**Chapter 2 TEST**

**Graphing Calculators not allowed**

1. Consider the following graph of a function *f* :  
     
   A graph with lines and dots

   Description automatically generated  
     
   a) Determine the equations of all of its asymptotes. [1]  
     
     
     
   b) What is the domain of *f*? [1]  
     
     
     
   c) Where is the function discontinuous on its domain? [1]  
     
     
     
   d) Determine the following limits and values if they exist: [4]  
     
    i) v)   
     
     
    ii) vi)   
     
     
    iii) vii)   
     
     
    iv) viii)
2. A particle is moving along the *x*-axis so that at a time *t* (in seconds), it is at a position [3]  
   (in metres).  
   a) Find its average velocity in the first 3 seconds.   
     
     
     
     
     
   b) Find its instantaneous velocity at time .   
     
     
     
     
     
     
     
     
   c) In which direction is it moving at time ?   
     
     
   d) On which side of the origin is it at time ?
3. Let . [4]  
     
   a) Determine its slope at .  
     
     
     
     
     
     
     
   b) Determine its slope at .  
     
     
     
     
     
   c) Determine the equation of the tangent line at .  
     
     
     
     
     
     
   d) Determine the equation of the normal line at .
4. Use the IVT to prove that the equation is solvable. [2]
5. Determine the following limits [16]  
     
   a)   
     
     
     
   b)   
     
     
     
   c)   
     
     
     
     
   d)   
     
     
     
     
   e)   
     
     
     
     
   f)   
     
     
     
     
     
   g)   
     
     
   h)   
     
     
     
     
   i)   
     
     
     
     
     
   j)   
     
     
     
     
     
   k)   
     
     
     
     
     
   l)   
     
     
     
     
     
   m)   
     
     
     
     
   n) Let be the greatest integer function.

p)   
  
  
  
  
q)

1. For each function, determine *k* such that it is continuous on its domain. [3]  
   a)   
     
     
     
     
     
   b)
2. TRUE or FALSE? [3]  
   If TRUE, no explanation is needed.  
   If FALSE, give a counterexample (expression or graph)  
   a) If exists, but does not exist, then does not exist.  
     
     
   b) If neither nor exists, then does not exist.  
     
     
   c) If *f* is continuous at *a*, then so is   
     
     
     
   d) If is continuous at *a*, then so is *f*.