Derivatives Starter Pack Solutions

1. $\frac{d}{dx}\left(e^{3x^2+2x-1}\right) = \left(e^{3x^2+2x-1}\right)(6x+2)$

2. $\frac{d}{dx}\left(\tan\left(\sqrt{2x^2+3}\right)\right) = \sec^2\left(\sqrt{2x^2+3}\right).\frac{1}{2\left(\sqrt{2x^2+3}\right)}.(4x)$

3. $\frac{d}{dx}(sin^2(\ln(2x))) = 2\,sin(\ln(2x)).cos(\ln(2x)).\frac{1}{2x}.(2)$

4. $f(2) = \sqrt{2(2)+5} = \sqrt{9} = 3$

   $f'(x) = \frac{1}{2\sqrt{2x+5}}.2 = \frac{1}{\sqrt{2x+5}} \rightarrow f'(2) = \frac{1}{\sqrt{2(2)+5}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$

   Now: $y - f(2) = f'(2)(x-2) \rightarrow y - 3 = \frac{1}{3}(x-2)$

5. $4x + 3(y + xy') - 2yy' = 0 \rightarrow 4x + 3y + 3xy' - 2yy' = 0 \rightarrow$

   $4x + 3y = 2yy' - 3xy' \rightarrow 4x + 3y = y'(2y - 3x) \rightarrow y' = \frac{4x+3y}{2y-3x}$

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