****

**Solution**

**Q−1: [**5 **marks]** Given and , find the composition and the domain of .

**The domain of**

**Q−2: [2+3 marks]** Solve for the following equations:

1. .
2. .

**Q−3: [5 marks]** Use the definition of the derivative to find the derivative of .

**Q­−4: [5 marks]** **[**5 **marks]** Let. Find the point(s) on the graph of at which the tangent line is horizontal.

**Q­−5**: **[5 marks] [**5 **marks]** Let . Find the interval on which is increasing or decreasing, and find the local maximum and minimum, if any.

|  |  |  |
| --- | --- | --- |
| Interval | () | ( |
| Sign of | +++++ | ------- |
| Conclusion |  |  |

**Q−6:****[5 marks]** A square sheet of cardboard with each side  centimeters is to be used to make an open-top box by cutting a small square of cardboard from each of the corners and bending up the sides. What is the side length of the small squares if the box is to have as large a volume as possible?

**Q­−7:****[**5 **marks]** find the equation of the tangent line to the graph of  at the point.

**Q­−8:****[5 marks]** consider the function. Using the logarithmic differentiation find an equation of the line tangent to the graph of at .

The equation of the line: