Math 102 - Fall 2013 - Quiz #4 **Score:** _____ out of 10.

Name: key

Show all work clearly and in order.

1. Convert the following to base 10 (use the expanded form to help you).

(a) 1301_{five} $= 1(5^3) + 3(5^2) + 0(5^1) + 1(1)$

$= 125 + 3(25) + 0 + 1$

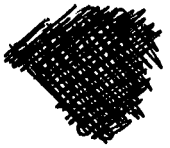
$= \boxed{201} = \boxed{201_{\text{ten}}}$

(b) 10111_{two} $= 1(2^4) + 0(2^3) + 1(2^2) + 1(2^1) + 1(2^0)$

$= 16 + 0 + 4 + 2 + 1$

$= \boxed{23} = \boxed{23_{\text{ten}}}$

2. Convert 153_{ten} to base five.



$125 \overline{)153}$ 1, -125, 28

$25 \overline{)28}$ 1, -25, 3

$5 \overline{)3}$ 0, -0, 3

3

$\boxed{1103_{\text{five}}}$

3. Use the definition of addition to compute $2 + 5$.

Let $A = \{a, b\}$, $B = \{c, d, e, f, g\}$ ← disjoint sets

$n(A) = 2$

$n(B) = 5$

$2 + 5 = n(A \cup B) = n(\{a, b\} \cup \{c, d, e, f, g\}) = n(\{a, b, c, d, e, f, g\}) = \boxed{7}$

4. Use the definition of subtraction (take-away definition) to compute $4 - 2$.

Let $A = \{a, b, c, d\}$

$B = \{a, b\}$ ← NOTE: $B \subseteq A$

$n(A) = 4$

$n(B) = 2$

$4 - 2 = n(A - B) = n(\{a, b, c, d\} - \{a, b\}) = n(\{c, d\}) = \boxed{2}$

5. Is the set $\{0, 2, 4, 6, \ldots\}$ closed under addition?

$\boxed{\text{yes}}$

6. Is the set $\{0, 1, 2, 3\}$ closed under addition?

$\boxed{\text{NO}}$ for example $2 + 3 = 5$, but 5 is NOT in the set.