AQ8.3: Activity Questions 3 - Not Graded

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

**Level 1:**

***1 point***

Which of the following statments are correct ?

Derivative of ex2cos⁡x*ex*2cos*x* is ex(2xcos⁡x−x2sin⁡x)*ex*(2*x*cos*x*−*x*2sin*x*).

Derivative of exsin⁡x*ex*sin*x* is exsin⁡x(sin⁡x+xcos⁡x)*ex*sin*x*(sin*x*+*x*cos*x*).

Derivative of exsin⁡x*ex*sin*x* is exsin⁡x(sin⁡x−xcos⁡x)*ex*sin*x*(sin*x*−*x*cos*x*).

Derivative of ex2cos⁡x*ex*2cos*x* is ex2cos⁡x(2xcos⁡x−x2sin⁡x)*ex*2cos*x*(2*x*cos*x*−*x*2sin*x*).

lim⁡x→0+sin⁡xx*x*→0+lim​*x*​sin*x*​ is

***1 point***

***1 point***

Consider a function f:R→R*f*:R→R such that f(x)=x∣x∣*f*(*x*)=*x*∣*x*∣. Which of the following option(s) is(are) true?

f*f* is not diffrentiable at any point of RR.

f*f* is diffrentiable on RR.

f′(x)={2xif x≥0−2xif x<0,*f*′(*x*)={2*x*−2*x*​if *x*≥0if *x*<0,​.

f′(x)={−2xif x≥02xif x<0,*f*′(*x*)={−2*x*2*x*​if *x*≥0if *x*<0,​

f′(x)=2x*f*′(*x*)=2*x*

f′(x)={2xif x>0−2xif x<0,*f*′(*x*)={2*x*−2*x*​if *x*>0if *x*<0,​, and f*f* is not differentiable at 0.

If f(x)=9−x2*f*(*x*)=9−*x*2​, then find out the value of 8×lim⁡x→1f(x)−f(1)x−18​×*x*→1lim​*x*−1*f*(*x*)−*f*(1)​.

***1 point***

The value of lim⁡x→∞xe−x*x*→∞lim​*xe*−*x* is

***1 point***

**Level 2:**

Consider the following statements.

* Derivative of f(x)=logx5*f*(*x*)=log*x*​5 , where x>0*x*>0, and x≠1*x*=1 is −logx5logxex2*x*2−log*x*​5log*x*​*e*​.
* Derivative of f(x)=logx5*f*(*x*)=log*x*​5 , where x>0*x*>0, and x≠1*x*=1 is −logx5logxex*x*−log*x*​5log*x*​*e*​.
* Derivative of f(x)=logex2*f*(*x*)=log*e*​*x*2 is −2x2*x*2−2​.
* Derivative of f(x)=logex2*f*(*x*)=log*e*​*x*2 is 2x*x*2​.

Then the number of correct statements is

***1 point***

***1 point***

In which of the following, one can apply L'Hospital's rule to evaluate the limits?

lim⁡x→∞xx+sin⁡x*x*→∞lim​*x*+sin*xx*​

lim⁡x→0sin⁡2x1−cos⁡(2x)*x*→0lim​1−cos(2*x*)sin2*x*​

lim⁡x→∞7+ln⁡xx3+6*x*→∞lim​*x*3+67+ln*x*​

lim⁡x→0+1x*x*→0+lim​*x*1​

if f(x+y)=f(x)f(y)*f*(*x*+*y*)=*f*(*x*)*f*(*y*) for all x,y∈R*x*,*y*∈R and f(9)=6*f*(9)=6, f′(0)=4*f*′(0)=4, then f′(9)*f*′(9) is

***1 point***

***1 point***

Let f*f* and g*g* be two distinct functions from RR to RR. Which of the following statements are true?

If fg*fg* is differentiable, then both f*f* and g*g* are differentiable.

Assume that g(x)≠0*g*(*x*)=0 for all x∈R*x*∈R. If fg*gf*​ is differentiable, then both f*f* and g*g* are differentiable.

If f*f* is an even differentiable function, then f′*f*′ is an odd function.

If f*f* is an odd differentiable function then, f′*f*′ is an even function.

The value of lim⁡x→0+cot⁡(x)sin⁡(4x)*x*→0+lim​cot(*x*)sin(4*x*) is