Name_____

Differentiate the following functions.

1. $f(x) = x^2 + \arctan x$
2. $g(t) = \arcsin(2t + 2)$
3. $y = x \arcsin x$
4. $y = \dfrac{1}{\sin^{-1} x}$
5. $f(x) = x \arctan \sqrt{x}$
6. $y = x^2 \arcsin x$
7. $y = \dfrac{1 + \arctan x}{2 - 3\arctan x}$
8. $f(x) = \arcsin(\cos x)$
9. $f(x) = x(\arctan x)^2$
10. $y = \left(\arcsin\left(x^3\right)\right)^4$
11. $y = \arctan\left(e^{-x^2}\right)$
12. $h(x) = \arctan(\ln x)$ Find the tangent line at $x = e$.
13. $y = x \arcsin x + \sqrt{1 - x^2}$
14. $y = \ln(x^2 + 4) - x \arctan\left(\dfrac{x}{2}\right)$ Find the tangent at $x = 2$.
15. $y = \arctan\left(\dfrac{1}{x}\right) - \arctan x$

INVERSE TRIG DERIVATIVES

$$\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1 - x^2}}$$

$$\frac{d}{dx}(\arccos x) = \frac{-1}{\sqrt{1 - x^2}}$$

$$\frac{d}{dx}(\arctan x) = \frac{1}{1 + x^2}$$

Answer Key to Worksheet: Inverse Trig Derivatives

1. $2x + \frac{1}{1+x^2}$

2. $\frac{2}{\sqrt{1-4(1+t)^2}}$

3. $\frac{x}{\sqrt{1-x^2}} + \text{ArcSin}[x]$

4. $-\frac{1}{\sqrt{1-x^2}\,\text{ArcSin}[x]^2}$

5. $\frac{\sqrt{x}}{2+2x} + \text{ArcTan}[\sqrt{x}]$

6. $x\left(\frac{x}{\sqrt{1-x^2}} + 2\,\text{ArcSin}[x]\right)$

7. $\frac{5}{(1+x^2)(2-3\,\text{ArcTan}[x])^2}$

8. $-\text{Csc}[x]\sqrt{\text{Sin}[x]^2}$

9. $\text{ArcTan}[x]\left(\frac{2x}{1+x^2} + \text{ArcTan}[x]\right)$

10. $\frac{12x^2\,\text{ArcSin}[x^3]^3}{\sqrt{1-x^6}}$

11. $-\frac{2e^{x^2}x}{1+e^{2x^2}}$

12. $y = \frac{e(-2+\pi)+2x}{4e}$

13. $\text{ArcSin}[x]$

14. $y = -\frac{\pi x}{4} + \ln[8]$

15. $-\frac{2}{1+x^2}$

Note: P12 and P14 are equations of tangent lines. The rest are derivatives.

Please report any mistakes you find.