key.

IB Cal: Derivatives of Trigonometric, Exponential, and Logarithmic Functions. Work on graph paper.

Differentiate the following functions:

1. $f(x)=\sin x+\cos x$

$f'(x)=\cos x-\sin x$

2. $f(x)=2\sin x+\tan x$

$f'(x)=2\cos x+\sec^2 x$

3. $f(t)=t^2+\cos t+\cos(\frac{\pi}{4})$

$f'(t)=2t-\sin t$

4. $f(t)=t^2+\cos t+\cos(\frac{\pi}{4})$

$f'(t)=2t-\sin t$

5. $f(x)=\sin^2 x$

$f'(x)=2\sin x\cos x$

6. $f(x)=\sqrt{x}\cos x+x\cot x$

$f'(x)=\frac{1}{2}x^{-\frac{1}{2}}\cos x+\sqrt{x}(-\sin x)+\cot x-x\csc^2 x.$

7. $f(x)=x^2\cos x$

$f'(x)=2x\cos x-x^2\sin x$

8. $f(x)=\frac{\sin x}{x}$

$f'(x)=\frac{\cos x\cdot x-\sin x}{x^2}$

9. $f(t)=e^t\csc t$

$f'(t)=e^t\csc t-e^t\csc t\cot t$

10. $f(x)=x^2\ln x$

$f'(x)=2x\ln x+\frac{x^2}{x}=2x\ln x+x$

11. $f(x)=e^{2x}(\sin x-\cos x)$

$f'(x)=2e^{2x}(\sin x-\cos x)+e^{2x}(\cos x+\sin x)$

12. $f(x)=\frac{\sin x}{e^x}$

$f'(x)=\frac{\cos x\cdot e^x-\sin x e^x}{e^{2x}}=\frac{\cos x-\sin x}{e^x}$

13. $f(x)=\frac{x\cos x}{e^x}$

$f'(x)=\frac{[\cos x+x(-\sin x)]\cdot e^x-x\cos x\cdot e^x}{e^{2x}}=\frac{\cos x-x\sin x-x\cos x}{e^x}$

14. $f(x)=\frac{\tan x}{1-2x}$

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

15. $f(t)=\frac{2+\sin t}{t+2}$

$f'(t)=\frac{(\cos t)(t+2)-(2+\sin t)}{(t+2)^2}=\frac{t\cos t+2\cos t-2-\sin t}{(t+2)^2}$

16. $f(x)=\frac{1+\sin x}{2-\cos x}$

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

$=\frac{2\cos x-\cos^2 x-\sin x-\sin^2 x}{(2-\cos x)^2}$

$=\frac{2\cos x-\sin x-(\cos^2 x+\sin^2 x)}{(2-\cos x)^2}$

$=\frac{2\cos x-\sin x-1}{(2-\cos x)^2}$

17. $f(t)=\sqrt{t}\ln t$

$f'(t)=\frac{1}{2}(t)^{-\frac{1}{2}}\ln t+\frac{\sqrt{t}}{t}$

18. $f(t)=\frac{\ln t}{t}$

$f'(t)=\frac{(\frac{1}{t})(t)-\ln t}{t^2}$

$=\frac{1-\ln t}{t^2}$