WORK-ENERGY-POWER

Units 10 & 11 Dr. John P. Cise, Professor of Physics, Austin Com. College, 1212 Rio Grande St., Austin Tx 78701 jpcise@austincc.edu & NYTimes,Nov. 3, 2016 by Tom Voelk

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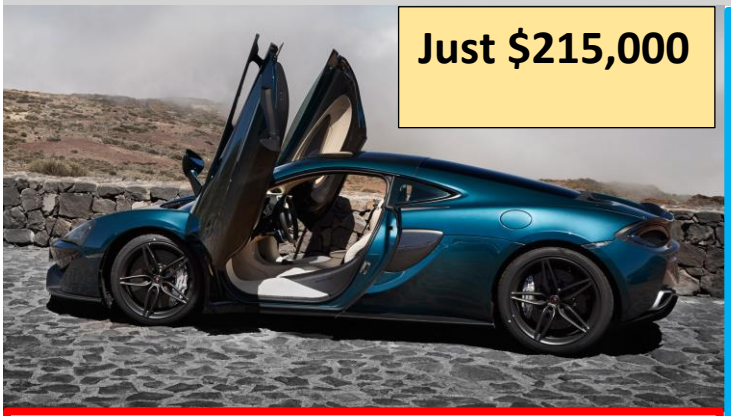
Many supercars look spectacular, but are tough to live with day to day. The McLaren 570GT, 2017



INTRODUCTION: **This twin turbo engine output power(P_{OUT}) goes into doing (output work/unit time) where W_{OUT} = Useful kinetic energy = ½ m v^2.**

Thus P_{OUT} = ½ m v^2/t

X = efficiency = P_{OUT}/P_{input} , X P_{INPUT} = ½ m v^2/t

At McLaren web site the curb weight + driver = 3300 lb..

QUESTIONS: **(a) Convert power input of 562 HP to ft. lb./s.?, (b) Find mass of car in slugs?, (c) Find this twin turbo 570GT's efficiency X?**

HINTS: **weight = mass X gravity = m g , W = m g 550 ft. lb./s. = 1 HP, 60 mph = 88 ft./s. .**

ANSWERS: **(a) 309,100 ft. lb./s., (b) 103.125 slugs (c) 0.3914 or 39.14 %**

Author's comments: **Efficiency of about 40% is typical of twin-turbo engines. Regular none turbos get about 20% efficiency. For this reason cars in the late 2016's are mostly turbo's. Hybrids (part gas and part electric) are getting efficiency numbers about 50%. All electric cars are about 60% efficient by EPA measurements.**

with a softer suspension, is as much at home commuting as on the track.

Acoustical insulation is added to the cabin. Special Pirelli tires include a foam liner of sorts to cut road noise. The GT gets a tamer exhaust note, too. The result is high performance, high style and high livability. Oh, and high price. **Chances are slim that the car, starting at just over $200,000 ($215,000 as tested),** will grab market share from the Toyota Corolla and Honda Civic. Remarkably decaffeinated while cruising from drugstore to pizza place, the GT is never jittery. And yet, employ launch control and **the car will sprint from 0 to 60 in 3.3 seconds**. With an E.P.A. fuel economy rating of 16 city and 23 highway on specified premium gas, the car matches many crossovers. Fun fact: No McLaren gets saddled with a gas-guzzler tax. Those special, **foam-lined rear tires are driven by a 3.8-liter twin-turbo V8 pumping out 562 horsepower** and 443 pound-feet of torque.