1. (1 pt) Enter a T or an F in each answer space below to indicate whether the corresponding statement is true or false.

A good technique is to think of several examples, especially examples which might show that the statement is false!

For reference you can find some definitions here.

You must get all of the answers correct to receive credit.

- 1. The sequence 1, -1, 1, -1, 1, -1, ... does not have a convergent subsequence.
- 2. The sequence of rational numbers 3.1, 3.14, 3.141, 3.14159, ... which approximates the ratio of the circumference of a circle and its diameter, has a rational number as its limit point.
- 3. The sequence 1, 2, 3, 4, ... has no finite limit.
- 4. Every bounded sequence converges to a limit point.

2. (1 pt) Enter a T or an F in each answer space below to indicate whether the corresponding statement is true or false.

A good technique is to think of several examples, especially examples which might show that the statement is false!

For reference you can find some definitions here.

You must get all of the answers correct to receive credit.

- 1. Every differentiable function on the interval [-2, 2] must have a minimum.
- 2. Every continuous function on the interval [3, 6] must have both a maximum and a minimum.
- 3. Every continuous function on the interval (1, 3] must have a maximum.
- 4. Every differentiable function on the interval [3, 4] must have both a maximum and a minimum.

3. (1 pt) Enter a T or an F in each answer space below to indicate whether the corresponding statement is true or false.

A good technique is to think of several examples, especially examples which might show that the statement is false!

For reference you can find some definitions here.

You must get all of the answers correct to receive credit.

- 1. If a function is increasing near a point a then its linear approximation at a cannot be decreasing.
- 2. If a differentiable function has a maximum value then its domain must be a bounded, closed interval.

4. (1 pt) Enter a T or an F in each answer space below to indicate whether the corresponding statement is true or false.

A good technique is to think of several examples, especially examples which might show that the statement is false!

For reference you can find some definitions here.

You must get all of the answers correct to receive credit.

- 1. If the linear approximation of a differentiable function is decreasing at a point a then the function could be constant near the point a.
- 2. If \( f(x) \) is a continuous function and the sequence \( f(a_1), f(a_2), f(a_3), \ldots \) converges to a finite limit, then the sequence \( a_1, a_2, a_3, \ldots \) also converges to a limit.
- 3. Every continuous function whose domain is a bounded, closed interval has a maximum value.
- 4. Every differentiable function is continuous.

5. (1 pt) Enter a T or an F in each answer space below to indicate whether the corresponding statement is true or false.

A good technique is to think of several examples, especially examples which might show that the statement is false!

For reference you can find some definitions here.

You must get all of the answers correct to receive credit.

- 1. If the linear approximation of a differentiable function is increasing at a point a then the function is also increasing near the point a.
- 2. Every continuous function whose domain is a bounded, closed interval and which has a maximum value also has a minimum value.
- 3. If a continuous function \( f(x) \) has a maximum value on an interval then the function \(-f(x)\) has a minimum on that same interval.
- 4. If \( f(x) \) is a continuous function and the sequence \( f(a_1), f(a_2), f(a_3), \ldots \) converges to a finite limit, then the sequence \( a_1, a_2, a_3, \ldots \) also converges to a limit.
- 5. If \( f(x) \) is a continuous function and the sequence \( a_1, a_2, a_3, \ldots \) converges to a finite limit, then the sequence \( f(a_1), f(a_2), f(a_3), \ldots \) also converges to a limit.
- 6. Every differentiable function has a maximum value.
- 7. If a continuous function has a maximum value then its domain must be a bounded, closed interval.
- 8. If a differentiable function \( f(x) \) has a maximum value on an interval then the function \(-f(x)\) has a minimum on that same interval.