

# WORK-ENERGY-POWER

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## Kia Cadenza Offers Budget-Minded Pampering



**INTRODUCTION:** This 2017 Kia Cadenza turbo engine output power ( $P_{OUT}$ ) goes into doing (output work/unit time) where  $W_{OUT} = \text{Useful kinetic energy} = \frac{1}{2} m v^2$ . Thus  $P_{OUT} = \frac{1}{2} m v^2/t$

$X = \text{efficiency} = P_{OUT}/P_{input}$  ,

$$P_{OUTPUT} = X P_{INPUT} = \frac{1}{2} m v^2/t$$

Wikipedia: Weight of cadenza is listed as 3730 lb.

**QUESTIONS:** (a) Find mass of Cadenza in slugs?  
(b) Convert input power of cadenza to ft. lb./s.,  
(c) Find efficiency X of Cadenza? (d) Comment on result?

**HINTS:** 60 mph = 88 ft./s., weight = m g , g = 32 ft./s.<sup>2</sup>

**ANSWERS:** (a) 116.56 slugs, (b) 159,500 ft. lb./s.,  
(c) 0.40 or 40 %, (d) 40% efficiency is typical of twin turbo car engines.

### Driven | 2017 Kia Cadenza

The second-generation Kia Cadenza elevates design, comfort and features to a level that should have brands that make near-luxury cars looking over their shoulders.

The near-luxury entry from Kia, the South Korean automaker, is the Cadenza. The 2017 model is the second generation to be sold in the United States. Simply put, this elevated machine pampers owners with Coach quality at Wilsons Leather prices. Base models with standard rearview camera and leather seating start at \$32,890. My Limited tester at \$45,290 is stuffed with details expected from upscale rides. **(((Acceleration is brisk, nailing 0 to 60 runs in just under 7 seconds. But the revised V6, refined as it is, doesn't match the velvety operation found under high-zoot hoods. At 3.3-liters, the engine produces 290 horsepower)))** and 253 pound-feet of torque. The transmission has eight speeds and shift paddles on the steering wheel. Drive modes alter shift dynamics, steering weight and throttle response, but not suspension firmness. (Remember those extra Franklins in your wallet or purse before grousing.) The new Cadenza's lighter chassis structure manages to improve torsional rigidity by 35 percent