MAT – 112: Calculus I and Modeling

Solution 4

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Other Problems

Problem 1. We can find the rate at which the period changes with respect to the temperature (dT/du) by taking the derivative of the equation

$$T = 2\pi\sqrt{\frac{L}{g}}$$

with respect to u. To that end, we have

$$\frac{dT}{du} = 2\pi\frac{d}{du}\sqrt{\frac{L}{g}},$$

which requires the chain rule with outside function $\sqrt{x}$ and inside function $\frac{L}{g}$. Thus, we have

$$\begin{aligned}\frac{dT}{du} &= 2\pi\left(\frac{1}{2}\left(\frac{L}{g}\right)^{-1/2}\frac{1}{g}\frac{dL}{du}\right)\\ &= \pi\left(\frac{L}{g}\right)^{-1/2}\frac{1}{g}(kL)\\ &= k\pi\sqrt{\frac{L}{g}}.\end{aligned}$$