

**Quiz 5 solutions—version A**

Name \_\_\_\_\_

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1. Differentiate the following functions of  $x$ .

(a)  $(2x^3 - 5x)^8$

$$8(2x^3 - 5x)^7(6x^2 - 5)$$

(b)  $\sin^{-1}(\sqrt{x})$

$$\frac{1}{2\sqrt{x(1-x)}}$$

2. Find the points on the ellipse  $x^2 + xy + y^2 = 3$  where the tangent line is horizontal.

Implicit differentiation gives

$$y' = -\frac{2x + y}{x + 2y},$$

so  $y' = 0$  when  $y = -2x$ . Substitute  $y = -2x$  into the equation of the ellipse to get  $3x^2 = 3$ , so  $x = \pm 1$ . Using  $y = -2x$  again, find two solutions:  $(1, -2)$  and  $(-1, 2)$ .