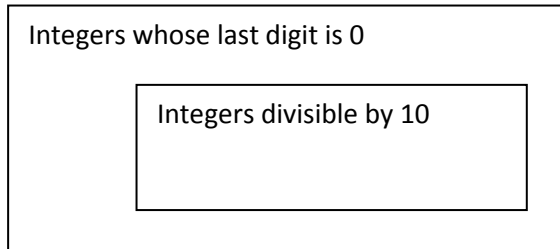


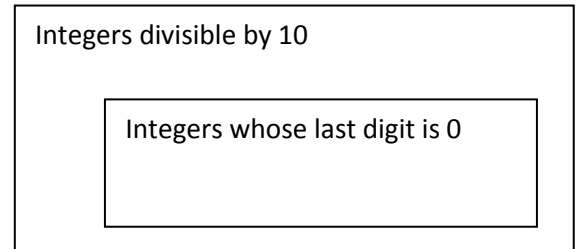
12. Converse: If  $\sim q \rightarrow \sim p$  is true, then  $p \rightarrow q$  is true.  
Biconditional:  $p \rightarrow q$  is true if and only if  $\sim q \rightarrow \sim p$  is true.
16. If a polygon is a triangle, then it has exactly three sides.  
If a polygon has exactly three sides, then it is a triangle.
20. Reverse: Two angles with measures that have a sum of 90 are complementary angles.  
Since this is true, the Biconditional: Two angles are complementary angles if and only if their measures have a sum of 90.
28. No, this is not a good definition, as it does not specify the direction of the rays.
34. The converse of A would not be true, since  $x$  could be less than zero.  
The converse of B would not be true, since  $x$  could equal negative 3.  
The converse of C would not be true, since the original statement is not true.  
The converse of D would be true, and could therefore be written as a biconditional.
38. A polygon is a hexagon if and only if it is a six-sided figure.
42. This is a good description of the letter B, and would not fit any of the other letters.
46.  $\angle A$  and  $\angle B$  are a linear pair if and only if  $\angle A$  and  $\angle B$  are adjacent and supplementary angles.

48. a. If an integer is divisible by 10, then its last digit is 0.  
If the last digit is 0, then an integer is divisible by 10.

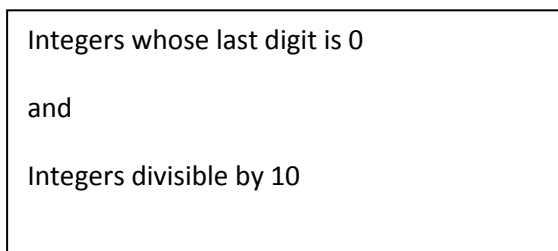
b.



c.



d.



- e. They must overlap each other completely.
- f. There can be no exceptions or counterexamples for a good definition to be written as a biconditional.