

4.2 Inverse Derivatives

Calculus

Name: _____

CA #1

Find the following.		
1. $\frac{d}{dx} \sin^{-1}(8x)$	2. $\frac{d}{dx} \sec^{-1}(x^2)$	3. $\frac{d}{dx} \cot^{-1}(2x)$
4. $\frac{d}{dx} \sin^{-1}(-x^2)$	5. $\frac{d}{dx} \tan^{-1}(6x^3)$	6. $\frac{d}{dx} \cos^{-1}(2x^5)$
7. $\frac{d}{dx} \csc^{-1}(x^3)$	8. Anti-derivative of $f'(x) = -\frac{6x^2}{\sqrt{1-4x^6}}$	
9. Anti-derivative of $f'(x) = \frac{20x^4}{1+16x^{10}}$		10. Anti-derivative of $f'(x) = -\frac{2}{x\sqrt{4x^4-1}}$
11. Anti-derivative of $f'(x) = \frac{3}{\sqrt{1-9x^2}}$	12. $\frac{d}{dx} \sec^{-1}(x^5)$	
13. $\frac{d}{dx} \cos^{-1}(7x^3)$	14. $\frac{d}{dx} \tan^{-1}(3x)$	

INVERSE FUNCTIONS:

15. If $f(x) = 4\sqrt{x}$ and $f^{-1}(20) = 25$, find the derivative of $f^{-1}(x)$ at $x = 20$

16. If $f(x) = \cos(x)$ and $f^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$, find the derivative of $f^{-1}(x)$ at $x = \frac{\sqrt{2}}{2}$

17. If $f(x) = 3x + 10$ find $\frac{d}{dx}[f^{-1}(x)]$ at $x = -2$.

18. If $f(x) = \frac{x^3}{27}$ find $\frac{d}{dx}[f^{-1}(x)]$ at $x = 1$.

Answers to 4.2 CA #1

1. $\frac{8}{\sqrt{1-64x^2}}$	2. $\frac{2}{x\sqrt{x^4-1}}$	3. $-\frac{2}{4x^2+1}$	4. $-\frac{2x}{\sqrt{1-x^4}}$	5. $\frac{18x^2}{36x^6+1}$	6. $-\frac{10x^4}{\sqrt{1-4x^{10}}}$	7. $-\frac{3}{ x \sqrt{x^6-1}}$
8. $\cos^{-1}(2x^3) + C$	9. $\tan^{-1}(4x^5) + C$	10. $\csc^{-1}(2x^2) + C$	11. $\sin^{-1}(3x) + C$	12. $\frac{5}{ x \sqrt{x^{10}-1}}$		
13. $-\frac{21x^2}{\sqrt{1-49x^6}}$	14. $\frac{3}{9x^2+1}$	15. $\frac{5}{2}$	16. $-\sqrt{2}$	17. $\frac{1}{3}$	18. 1	