

# ANGULAR & LINEAR POWER/ENERGY/WORK: Unit 16,11

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BEHIND THE WHEEL | 2011 BMW 1 SERIES M

## A Rowdy New Addition to the BMW M Family



**QUESTIONS:** (a) Find the 335 HP of this car in ft. lb. /s? (b) Find the HP of this car using  $P = (\text{torque}) \times (\text{Angular velocity})$ ? Take the angular velocity to be the average of the two rpms given below. Be sure to convert the rpm to radians/s. (c) How does (a) compare to (b)? (d) Find the mass of this car? (e) Find the acceleration of this car? (f) Find the force needed to cause this car to accelerate as found in (e)? Linear Power is  $FxV$ . Find power engine is producing at 60 mph? **HINT:** 88 ft/s = 60 mph. 1 HP=550 ftlb/s. **ANSWERS:** (a) 184,250 ft lb/s (b) 208,602 ft lb/s (c) \_\_\_\_\_ (d)112 slugs,(e)18.72 ft/s<sup>2</sup> (f) 2,097 lb, (g) 184,536 ft lb/s. **COMMENT:** No matter how we compute P, ~ the same appears.

**POISED** [The M version of the 1 Series](#) Coupe is distinguished by its enormous wheels and a linebacker's stance. [More Photos »](#)

This sprightly coupe is nearly 10 inches shorter than the 2011 M3 and at **3,362 pounds**, weighs about 350 pounds less. But the 1 Series duplicates the wide stance of the M3, with front and rear axles spanning a respective 2.8 and 1.8 inches more than the standard 1 Series. Bowing to regulatory realities, the most recent M models have moved away from high-revving naturally aspirated engines. The 1 Series M signals the new downsized regime

**: a twin-turbocharged 335-horsepower in-line 6 .**

Those two turbochargers help the BMW **develop 332 pound-feet of torque, fully available between 1,500 and 4,500 r.p.m.** With that thrust immediately available at low engine speeds, the 1

Series M and the M3, BMW says, run a **dead heat to 60 m.p.h., both cars managing 4.7**

**seconds.** The 1 Series has spawned vocal detractors, especially in the blogosphere. Their calumny often includes claims that there's not enough of a price spread between various iterations of the 1 and 3 Series. This top-shelf 1 Series M leaves that argument for dead: enthusiasts can easily ascertain, and appreciate, the difference between this \$50,000 car and a \$65,000 M3, especially when these BMWs will run nose-to-tail in virtually any situation.