## Answer on Question \#63187, Physics / Solid State Physics

A powerful motorcycle can accelerate from 0 to $30.0 \mathrm{~m} / \mathrm{s}$ (about $108 \mathrm{~km} / \mathrm{h}$ ) in 4.20 s . What is the angular acceleration of its 0.320 -m-radius wheels?

## Solution:

The linear acceleration is
$\mathrm{a}_{\mathrm{t}}=\Delta \mathrm{v} / \Delta \mathrm{t}=30.0(\mathrm{~m} / \mathrm{s}) / 4.20(\mathrm{~s})=7.14 \mathrm{~m} / \mathrm{s}^{2}$.
We also know the radius of the wheels.
Entering the values for $a_{t}$ and $r$ into $\alpha=a_{t} / r$, we get
$\alpha=a_{t} / r=7.14\left(\mathrm{~m} / \mathrm{s}^{2}\right) / 0.320(\mathrm{~m})=22.3 \mathrm{rad} / \mathrm{s}^{2}$
Answer: $22.3 \mathrm{rad} / \mathrm{s}^{\mathbf{2}}$
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