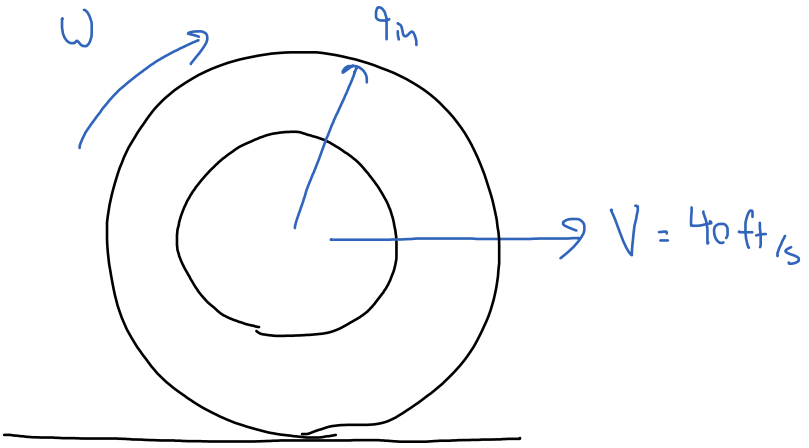
Problem 2

A car is moving 40 ft/s on 18 inch diameter wheels. What is the angular velocity of the wheels on the car? If the car is in third gear with a gear ratio of 4.89:1, what is the angular velocity of the engine in rotations per minute? (Hint, the engine is the input to the gear train and the wheels are the output of the gear train in the transmission.)



$$V = -r\omega$$

$$40\ ft/s = -\frac{9}{12}\ ft\ \omega$$

$$\omega = -53.33\ rad/s$$

clockwise

angular velocity of wheel

$$\text{Gear Ratio} = \frac{4.89}{1} = \frac{\omega_{in}}{\omega_{out}}$$

$$\omega_{engine} = 260.8\ rad/s = 2490.5\ rpm$$