AP Calculus | Name________________________Pd.__

Chain Rule (2) | D(1) Day 7

1-12: Find the derivative of the function.

1. $F(x)=\sqrt{1-2x}$	2. $f(x)=\dfrac{1}{(1+\sec x)^2}$
3. $f(t)=\sin\left(e^t\right)+e^{\sin t}$	4. $y=\cos\left(a^3+x^3\right)$ $a=\text{some constant}$
5. $y=xe^{-kx}$ $k=\text{some constant}$	6. $y=a^3+\cos^3 x$ $a=\text{some constant}$
7. $g(x)=(x^2+1)^3(x^2+2)^6$	8. $h(t)=(t+1)^{\frac{2}{3}}\left(2t^2-1\right)^3$
9. $F(t)=(3t-1)^4(2t+1)^{-3}$	10. $y=2^{\sin \pi x}$
11. $y=\sqrt{1+2e^{3x}}$	12. $y=5^{-\frac{1}{x}}$

13-16: Find the equation of the tangent line to the curve at the given point.

13. $y=(1+2x)^{10}$ $(0,1)$

14. $y=\sqrt{1+x^3}$ $(2,3)$

15. $y=\sin(\sin x)$ $(\pi,0)$

16. $y=\sin x+\sin^2 x$ $(0,0)$

17-18: A table of values for f, g, f', and g' is given.

x	f(x)	g(x)	f'(x)	g'(x)
1	3	2	4	6
2	1	8	5	7
3	7	2	7	9

17. If $h(x)=f(g(x)),\ \ find\ \ h'(1)$

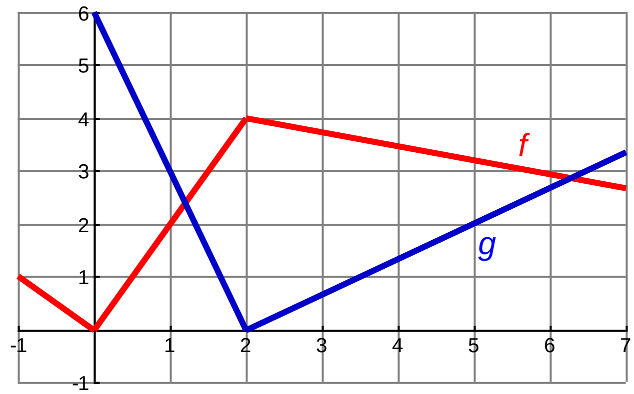
18. If $H(x)=g(f(x)),\ \ find\ \ H'(1)$

19-22: If f and g are the functions whose graphs are shown. Let $u(x)=f(g(x))$, $v(x)=g(f(x))$, and $w(x)=g(g(x))$. Find each derivative, if it exists. If it does not exist, explain why.

19. $u'(1)$

20. $v'(1)$

21. $w'(1)$



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Answers

1. $F'(x) = \frac{-1}{\sqrt{1-2x}}$
2. $f'(x) = \frac{-2\sec x \tan x}{(1+\sec x)^3}$
3. $f'(t) = e^t \cos(e^t) + e^{\sin t} \cos t$
4. $y'(x) = -3x^2 \sin(a^3 + x^3)$
5. $y'(x) = e^{-kx}(-kx+1)$
6. $y'(x) = -3\sin x \cos^2 x$
7. $g'(x) = 6(x^2+1)^2(x^2+2)^5(3x^2+4)$
8. $f'(t) = \frac{2(2t^2-1)^2(20t^2+18t-1)}{3(t+1)^{\frac{1}{3}}}$
9. $F'(t) = \frac{-6(3t-1)^3(-t-3)}{(2t+1)^4}$
10. $y'(x) = \pi \cos(\pi x) 2^{\sin(\pi x)} \ln 2$
11. $y'(x) = \frac{3e^{3x}}{\sqrt{1+2e^{3x}}}$
12. $y'(x) = \frac{\ln 5 \cdot 5^{-\frac{1}{x}}}{x^2}$
13. $y - 1 = 20(x - 0)$
14. $y - 3 = 2(x - 2)$
15. $y - 0 = -1(x - \pi)$
16. $y - 0 = 1(x - 0)$
17. $h'(1) = 30$
18. $H'(1) = 36$
19. $u'(1) = \frac{3}{4}$
20. $v'(1) = dne$
21. $w'(1) = -2$