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| Test 1Dusty Wilson Math 151No work = no creditNo Symbolic Calculators | **Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*It is rare to find learned men who are clean, do not stink and have a sense of humour.*Gottleb Leibnez (1646 - 1716) German mathematician |

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| Warm-ups (1 pt each): | =\_\_\_\_\_ | =\_\_\_\_\_ | =\_\_\_\_\_ |

(1 pt) The quote (above) was said about Leibniz. What were two of his positive qualities?

(5 pts) The table gives the values of *f* near 2, but not equal to 2. Use the table to estimate .

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|  | 1 | 1.9 | 1.99 | 2 | 2.01 | 2.1 | 3 |
|  | 2.8325 | 3.0251 | 2.9998 |  | 3.0001 | 2.9769 | 2.4984 |

(8 pts) Consider the graph of *f* (right).

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| 1. Find and label a point A where *f* ’ is positive.
2. Find and label a point B where *f* ’ is negative.
3. Find and label a point C where *f* ’ is undefined.
4. Find and label a point D where *f* ’ is zero and is negative immediately to the left of D and positive to the right of D.
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(10 pts) Evaluate 

(10 pts) Consider the function .

1. (7 pts) Use the definition of the derivative to find the derivative of *f*. Hint: You may check using the techniques of chapter 3.

1. (3 pts) Find the equation of the tangent line to *f* when *x = -*1.

(5 pts) Using the definition of continuity, explain why the function  is discontinuous at . Show work to support your explanation (one sided limits).

(5 pts) Use the precise definition of the limit to prove 

(10 pts) Evaluate 

(5 pts) State either the definition of the derivative or the intermediate value theorem (your choice)

(5 pts) If  for all *x*, evaluate 

(6 pts) Suppose the height of a falling object after *t* seconds is given by the function  where the position is given in feet above the ground.

1. Find and interpret 

1. Use the definition of the derivative to find 

1. Interpret  including units

(16 pts) Use the graph of *g* to answer the questions below.

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| 1. (2 pts) = \_\_\_\_\_
2. (2 pts) Find= \_\_\_\_\_
3. (2 pts) Find= \_\_\_\_\_
4. (2 pts) Find = \_\_\_\_\_
 |  |

1. (2 pts) Where is  zero?
2. (2 pts) For what *a* does  exist, but *g* does not exist?
3. (2 pts) For what *b* does  fail to exist, but *g* does exist?
4. (2 pts) Give an *x* value such that  and  (Hint: There is more than one answer, but you only need to give one.)