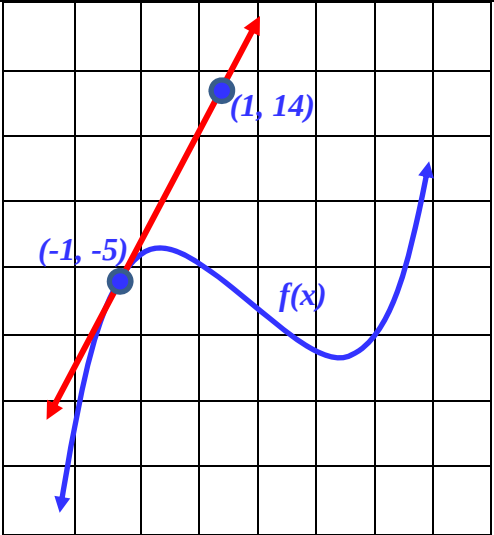


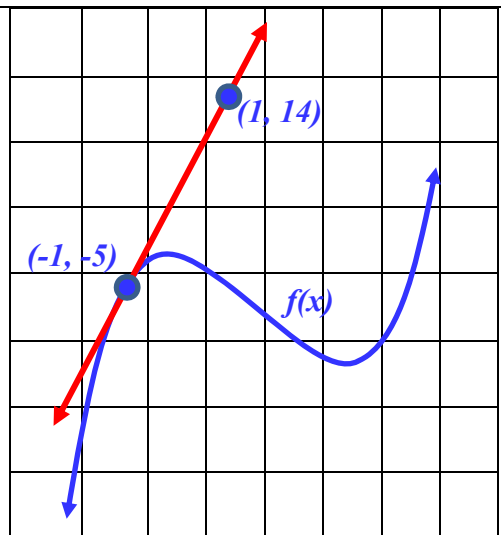
CP Calculus Extra Practice

1. Given the graph $f(x)$, find $f'(-1)$	
2. If $f(x) = \sin x $ for all x , then the value of the derivative $f'(x)$ at $x = -\frac{\pi}{3}$	
3. Find $\frac{d}{dx} \{\sin(x^2 - 3x + 4)\}$	
4. If $y = \sqrt{\frac{(x+1)(x-2)}{(x-1)^3}}$, find $f'(x)$	
5. Find the first derivative of $f(x)$ given that $f(x) = \sqrt{\frac{(x+1)(x-2)}{(x+3)}}$	
6. If $f'(x) = -f(x)$ and $f(0) = 1$, then $f(x) = ?$	
7. The slope of the line tangent to the graph of $f(x) = e^{\sin x}$ at $x=0$ is	
8. If $f(x) = x^2 \cot x$ then $\frac{dy}{dx}$ is	
9. If $f(x) = \ln\left\{\frac{x+1}{x-1}\right\}$ for all $x \neq \pm 1$ then $f'(2)$ is	
10. If $f(x) = \sec^5(\sqrt{3x})$, then $\frac{dy}{dx}$ is	
11. If $f(x) = (x-1)^{2/3}(x+3)^{1/3}$ for all the x , then the <u>domain of $f'(x)$</u> is	

12. If $y = xe^x$, then $\frac{d^n y}{dx^n} = f^{(n)}(x) =$
13. If $\tan(xy) = x$, then $\frac{dy}{dx} =$
14. If $f(x) = 2^{\left(\frac{1}{x}\right)}$, then $\frac{dy}{dx} =$
15. If $3y - 2x = \log(x^2 - y^3)$, then the value of $\frac{dy}{dx}$ at (3, 2)
16. If $f(x) = \ln\{\ln(\ln x)\}$, then $f'(x) =$
17. If $y = x^x$, then find $f'(x)$ using "logarithmic differentiation"
18. If $f(x) = (x^2 + 1)^3$, then the <u>SECOND</u> derivative of $f(x)$ at $x = 0$ is
19. If $y = \sqrt{\frac{x^2 - 1}{x^2 + 1}}$, then $\frac{dy}{dx} =$
20. Find $\lim_{n \rightarrow (-\infty)} \frac{-4n^2}{3n^2 - 5n + 6}$
21. If $\lim_{x \rightarrow (\infty)} \frac{\sqrt{x+1} - \sqrt{x-1}}{\sqrt{x}}$
22. If $\lim_{x \rightarrow (\infty)} \frac{\sqrt{x}}{\sqrt{x+1} - \sqrt{x-1}}$
23. The position of a moving particle on a straight line at any time, t , is given by $s(t) = 2 \sin(\pi t) + 3 \cos(\pi t)$ What is the acceleration of the particle when $t=3$ seconds?
24. If $\begin{cases} f(x) = \frac{\sqrt{3x+1} - \sqrt{x+3}}{x-1} \\ f(1) = k \end{cases}$, for $x \neq 1$, and $f(x)$ is continuous at $x=1$, then $k=$

CP Calculus Extra Practice

1. Given the graph $f(x)$, find $f'(-1) = \frac{14 - (-5)}{1 - (-1)}$



2. If $f(x) = |\sin x|$ for all x , then the value of the derivative at $x = -\frac{\pi}{3}$ is $f'(x) = -\left|\cos\left(-\frac{\pi}{3}\right)\right| = -\frac{1}{2}$

3. Find $\frac{d}{dx}\{\sin(x^2 - 3x + 4)\} = (2x - 3)\cos(x^2 - 3x + 4)$

4. If $\sin y = \ln x$, $0 < x < \pi$, what is $\frac{dy}{dx}$ in terms of x and y ?
- $y' = \frac{1}{x \cos y}$

5. Find the first derivative of $f(x)$ given that
- $$f(x) = \sqrt{\frac{(x+1)(x-2)}{(x+3)}}$$
- $$f' = \frac{1}{2} \sqrt{\frac{(x+1)(x-2)}{(x+3)}} \left(\frac{1}{x+1} + \frac{1}{x-2} - \frac{1}{x+3} \right)$$

6. If $f'(x) = -f(x)$ and $f(0) = 1$, then $f(x) = ?e^{-x}$

7. The slope of the line tangent to the graph of $f(x) = e^{\sin x}$ at $x=0$ is $m = f'(0) = 1$

8. If $f(x) = x^2 \cot x$ then $\frac{dy}{dx}$ is $f' = 2x \cot x - x^2 \csc^2 x$

9. If $f(x) = \ln\left\{\frac{x+1}{x-1}\right\}$ for all $x \neq \pm 1$ then $f'(2)$ is $f'(2) = \frac{1}{3} - 1 = -\frac{2}{3}$

10. If $f(x) = \sec^5(\sqrt{3x})$, then $\frac{dy}{dx}$ is $f' = \frac{5\sqrt{3}}{2\sqrt{x}} \tan(\sqrt{3x}) \sec^5(\sqrt{3x})$

11. If $f(x) = (x-1)^{2/3}(x+3)^{1/3}$ for all the x , then the domain of $f'(x)$ is

$$f' = \frac{2(x+3)^{1/3}}{3(x-1)^{1/3}} + \frac{(x-1)^{2/3}}{3(x+3)^{2/3}}$$

$$D: x \neq 1; x \neq -3$$

12. If $y = xe^x$, then $\frac{d^n y}{dx^n} = f^{(n)}(x) = ne^x + xe^x$

13. If $\tan(xy) = x$, then $\frac{dy}{dx} = \sec^2(xy)\{y + xy'\} = 1 \Rightarrow y' = \frac{\cos^2(xy) - y}{x}$

14. If $f(x) = 2^{\left(\frac{1}{x}\right)}$, then $\frac{dy}{dx} = -\frac{\{\ln 2\}2^{(1/x)}}{x^2}$

15. If $3y - 2x = \log(x^2 - y^3)$, then the value of $\frac{dy}{dx}$ at $(3, 2)$

$$3y' - 2 = \frac{2x - 3y^2 y'}{x^2 - y^3} \Rightarrow y'(3) = \frac{6 + 2 \ln 10}{12 + 3 \ln 10}$$

16. If $f(x) = \ln\{\ln(\ln x)\}$, then $f'(x) = f' = \frac{1}{x \ln x \{\ln\{\ln x\}\}}$

17. If $y = x^x$, then find $f'(x)$ using "logarithmic differentiation" $f' = x^x \{1 + \ln x\}$

18. If $f(x) = (x^2 + 1)^3$, then the SECOND derivative of $f(x)$ at $x = 0$ is $f''(0) = 6$

19. If $y = \sqrt{\frac{x^2 - 1}{x^2 + 1}}$, then $\frac{dy}{dx} = \sqrt{\frac{x^2 - 1}{x^2 + 1}} \left[\frac{x}{x^2 - 1} - \frac{x}{x^2 + 1} \right]$

20. Find $\lim_{n \rightarrow (-\infty)} \frac{-4n^2}{3n^2 - 5n + 6} = \frac{-4}{3}$

21. If $\lim_{x \rightarrow (\infty)} \frac{\sqrt{x+1} - \sqrt{x-1}}{\sqrt{x}} = 0$

22. If $\lim_{x \rightarrow (\infty)} \frac{\sqrt{x}}{\sqrt{x+1} - \sqrt{x-1}} = \infty$

23. The position of a moving particle on a straight line at any time, t , is given by $s(t) = 2 \sin(\pi t) + 3 \cos(\pi t)$. What is the acceleration of the particle when $t=3$ seconds?
 $s''(3) = -2\pi^2 \sin(3\pi) - 3\pi^2 \cos(3\pi) = 3\pi^2$

24. If $\begin{cases} f(x) = \frac{\sqrt{3x+1} - \sqrt{x+3}}{x-1}, & \text{for } x \neq 1, \\ f(1) = k \end{cases}$, and $f(x)$ is continuous at $x=1$, then $k=1/2$