

Q1. Find the derivative of the function $R = (q^3 + 1)^4$. $\frac{dR}{dq} = ?$

Explanation: The first step to solve this question would be to recognize that we will need to use the chain rule to find the derivative of this function. We recognize that to apply the chain rule we need to find the inner and the outer function first. In this case, the inner function will be $q^3 + 1$ which if we make the substitution with u , then our outer function will be u^4 . Now applying the chain rule, we first take the derivative of the outer function which gives us $\frac{d(u^4)}{du} = 4u^3 = 4(q^3 + 1)^3$ (using the power rule and then resubstituting). Next, we take the derivative of the inner function which gives us $\frac{d(q^3+1)}{dq} = 3q^2$ (using the power rule and constant rule). Finally, we take the product of the two parts which gives us $12q^2(q^3 + 1)^3$.

Insights:

- Remind the student what the chain rule is.
- Ask the student how to break up the function into inner and outer functions.
- Make sure they find the derivatives of the inner and outer functions correctly.
- Remind them to resubstitute the original inner function back into the derivative of the outer function.