Math 103-920 Quiz 7

KEY

Show your work to receive full credit!

1. Find the derivative of

$$f(x) = \frac{10(x^3)(\sin^2 x)e^{\cos(x)}}{(x-3)^2 2^x}$$

We proceed by logarithmic differentiation.

$$\begin{aligned}
\ln f(x) &= \ln\left[\frac{10(x^3)(\sin^2 x)e^{\cos(x)}}{(x-3)^2 2^x}\right] \\
&= \ln(10) + 3\ln x + 2\ln\sin x + \cos x - 2\ln(x-3) - x\ln(2) \\
\frac{f'(x)}{f(x)} &= 0 + \frac{3}{x} + \frac{2\cos x}{\sin x} - \sin x - \frac{2}{x-3} - \ln(2) \\
f'(x) &= \left(0 + \frac{3}{x} + \frac{2\cos x}{\sin x} - \sin x - \frac{2}{x-3} - \ln(2)\right)\frac{10(x^3)(\sin^2 x)e^{\cos(x)}}{(x-3)^2 2^x}
\end{aligned}$$