COT 3100 Quiz #1: d = rt, logs (Week of Feb 6, 2023) – M, T, W Version

Last Name: _____ First Name: _____

Circle Recitation: 8:30 am 10:30 am 11:30 am 12:30 pm 3:30 pm 4:30 pm 7:30 pm

1) (8 pts) Trusty Tortoise and Roger Rabbit are taking a (same) journey. Trusty Tortoise travels at an average speed of 3 miles and hour and never stops on the journey. Roger Rabbit will spend 10 minutes traveling at an average speed of 8 miles an hour before taking a 20 minute break, and alternating this pattern. Find any distance, D_1, such that Trusty Tortoise wins the race, stating, with proof, the amount of time both Trusty Tortoise and Roger Rabbit take to traverse that distance. (Express both times in HR:MIN:SEC format.)

D_1 = _____ , Tortoise Time = _____ , Rabbit Time = _____

2) (8 pts) Let S be an arithmetic sequence of 50 terms with a first term of a_1 and a common difference of 3. Let T be an arithmetic sequence of 50 terms with a first term of a_1 and a common difference of 5. Let sum(X) represent the sum of the terms in the arithmetic sequence X. What is the value of sum(T) – sum(S)? (Put a box around your final answer.)

3) (9 pts) The following relationship holds between positive real numbers x and y:

$$log_{\sqrt{2}}x + log_4 x^3 = log_8 y$$

In order for this equation to hold, we can express y in the form $y = x^{\frac{a}{b}}$, where a and b are both positive integers with gcd(a, b) = 1. (The exponent is a fraction in lowest terms.) Find the fraction, $\frac{a}{b}$, for which $y = x^{\frac{a}{b}}$. (Put a box around your final answer.)