Math 200 - Quiz 2

September 8, 2010

Name key

Score _____

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

1. (1 point) Find the sum: $\underbrace{13 + 14 + 15 + \cdots + 119}$

THERE ARE $119-12 = 107$ TERMS

2x THE SUM $\left\{ \begin{array}{r} 13 + 14 + \cdots + 119 \\ + \; 119 + 118 + \cdots + 13 \\ \hline 107 \text{ PAIRS OF } 132 \end{array} \right.$ → SUM IS $\frac{(107)(132)}{2} = \boxed{7062}$

2. (2 points) Find five terms that continue the following arithmetic sequence. Then find the 3142nd term.

$$2, 6, 10, 14, 18, 22, \ldots$$

DIFFERENCE IS 4 ⇒ NEXT FIVE TERMS ARE 26, 30, 34, 38, 42

N^{TH} TERM IS $4N - 2$

SO, 3142^{ND} TERM IS $4(3142) - 2 = \boxed{12,566}$

3. (1 point) Use a counterexample to disprove the following conjecture.

$(x + 5)^2 = x^2 + 25$ for any real number x

LET $x = 1$:

$(1+5)^2 = 6^2 = 36 \neq 1^2 + 25 = 26$

THIS CONJECTURE IS ONLY TRUE FOR $x = 0$.

4. (1 point) How many terms are in the following sum?

$$22 + 25 + \cancel{28} + \cancel{31} + \cdots + 610$$

22, 25, 28, 31, ...

IS AN ARITHMETIC SEQUENCE

WITH N^{TH} TERM $= 3N + 19$

$610 = 3N + 19$

$591 = 3N$

$N = 197$

THERE ARE 197 TERMS

5. (1 pt ex cred) Compute the sum in Problem 4.

$\left\{ \begin{array}{r} 22 + 25 + 28 + \cdots + 610 \\ 610 + \quad \cdots \quad + 22 \\ \hline 197 \text{ PAIRS OF } 632 \end{array} \right.$ 2x THE SUM

SUM IS $\frac{(197)(632)}{2} = \boxed{62,252}$