What is the sum of all the probabilities of the paths?

(e) (1 point) Explain how your last two answers can be used to determine the probability that an X is selected from box 3.

10. (3 points) When a thumbtack is dropped, it will land point up or point down. An experiment was repeated 80 times with the following results: point up 56 times, point down 24 times.

    (a) What value would you assign to the probability of the tack landing point down?

    (b) Is your probability theoretical or experimental?

    (c) What would you do if you wanted a reasonably good estimate for the other type of probability?

11. (3 points) Design a spinner that has only three different sections, colored red, blue, and green, so that the probability of red is 25%, the probability of blue is 60%, and the probability of green is 15%. Explain your reasoning.

12. (3 points) Consider the two different experiments: (1) select a letter from *racecar*, (2) select a letter from *sample*. Which experiment has a uniform sample space? Explain.

13. (3 points) A jar is filled with coins. The probability of selecting a penny is 7/8. Is it possible that the probability of selecting a quarter is 1/5? Explain.

14. (5 points) Suppose A and B are events such that $P(A) = 0.85$, $P(B) = 0.55$, and $P(A \cup B) = 0.93$.

    (a) Determine $P(A \cap B)$.

    (b) Determine $P(\overline{B})$.

    (c) Find the odds in favor of A.

    (d) Determine $P(B|A)$.

    (e) Are A and B independent? Explain.

15. (3 points) Give an example of each of the following or say that it is impossible

    (a) A whole number that is not a natural number

    (b) An integer that is not a rational number

    (c) A number that is real and irrational

16. (2 pts extra credit) Determine the repeating decimal form of the product $0.75 \times 0.\overline{5}$ by (1) writing each number as a fraction, (2) multiplying the fractions, and then (3) using division to write your result in decimal form.