1. $y = 2x^2 - 5x$

$y' = 2 \cdot 2x^1 - 5$

$y' = 4x - 5$

$y'' = 4$

2. $f(x) = 5x^{-3}$

$f'(x) = 5(-3)x^{-4}$

$= -15x^{-4}$

$f''(x) = -15(-4)x^{-5}$

$= 60x^{-5}$

$= \frac{60}{x^5}$

3. $f(x) = x\sqrt[5]{x}$

$= x \cdot x^{\frac{1}{5}}$

$= x^{1+\frac{1}{5}}$

$f(x) = x^{\frac{6}{5}}$

$f'(x) = \frac{6}{5}x^{\frac{6}{5}-1}$

$= \frac{6}{5}x^{\frac{1}{5}}$

$f''(x) = \frac{6}{5} \cdot \frac{1}{5}x^{\frac{1}{5}-1}$

$= \frac{6}{25}x^{-\frac{4}{5}}$

$= \frac{6}{25x^{4/5}}$

4. $y = 7(x^2-3x)^3$

$y' = 7 \cdot 3(x^2-3x)^2 \cdot \frac{d}{dx}(x^2-3x)$

$= 21(x^2-3x)^2 \cdot (2x-3)$

$y' = 21\underbrace{(2x-3)}_{P}\underbrace{(x^2-3x)^2}_{Q}$

$P' = 2 \quad Q' = 2(x^2-3x)^1 \cdot \frac{d}{dx}(x^2-3x)$

$Q' = 2(x^2-3x)(2x-3)$

$P'Q + PQ'$

$y'' = 21\left[2(x^2-3x)^2 + (2x-3)2(x^2-3x)(2x-3)\right]$

$y'' = 21 \cdot 2(x^2-3x)\left[x^2-3x + (2x-3)(2x-3)\right]$

$= 42(x^2-3x)\left[x^2-3x+4x^2-6x-6x+9\right]$

$= 42(x^2-3x)(5x^2-15x+9)$

$= 42x(x-3)(5x^2-15x+9)$