AP Calculus Name_____Pd.__

Review Derivatives (1) D(1) Day 9

1-24: Calculate y':

1. $y = \left(x^2 + x^3\right)^4$	2. $y = \frac{1}{\sqrt{x}} - \frac{1}{\sqrt[5]{x^3}}$	3. $y = \frac{x^2 - x - 2}{\sqrt{x}}$
4. $y = \frac{\tan x}{1 + \cos x}$	5. $y = x^2 \sin(\pi x)$	6. $y = \frac{t^4 - 1}{t^4 + 1}$
7. $y = \ln(x \ln x)$	8. $y = \sqrt{x} \cos\sqrt{x}$	9. $y = \frac{e^{\frac{1}{x}}}{x^2}$

10. $y = \ln\sec x$	11. $y = \cot(\csc x)$	12. $y = e^{x\sec x}$
13. $y = 3^{x\ln x}$	14. $y = \sec(1+x^2)$	15. $y = \log_5(1+2x)$
16. $y = (\cos x)^x$	17. $y = \dfrac{(x^2+1)^4}{(2x+1)^3(3x-1)^5}$	18. $y = e^{\cos x} + \cos(e^x)$

19. $y = 10^{\tan \pi\theta}$	20. $y = \cot\left(3x^2 + 5\right)$	21. $y = \sqrt{t \ln\left(t^4\right)}$
22. $y = \tan^2(\sin\theta)$	23. $y = (3x + 2)^5 (5 - x)^8$	24. $y = \left(\dfrac{2x - 5}{x + 4}\right)^8$

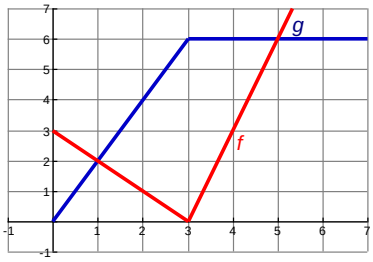
25-27: Find an equation of the tangent to the curve at the given point.

25. $y = 4\sin^2 x, \quad \left(\dfrac{\pi}{6}, 1\right)$	26. $y = \dfrac{x^2 - 1}{x^2 + 1}, \quad (0, -1)$	27. $y = \sqrt{1 + 4\sin x}, \quad (0, 1)$

28-29: Suppose that h(x)=f(x)g(x) and F(x)=f(g(x)), where f(2)=3, g(2)=5, g'(2)=4, f'(2)= -2, and f'(5)=11.

28. Find $h'(2)$	29. Find $F'(2)$

30-32: Suppose f and g are functions whose graphs are shown, let P(x)=f(x)g(x), Q(x)=f(x)/g(x), and C(x)=f(g(x)).



30. Find $P'(2)$	31. Find $Q'(2)$	32. Find $C'(2)$

33-40: Find f' in terms of g'

33. $f(x)=x^2g(x)$	34. $f(x)=g(x^2)$	35. $f(x)=\left[g(x)\right]^2$	36. $f(x)=g(g(x))$
37. $f(x)=g(e^x)$	38. $f(x)=e^{g(x)}$	39. $f(x)=\ln\lvert g(x)\rvert$	40. $f(x)=g(\ln x)$

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Answers:

1. $y'(x) = 4\left(2x + 3x^2\right)\left(x^2 + x^3\right)^3$

2. $y'(x) = -\frac{1}{2x^{\frac{3}{2}}} + \frac{3}{5x^{\frac{8}{5}}}$

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

4. $y'(x) = \frac{\sec^2 x(1+\cos x) + \sin x \tan x}{(1+\cos x)^2}$

5. $y'(x) = \pi x^2 \cos(\pi x) + 2x\sin(\pi x)$

6. $y'(t) = \frac{8t^3}{\left(t^4+1\right)^2}$

7. $y'(x) = \frac{1+\ln x}{x \ln x}$

8. $y'(x) = \frac{-\sqrt{x}\sin\sqrt{x} + \cos\sqrt{x}}{2\sqrt{x}}$

9. $y'(x) = \frac{-e^{\frac{1}{x}}(1+2x)}{x^4}$

10. $y'(x) = \tan x$

11 $y'(x) = \csc^2(\csc x) \bullet \csc x \bullet \cot x$

12. $y'(x) = e^{x\sec x} \bullet \sec x(x\tan x + 1)$

13. $y'(x) = 3^{x\ln x} \bullet \ln 3(1+\ln x)$

14 $y'(x) = 2x\sec\left(1+x^2\right)\tan\left(1+x^2\right)$

15. $y'(x) = \frac{2}{(1+2x)\ln 5}$

16. $\frac{dy}{dx} = \left(-x\tan x + \ln(\cos x)\right)(\cos x)^x$

17 $\frac{dy}{dx} = \left(\frac{8x}{x^2+1} - \frac{6}{2x+1} - \frac{15}{3x-1}\right)\left(\frac{\left(x^2+1\right)^4}{(2x+1)^3(3x-1)^5}\right)$

18. $y'(x) = \sin x \bullet e^{\cos x} - \sin\left(e^x\right) \bullet e^x$

19. $y'(x) = \pi 10^{\tan \pi\theta} \ln(10)\sec^2(\pi\theta)$

20 $y'(x) = -6x\csc^2\left(3x^2+5\right)$

21. $y'(t) = \frac{4+\ln\left(t^4\right)}{2\sqrt{t\ln\left(t^4\right)}}$

22. $y'(\theta) = 2\tan(\sin\theta) \bullet \sec^2(\sin\theta) \bullet \cos\theta$

23 $y'(x) = (3x+2)^4(5-x)^7(-39x+59)$

24. $y'(x) = \frac{104(2x-5)^7}{(x+4)^9}$

25. $y - 1 = 2\sqrt{3}\left(x - \frac{\pi}{6}\right)$

26 $y + 1 = 0(x-0)$ *or* $y = -1$

27. $y - 1 = 2(x-0)$

28. $h'(2) = 2$

29. $F'(2) = 44$

30. $P'(2) = -2$

31 $Q'(2) = -\frac{3}{8}$

32. $C'(2) = 6$

33. $f'(x) = x^2 \cdot g'(x) + 2x \cdot g(x)$

34. $f'(x) = 2x \cdot g'(x^2)$

35. $f'(x) = 2g(x) \cdot g'(x)$

36. $f'(x) = g'\left[g(x)\right] \cdot g'(x)$

37. $f'(x) = g'\left[e^x\right] \cdot e^x$

38. $f'(x) = e^{g(x)} \cdot g'(x)$

39. $f'(x) = \frac{g'(x)}{g(x)}$

40. $f'(x) = \frac{g'(\ln x)}{x}$