Name (Last, First)___Key___

1. Find the derivative of the following function.

$$f(x) = \frac{8x - 3}{9x + 4}$$

$$f'(x) = \frac{(9x+4)\frac{d}{dx}(8x-3) - (8x-3)\frac{d}{dx}(9x+4)}{(9x+4)^2}$$

$$= \frac{(9x+4)\cdot 8 - (8x-3)\cdot 9}{(9x+4)^2}$$

$$= \frac{72x+32 - 72x + 27}{(9x+4)^2} = \boxed{\frac{59}{(9x+4)^2}}$$

2. Find $\dfrac{dy}{dx}$ for

$$y = 9x^2 \sin x + 18x \cos x - 18 \sin x$$

$$\frac{dy}{dx} = 9\left(x^2 \frac{d}{dx}(\sin x) + \sin x \frac{d}{dx}(x^2)\right) + 18\left(x \frac{d}{dx}(\cos x) + \cos x \frac{d}{dx}(x)\right)$$

$$- 18\frac{d}{dx}(\sin x)$$

$$= 9x^2 \cos x + 18x\sin x - 18x\sin x + 18\cos x - 18\cos x$$

$$= \boxed{9x^2 \cos x}$$