AQ8.4: Activity Questions 4 - Not Graded

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

**Level 1:**

Suppose m1*m*1​, m2*m*2​, and m3*m*3​ denote the slopes of the tangents of the curve represented by the function f(x)=x3+3x*f*(*x*)=*x*3+3*x*, at the points (−1,f(−1))(−1,*f*(−1)), (0,f(0))(0,*f*(0)), and (1,f(1))(1,*f*(1)), respectively. The value of m1+m2+m3*m*1​+*m*2​+*m*3​ is

***1 point***

***1 point***

Which of the following statements are correct?

Tangent to the parabola (y−k)=a(x−h)2(*y*−*k*)=*a*(*x*−*h*)2 at the vertex is x=h*x*=*h*

Tangent to the parabola (y−k)=a(x−h)2(*y*−*k*)=*a*(*x*−*h*)2 at the vertex is y=k*y*=*k*.

Tangent to the parabola y=ax2*y*=*ax*2 at (a,a3)(*a*,*a*3) is y=a2(2x−a)*y*=*a*2(2*x*−*a*).

Tangent to the parabola y=ax2*y*=*ax*2 at (a,a3)(*a*,*a*3) is y=2ax+a3*y*=2*ax*+*a*3.

***1 point***

Consider the function f:R→R*f*:R→R, such that f(x)=ax2+bx+c*f*(*x*)=*ax*2+*bx*+*c*. Which of the following statements are correct?

The slope of the linear approximation Lf(x)*Lf*​(*x*) at (m,f(m))(*m*,*f*(*m*)) is 2am+b2*am*+*b*.

The slope of the linear approximation Lf(x)*Lf*​(*x*) at (m,f(m))(*m*,*f*(*m*)) is 2ax+b2*ax*+*b*.

The equation of the linear approximation Lf(x)*Lf*​(*x*) at (m,f(m))(*m*,*f*(*m*)) is y=(2am+b)x+c−am2*y*=(2*am*+*b*)*x*+*c*−*am*2.

The equation of the linear approximation Lf(x)*Lf*​(*x*) at (m,f(m))(*m*,*f*(*m*)) is y=(2am+b)x+c*y*=(2*am*+*b*)*x*+*c*.

***1 point***

Consider the function f:R→R*f*:R→R, such that f(x)=exsinx*f*(*x*)=*exsinx*. Which of the following expression represents the linear approximation Lf(x)*Lf*​(*x*) at x=π2*x*=2*π*​?

The slope of the linear approximation Lf(x)*Lf*​(*x*) at x=π2*x*=2*π*​ is −eπ2−*e*2*π*​.

The slope of the linear approximation Lf(x)*Lf*​(*x*) at x=π2*x*=2*π*​ is eπ2*e*2*π*​.

The equation of the linear approximation Lf(x)*Lf*​(*x*) at x=π2*x*=2*π*​ is Lf(x)=−eπ2x+eπ2(1+π2)*Lf*​(*x*)=−*e*2*π*​*x*+*e*2*π*​(1+2*π*​).

The equation of the linear approximation Lf(x)*Lf*​(*x*) at x=π2*x*=2*π*​ is Lf(x)=eπ2x+eπ2(1−π2)*Lf*​(*x*)=*e*2*π*​*x*+*e*2*π*​(1−2*π*​).

**Level 2:**

Let f*f* be a differentiable function at x=1*x*=1. The tangent line to the curve represented by the function f*f* at the point (1,0)(1,0) passes through the point (5,8)(5,8). What will be the value of f′(1)*f*′(1)?

***1 point***

Suppose the tangent of the curve represented by a function f*f* at the point (1,f(1))(1,*f*(1)) is given by the equation y=3x+2*y*=3*x*+2. What is the value of f(1)*f*(1)?

***1 point***

Using the linear approximation of f(x)=x*f*(*x*)=*x*​ at x=4*x*=4, the approximate value of 4.44.4​ is

***1 point***

Using the linear approximation of f(x)=(1+x)4*f*(*x*)=(1+*x*)4 at x=0*x*=0, the approximate value of (1.01)4(1.01)4 is