

Name _____

All problems are worth **10** points.

Simplify the following giving the "exact answer":

1. $\sin\left(\tan^{-1}\left(-\frac{2}{5}\right)\right) = \underline{\hspace{2cm}}$

2. $e^{-\ln(\cos(x))} = \underline{\hspace{2cm}}$

Evaluate the following derivatives:

3. $f(x) = \tan^{-1}(e^x) \quad f'(x) = \underline{\hspace{2cm}}$

4. $f(x) = \ln(\cosh(x)) \quad f'(x) = \underline{\hspace{2cm}}$

5. $f(x) = x^{3x} \quad ; \text{ for } x > 0 \quad f'(x) = \underline{\hspace{2cm}}$

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6. $f(x) = \sin(\sin^{-1}(e^{-x}))$

$f'(x) =$ _____

Evaluate the following limits:

7. $\lim_{x \rightarrow -\pi} \frac{\sin(x)}{x+\pi} =$ _____

8. $\lim_{x \rightarrow \infty} \frac{e^x}{\sqrt{16e^{2x} + x^2 + e^{-2x}}} =$ _____

9. $\lim_{x \rightarrow \infty} x - \sqrt{x^2 + 6x - 48} =$ _____

10. Find the tangent (linear) approximation $L(x)$ to the function $f(x) = \sqrt{4x + 5}$ about $x = 5$.

a) $L(x) =$ _____

Give the following to at least four decimal places.

b) $L(5.003) =$ _____