AP Calculus Derivatives Day 3 Name________________ Pd.____

Derivatives: Polynomials & Exponential Functions

1-21: Differentiate the Function

1. $f(x)=e^5$ $f'(x)=0$	2. $f(t)=2-\frac{2}{3}t$ $f'(t)=-\frac{2}{3}$	3. $F(x)=\frac{3}{4}x^8$ $F'(x)=6x^7$
4. $h(x)=(x-2)(2x+3)$ $=2x^2-x-6$ $h'(x)=4x-1$	5. $g(t)=2t^{-\frac{3}{4}}$ $g'(t)=-\frac{3}{2}t^{-7/4}$	6. $A(s)=-\frac{12}{s^5}$ $=-12s^{-5}$ $A'(s)=60s^{-6}$
7. $y=x^{\frac{5}{3}}-x^{\frac{2}{3}}$ $y'=\frac{5}{3}x^{2/3}-\frac{2}{3}x^{-1/3}$	8. $h(t)=\sqrt[4]{t}-4e^t$ $=t^{1/4}-4e^t$ $h'(t)=\frac{1}{4}t^{-3/4}-4e^t$	9. $\sqrt{x}(x-1)$ $=x^{1/2}(x-1)=x^{3/2}-x^{1/2}$ $\frac{dy}{dx}=\frac{3}{2}x^{1/2}-\frac{1}{2}x^{-1/2}$
10. $3e^x+\frac{4}{\sqrt[3]{x}}$ $=3e^x+4x^{-1/3}$ $\frac{dy}{dx}=3e^x-\frac{4}{3}x^{-4/3}$	11. $y=\frac{x^2+4x+3}{\sqrt{x}}$ $=x^{-1/2}(x^2+4x+3)$ $=x^{3/2}+4x^{1/2}+3x^{-1/2}$ $y'=\frac{3}{2}x^{1/2}+2x^{-1/2}-\frac{3}{2}x^{-3/2}$	12. $y=\frac{\sqrt{x}+x}{x^2}$ $=x^{-2}(x^{1/2}+x)$ $=x^{-3/2}+x^{-1}$ $y'=-\frac{3}{2}x^{-5/2}-x^{-2}$
13. $k(r)=e^r+r^e$ $k'(r)=e^r+er^{e-1}$	14. $f(x)=x^3-4x+6$ $f'(x)=3x^2-4$	15. $f(t)=1.4t^5-2.5t^2+6.7$ $f'(t)=7t^4-5t$
16. $g(x)=x^2(1-2x)$ $=x^2-2x^3$ $g'(x)=2x-6x^2$	17. $S(p)=\sqrt{p}-p$ $=p^{1/2}-p$ $S'(p)=\frac{1}{2}p^{-1/2}-1$	18. $S(R)=4\pi R^2$ $S'(R)=8\pi R$
19. $y=x^8+12x^5-4x^4-6x+5$ $y'=8x^7+60x^4-16x^3-6$	20. $y=\frac{3x^2-\sqrt{x}+x}{x}$ $=x^{-1}(3x^2-x^{1/2}+x)$ $=3x-x^{-1/2}+1$ $y'=3+\frac{1}{2}x^{-3/2}$	21. $u=\sqrt[5]{t}+4\sqrt{t^5}$ $=t^{1/5}+4t^{5/2}$ $u'=\frac{1}{5}t^{-4/5}+10t^{3/2}$

22-24: Find an equation of the tangent line to the curve at the given point.

22. $f(x)=2x^3+6$, $(-1,4)$ $f'(x)=6x^2\big\vert_{x=-1}=6$ $y-4=6(x+1)$	23. $y=\sqrt[4]{x}$, $(1,1)$ $=x^{1/4}$ $y'=\frac{1}{4}x^{-3/4}\big\vert_{x=1}=\frac{1}{4}$ $y-1=\frac{1}{4}(x-1)$	24. $y=x^4+2x^2-x$, $(1,2)$ $y'=4x^3+4x-1\big\vert_{x=1}$ $=7$ $y-2=7(x-1)$