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**CORE MATHEMATICS 3**  
**CHAPTER 8 – DIFFERENTIATION**  
**EXTRA PRACTICE**

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1. Find  $\frac{dy}{dx}$  of the following:

a)  $y = \sqrt{5x-4}$

b)  $y = x^2 \sec 2x$

c)  $y = \frac{\cos x^2}{2x}$

d)  $y = (e^{2x} + 1)^{\frac{1}{2}}$

e)  $y = 5 \cos e^{c^2 2x}$

f)  $y = \ln(2x-1)$

g)  $y = x \cdot \sin \frac{2x}{3}$

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2. Given that  $x = \frac{y+1}{3-2y}$

find and simplify an expression for  $\frac{dy}{dx}$ . Hence find  $\frac{dy}{dx}$  at the point (1, 2).

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3. The curve  $C$  has the equation  $y = e^{2x} \sec x$ ,  $-\frac{\pi}{2} < x < \frac{\pi}{2}$ .

- a) Find an equation for the tangent to  $C$  at the point where the curve crosses the  $y$ -axis.
- b) Find, to 2 decimal places, the  $x$ -coordinate of the stationary point to  $C$ .
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4. The curve  $C$  has equation  $y = x^2 - 5x + 2 \ln \frac{x}{3}$ ,  $x > 0$ .

Find the exact coordinates of the stationary point.

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