Math 181: Quiz 10

Directions: You have 15 minutes to answer the following questions without outside resources.

1. (3 points) Consider the following function diagram.

(a) Is the function $f$ injective?  
\[ \text{No} \]

(b) Is the function $f$ surjective?  
\[ \text{Yes} \]

(c) Is the function $f$ bijective?  
\[ \text{No} \]

2. (2 points) Let $A$ be the set of even numbers between 1 and 1000 (including 1000) and let $B$ be the set of odd numbers between 1 and 1000 (including 1). Are $A$ and $B$ the same size? If so, explain a bijection that can pair the elements of the sets.

\[ \text{Yes} \]

$f: A \rightarrow B$

\[ x \mapsto x-1 \]

or

\[ 2 \rightarrow 1 \]
\[ 4 \rightarrow 3 \]
\[ 6 \rightarrow 5 \]

etc.

3. (5 points) For the following questions, consider the partition $6 + 5 + 5 + 3 + 3 + 3 + 1$.

(a) What is the size of the partition?  
\[ 26 \]

(b) Draw the Ferrers diagram for the partition.

(c) What is the conjugate partition?

\[ 7 + 6 + 6 + 3 + 3 + 3 + 1 \]