

**ANSWER SHEET**

1. Differentiate  $e^{\sec x}$ . (The derivative of  $\sec x$  is  $\sec x \tan x$ .)

**Answer:** Using the Chain Rule with  $u = \sec x$  we get

$$\begin{aligned}(e^{\sec x})' &= \frac{d}{du}(e^u) \frac{d}{dx}(\sec x), \\ &= (e^u)(\sec x \tan x), \\ &= e^{\sec x} \sec x \tan x.\end{aligned}$$

2. Differentiate  $\sin x^2 \cos x^2$ .

**Answer:** First we use the Product Rule:

$$(\sin x^2 \cos x^2)' = \sin x^2 (\cos x^2)' + \cos x^2 (\sin x^2)'$$

Now we have to find the two derivatives using the Chain Rule with  $u = x^2$  for both. We get

$$\begin{aligned}(\cos x^2)' &= \frac{d}{du}(\cos u) \frac{d}{dx}(x^2), \\ &= -2x \sin u, \\ &= -2x \sin x^2.\end{aligned}$$

Similarly,  $(\sin x^2)' = 2x \cos x^2$ , so

$$(\sin x^2 \cos x^2)' = \sin x^2 (-2x \sin x^2) + \cos x^2 (2x \cos x^2).$$