96. $-4.9t^2 + v_0 t + S_0 = S(t)$

$$-4.9t^2 + S_0 = S(t)$$

$$-4.9(6.8)^2 + S_0 = 0$$

2.3A. More Rules

A. $f(x) = 2x(x-5)$

$f'(x) = 2x^2 - 10x$

$4x - 10$

$f(x) = 2x(x-5)$

$f'(x) = 2(x-5) + 2x(1)$

$= 2x - 10 + 2x$

$= 4x - 10$

$$g(x) = 5x^2(x^3 - 3x)$$

$$g'(x) = 10x(x^3 - 3x) + 5x^2(3x^2 - 3)$$

1. <u>Product Rule</u> -

$$\frac{d}{dx}\left[f(x) \cdot g(x)\right] = f'(x)g(x) + f(x)g'(x)$$

Ex. $\frac{d}{dx}\left[3x^2\cos x\right]$

$$6x(\cos x)+3x^2(-\sin x)$$

$$3x\left[2\cos x - x\sin x\right]$$

Ex: $y = 2x\cos x - 2\sin x$

$2x(-\sin x) + \cancel{2(\cos x)} - \cancel{2\cos x}$

$2x(-\sin x)$

$2\sin x$ $2\cos x$

$0\cancel{(\sin x)} + 2(\cos x)$

B. Quotient Rule - if $y=\frac{f(x)}{g(x)}$

$$y' = \frac{f'(x)g(x) - f(x)g'(x)}{\left(g(x)\right)^2}$$

Ex. $y = \frac{2x^2+3x+4}{2x+5}$

$$y' = \frac{(4x+3)(2x+5) - 2(2x^2+3x+4)}{(2x+5)^2}$$

$$= \frac{8x^2+26x+15-4x^2-6x-8}{(2x+5)^2}$$

$$= \frac{4x^2+20x+7}{(2x+5)^2}$$

$$\frac{\cancel{4x^2}+\cancel{20x}+7}{\cancel{4x^2}+\cancel{20x}+25} \qquad \frac{\cancel{4x}(x+3)}{\cancel{4x}(x-5)}$$

Ex. $y = \dfrac{3x^2+2}{\cos x}$ $\left\{ \begin{array}{l} \text{Low d High} - \\ \text{High d Low} \\ \hline \end{array} \right.$

$$\frac{\cos x(6x) + (3x^2+2)(\sin x)}{\cos^2 x}$$

1-17 odd

25, 26, 39-42

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$$\frac{\cos t}{t}$$

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