Example: Find y' if $y = (2x + 3)^3(4-x^2)^5$

$y' = (2x+3)^3\left[5(4-x^2)^4(-2x)\right] + (4-x^2)^5\left[3(2x+3)^2(2)\right]$

$y' = 2(2x+3)^2(4-x^2)^4\left[-5x(2x+3) + 3(4-x^2)\right]$

$y' = 2(2x+3)^2(4-x^2)^4\left[-10x^2 - 15x + 12 - 3x^2\right]$

$\boxed{y' = 2(2x+3)^2(4-x^2)^4(-13x^2-15x+12)}$

Why to we need to bother being able to simplify like this?

@ what x-coord(s) does the function have horizontal tangent? $\rightarrow y' = 0$

$0 = (2)(2x+3)^2 \cdot (4-x^2)^4 \cdot (-13x^2-15x+12)$

$2 \neq 0$ $\quad 2x+3=0$ $\quad 4-x^2=0$ $\quad$ factor or Quad formula

$\boxed{x = -3/2}$ $\quad 4 = x^2$ $\quad \boxed{x = \pm 2}$ $\quad \boxed{\begin{array}{l} x = -1.697 \\ x = 0.543 \end{array}}$

Oct 14-10:32 AM

Example: Find y' if $y = \dfrac{(2x^3+7)^4}{(3x^2-2)^6}$

$y' = \dfrac{(3x^2-2)^6\left[4(2x^3+7)^3(6x^2)\right] - (2x^3+7)^4\left[6(3x^2-2)^5(6x)\right]}{(3x^2-2)^{12}}$

$24x^2 \qquad 36x$

$6x^3 - 4x - 6x^3 - 21$

$y' = \dfrac{12x \cdot \cancel{(3x^2-2)^5} \cdot (2x^3+7)^3 \cdot \left[2x(3x^2-2) - 3(2x^3+7)\right]}{(3x^2-2)^{\cancel{12}\ 7}}$

$\boxed{y' = \dfrac{12x(2x^3+7)^3(-4x-21)}{(3x^2-2)^7}}$

Oct 14-10:33 AM