

WHY DID SIR ISAAC NEWTON REFUSE A GLASS OF WINE BEFORE SITTING DOWN TO FORMULATE THE RULES FOR DIFFERENTIATION?

Rules for Differentiating.

A. $\frac{d}{dx}[c] = 0$	E. $\frac{d}{dx}[ax^n] = nax^{n-1}$
D. $\frac{d}{dx}[f(x) \pm g(x)] = f'(x) \pm g'(x)$	H. $\frac{d}{dx}[f(x)g(x)] = f(x)g'(x) + g(x)f'(x)$
T. $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)f'(x) - f(x)g'(x)}{g^2(x)}$	N. $\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$

Match each expression with a rule from above that you would apply to find the derivative.

1) $\frac{d}{dx}[5x^4]$	2) $\frac{d}{dx}[2\sqrt{x}]$	3) $\frac{d}{dx}[3x^5 - 2x^4 + 5]$
4) $\frac{d}{dx}[(2x^4 - x)^4]$	5) $\frac{d}{dx}[3]$	6) $\frac{d}{dx}\left[\frac{x}{x+1}\right]$
7) $\frac{d}{dx}[\sqrt{5x+2}]$	8) $\frac{d}{dx}[(2x-1)^4(5x+1)]$	9) $\frac{d}{dx}[3x^{-5}]$
10) $\frac{d}{dx}\left[\frac{x^2}{x-1}\right]$	11) $\frac{d}{dx}[3x^2 - 2x - 7]$	12) $\frac{d}{dx}[3\sqrt{2}]$
13) $\frac{d}{dx}[x]$	14) $\frac{d}{dx}[\sqrt[3]{x^2}]$	15) $\frac{d}{dx}\left[\frac{3}{2}x^{2/3}\right]$
16) $\frac{d}{dx}\left[\frac{x-1}{x+1}\right]$	17) $\frac{d}{dx}[\sin(3x-3)]$	18) $\frac{d}{dx}\left[\frac{x}{\tan x}\right]$
19) $\frac{d}{dx}[(\sin(x) + 3)^5]$	20) $\frac{d}{dx}[x\cos(x)]$	21) $\frac{d}{dx}[\sin(x) + \cos(x)]$

Use the appropriate rule to find the derivative y' .

22) $y = 2(x-2)^{-1}$	23) $y = (2x+1)^4$	24) $y = \sqrt{2x^2+1}$	25) $y = \frac{x}{x-2}$
26) $y = \frac{-1}{2x^2+1}$	27) $y = \frac{x^2}{x+1}$	28) $y = \frac{x^2+x+1}{x+1}$	29) $y = (x^2-2)(x+1)$
30) $y = x^3 + x^2 - 2x + 7$	31) $y = \frac{1}{x+1} + x + 1$	32) $y = (x+1)(2x+1)^3$	

Derivatives.

K. $\frac{-2}{(x-2)^2}$	R. $\frac{x^2+2x}{(x+1)^2}$	W. $\frac{4x}{(2x^2+1)^2}$	O. $\frac{2x}{\sqrt{2x^2+1}}$
V. $8(2x+1)^3$	B. $(8x+7)(2x+1)^2$	I. $3x^2 + 2x - 2$	