Semester 2

Assignment 1

LKE MNCUBE

Student Number : 59448873

Unique Number: 798498

1.1. Find the value of the

When , is negative (limit from the left hand side)

= ***Piecewise definition***

should be made positive, so multiply by -1

. -1 =.(-1)

= 1 – x

where = -

= -1

The correct option is:

(3) -1

1.2. Find the value of

= ***l’Hospital’s Rule***

Substitute value of t, make t=0

where cos(0) = 1

The correct option is:

(4)

1.3. Find the value of

= . ***Multiply by conjugate*** (Rationalize denominator)

=

Substitute value of h, make h=-4

= = -

The correct option is:

(3) -

1.4. if , then is:

First order implicit differential

=

= where () = 1

And () = 1

=

=

=

Second order implicit differential

=

= : Remove constant -2

=

= where =

= ***Chain rule***

=

= =

The correct option is:

(1)

1.5. Evaluate

= apply u substitution, where

Therefore

=

= . :Remove constant .

= ***power rule***

=

=

= substitute

=

The correct option is:

(2)

2.1. Evaluate

divide by the highest power in denominator & numerator

= - 3 substitute

2.2. Evaluate

= ***Piecewise definition***

LHS

substitute

RHS

substitute

LHS limit ≠ RHS Limit

Limit does not exist at as the graph diverges at this point

2.3. Evaluate

= simplify

=

=

= substitute

=

=

=

2.4. Let

(a)

LHS RHS

substitute substitute

(b) LHS limit ≠ RHS Limit

Limit does not exist at as the graph diverges at this point

2.5. Let

For a continuity, we need to find the limits where and

At

Let this be some function where:

LHS

substitute

RHS

substitute

Let LHS = RHS

At

Let this be some function where:

LHS

substitute

RHS

substitute

Let LHS = RHS

Solve simultaneous equation/system

*R1 + R2 R1*

*R1 R1*

*R2 R2*

*R1+R2 R2*

&

3.1. Let

3.2.

RHS

substitute

LHS

substitute

LHS limit ≠ RHS Limit

Limit does not exist at as the graph diverges at this point

3.3.

RHS

substitute

LHS

substitute

1

LHS limit = RHS Limit

Limit does exists at . Even though the graph changes gradient at this point is has a limit and therefore continuous

3.4. Determine if f is differentiable at by evaluating the one-sided limits

where

From the below calculation we see that f is differentiable at

LHS

RHS

4. Prove

Test the limit where:

= =

The limit at any does not exist, however:

, for any number n, positive values

substitute

substitute

5.1. Let

(a) Find by implicit differentiation

(b) Find by rewriting y as a function of x, then using the Quotient rule

(c) Find by letting

and using partial differentiation by calculating

and

sum difference rule

sum difference rule

5.2. Find the equation of the tangent line to at the point

Calculate m for slope formula, i.e. calculate into

Substitute

Therefore the coordinate where is (-1,)

Use general slope formula to get equation:

6. Use logarithmic differentiation to find if

7.1.

7.3.

substitute

8.