Revision session- Week 8

**This assignment will not be graded and is only for practice.**

**Multiple Select Questions:**

***1 point***

Table M2W2P1 gives functions in Column A with the equation of their tangents at the origin (0,0)(0,0) in column B and the plotted graphs and tangents in Column C.  
  
A table of equations with lines and numbers

AI-generated content may be incorrect.  
  
Based on the given Table M2W2P1, Choose the options which represent the correct matching of a given function with its tangent at (0,0) and its graph.

i) →→ b) →→ 3)

ii) →→ c) →→ 2)

iii) →→ c) →→ 2)

iii) →→ b) →→ 3)

ii) →→ a) →→ 1)

i) →→ a) →→ 1)

***1 point***

Consider the graphs given below:  
  
A group of graphs of a function

AI-generated content may be incorrect.  
  
Choose the set of correct options:

There are at least two points on Curve 1, where the derivatives of the function corresponding to Curve 1, are equal.

At the origin the derivative of the function corresponding to Curve 2 does not exist.

The derivative of the function corresponding to Curve 3, at the origin and at the point (−2,0)(−2,0) are the same.

The derivative of the function corresponding to Curve 4 does not exist at any point.

***1 point***

Let f*f* be a function and the Figure M2W2P1 represent the graph of function f*f*. The solid points denote the value of the function at the points, and the values denoted by the hollow points are not taken by the functions.  
  
A graph of a function

AI-generated content may be incorrect.  
   
Choose the set of correct options.

lim⁡t→2−f(t)=10*t*→2−lim​*f*(*t*)=10

lim⁡t→2+f(t)=5*t*→2+lim​*f*(*t*)=5

lim⁡t→6−f(t)=10*t*→6−lim​*f*(*t*)=10

lim⁡t→6+f(t)=10*t*→6+lim​*f*(*t*)=10

f*f* is continuous at x=2*x*=2.

f*f* is continuous at x=4*x*=4

***1 point***

Define a function f*f* as follows: f(x)={x3if x>1,x2if 0<x≤1xif x<0,0if x=0*f*(*x*)=⎩⎨⎧​*x*3*x*2*x*0​if *x*>1,if 0<*x*≤1if *x*<0,if *x*=0​ Choose the set of correct options.

f*f* is continuous, but not differentiable at x=1*x*=1.

f*f* is both continuous and differentiable at x=1*x*=1.

f*f* is continuous, but not differentiable at x=0*x*=0.

f*f* is both continuous and differentiable at x=0*x*=0.

f*f* is not continuous at x=0*x*=0.

f*f* is not continuous at x=1*x*=1.

***1 point***

Let f*f* and g*g* be two real valued functions defined as:  
  
                 f:R→R*f*:R→R  
  
                 f(x)=ex−1*f*(*x*)=*ex*−1  
  
                 g:R→R*g*:R→R  
  
                 g(x)=x*g*(*x*)=*x*  
  
Choose the set of correct options.

The linear function ex−1*ex*−1 is the best linear approximation of the function f(x)*f*(*x*) at the point x=1*x*=1.

In this case, lim⁡x→0f(x)g(x)=lim⁡x→0f(x)lim⁡x→0g(x)*x*→0lim​*g*(*x*)*f*(*x*)​=*x*→0lim​*g*(*x*)*x*→0lim​*f*(*x*)​.

In this case, (f+g)(*f*+*g*) (where, (f+g)(x)(*f*+*g*)(*x*) is defined by f(x)+g(x)*f*(*x*)+*g*(*x*)) is continuous at x=0*x*=0.

lim⁡x→0f(x)g(x)=0*x*→0lim​*f*(*x*)*g*(*x*)=0.

**Comprehension Type Question:**  
The profit of Company A with respect to time (in months) is given by the function f(t)*f*(*t*) (in lakhs) as follows: f(t)={(t−2)n−1t−3if 0≤t<3,⌊t⌋if t≥3*f*(*t*)={*t*−3(*t*−2)*n*−1​⌊*t*⌋​if 0≤*t*<3,if *t*≥3​ for some integer n*n*.  
The profit of Company B with respect to time (in months) is given by the function g(t)*g*(*t*) (in lakhs) as follows: g(t)={t3−33t−3if 0≤t<3,3tmif t≥3*g*(*t*)={*t*−3*t*3−33​3*tm*​if 0≤*t*<3,if *t*≥3​ for some integer m*m*.  
Use the information given above answer Questions 8,9 and 10.

***1 point***

If the functions f(t)*f*(*t*) and g(t)*g*(*t*) denoting the profits of Company A and Company B, respectively, are known to be continuous at t=3*t*=3, then which of the following options is(are) true?

n=3*n*=3

n=2*n*=2

m=2*m*=2

m=3*m*=3

***1 point***

Assuming g*g* to be continuous at t=3*t*=3, choose the set of correct options.

lim⁡t→3−g(t)−g(3)t−3=18*t*→3−lim​*t*−3*g*(*t*)−*g*(3)​=18

lim⁡t→3+g(t)−g(3)t−3=18*t*→3+lim​*t*−3*g*(*t*)−*g*(3)​=18

lim⁡t→3+g(t)−g(3)t−3=9*t*→3+lim​*t*−3*g*(*t*)−*g*(3)​=9

lim⁡t→3−g(t)−g(3)t−3=9*t*→3−lim​*t*−3*g*(*t*)−*g*(3)​=9

g*g* is not differentiable at t=3*t*=3.

g*g* is differentiable at t=3*t*=3.

Let Lf(t)*Lf*​(*t*) be the best linear approximation of the function f(t)*f*(*t*) at the point t=1*t*=1, assuming f*f* to be continuous at t=3*t*=3, then find the value of Lf(2)*Lf*​(2).

***1 point***

**Numerical Questions:**

Let f*f* be a differentiable function at x=−5*x*=−5. The tangent line to the curve represented by the function f*f* at the point (−5,−5)(−5,−5) passes through the point (4,5)(4,5). What will be the value of f′(−5)*f*′(−5)? (Answer should be rounded to 2 decimal places)

***1 point***

Let f:R→R*f*:R→R be defined by f(x)=x2*f*(*x*)=*x*2 and g:R→R*g*:R→R be defined by g(x)=x−5*g*(*x*)=*x*−5. Find the value of (fg)′(23)−(f∘g)′(23)(*fg*)′(23)−(*f*∘*g*)′(23), where f∘g(x)=f(g(x))*f*∘*g*(*x*)=*f*(*g*(*x*)) and fg(x)=f(x)g(x)*fg*(*x*)=*f*(*x*)*g*(*x*).