

# Gone in 60 Seconds

1. Legendary car thief/booster Randall "Memphis" Raines retired from the criminal life in 1994. Now six years later after Auto Theft in the greater Los Angeles/Long Beach district went down by 47%, his brother, Kip Raines takes over "the job", employed by British car broker Raymond Calitri. What is the Calitri's nickname and why?
2. When one night Kip messes up stealing some cars, Memphis gets called back to the life he got out of. His most impossible mission: Steal exotic cars all over Los Angeles and Long Beach in just four days and deliver them to Long Beach Harbor, Pier 14 by 8:00am, Friday morning, or never see his brother again. How many cars does he need to steal?
3. What type of business does Calitri run?
4. How does Calitri try to kill Kip in front of Memphis?
5. How many pounds/inch<sup>2</sup> of pressure does it take to crush a car? (Hint: Calitri tells us)
6. What does Memphis do to put out the fire on the stove? What type of chemical does he use?
7. Memphis and Kip, with the help of longtime friend Otto Halliwell reassembles his old crew which includes sexy Sara "Sway" Wayland", a renegade white-haired mechanic by day, What does Sway do at night for a living?
8. Why did Memphis like to steal cars in his youth? (Hint: Memphis tells us in the movie)
9. What is the mother's name for Kip and Memphis?
10. The Memphis' gang calls their future car-thefts by female names. Why?
11. One scene in the movie has another gang shooting and chasing Kip and Memphis. What stops the bad guys from chasing them?
  - a. Explain how the chase was stopped abruptly by the use of inertia.
12. A major problem in the movie, is the LAPD G.R.A.B. (Governor's Regional Auto-Theft Bureau) is on the lookout and Det. Roland Castlebeck and his partner, Det. Drycoff are keeping close eyes on Memphis and his team. In one scene, Castlebeck gives them a visit in the body shop. He seemed very interested in the 1983 Cadillac El Dorado. What was in the El Dorado that made Memphis nervous?
13. What was the name of the song that put Memphis and his team in the mood to steal cars?
14. What does Memphis mean when he says, "The ladies are dirty"? How did he figure it out?

15. What happens to the new ladies' keys? How do they get them back?
16. Why did two police departments fight over Calitri?
17. Castlebeck discovers the remains of a black light during his visit to Memphis' body shop. What is the purpose of the black light? How does this work?
18. Toward the end of the movie, Memphis and his crew have successfully "boosted" all of the cars with the exception of one.. Memphis' last car to steal is a 1967 Shelby GT 500 Mustang. He calls it his Unicorn. However, the team calls it by a female name. What is that name?
19. Just as Memphis pulls the Mustang job, Castlebeck arrives on the scene, and the long awaited high-speed car chase ensues.
  - a. Memphis escapes the Police by entering the Flood Control canal. How fast does the police measure the Mustang speed at this point? How is this done?
  - b. In one of the final chase scenes, a large compressed gas tank is damaged. Describe what happens using Newton's 1<sup>st</sup> and 3<sup>rd</sup> law.
  - c. Use Newton's 2<sup>nd</sup> law to explain what happened to the police car and the pendulum.
20. At the end of this last chase seen, Memphis and the mustang zoom in and out of alleys, onto busy city streets, through the docks, and finally onto a bridge where Memphis appears to be trapped. There is an accident up ahead and the road is completely blocked---when we see a large tow truck ramp being lowered into place, we have a pretty good idea where this scene is going. The problem is, Memphis is going to have to jump over the entire accident scene, and it's a big one. In addition to several wrecked

cars, there is the tow truck and two or three emergency vehicles. Although it's hard to get an exact length from the camera shots, it seems that the entire blockade spans a distance of at least 50 or 60 meters. Memphis is going to have to jump over all of that and then stick the landing.

- a. How fast does Memphis get the Mustang up to before he hits the ramp?
- b. Convert the Miles/hour to meters/sec. (Use  $1.61 \text{ km} = 1 \text{ mile}$ ) This will be  $v_0$ .
  
- c. If we look carefully at the incline it appears to be around 2 meters high, and the length of ramp is just a bit longer than the car. Because the 1967 Shelby is 4.7 m in length, we'll say the ramp is 5 m long. Calculate the angle of takeoff.  
(Use  $\sin \theta = \frac{\text{opp.}}{\text{hyp.}}$ )

- d. Now that we have the angle of takeoff, calculate the x and y components of the initial velocity. Remember #20 (a). That is  $v_{0x}$  and  $v_{0y}$ .  
Use the following relationships:  $\sin \theta = \frac{v_{0y}}{v_0}$  and  $\cos \theta = \frac{v_{0x}}{v_0}$

- e. From the vertical motion under the influence of earth's standard acceleration of gravity,  $g = -9.8 \text{ m/s}^2$ , determine the time of flight:  $t = ?$

[Use  $\Delta y = \frac{1}{2}gt^2 + v_{0y}t$  ] where,  $\Delta y = 0$  and  $v_{0y}$  from #20 (d).

- f. Calculate the theoretical maximum range of the projectile (the car) assuming no air resistance.  
[ Use Horizontal Displacement =  $\Delta X = v_{0x}t$  ]
- g. How does your calculated distance compare with the estimated distance of 50 to 60 m?
- h. How would air resistance affect the ideal calculated jump?
- i. Usually, air resistance will shorten a projectile's distance of a car by about 45%. With this correction, how far can Memphis jump? How does this compare with the required distance of 50-60 m?
- j. One of the longest ramp to ramp car jumps on record is 71 m in a Buick Skylark. How did Memphis compare with this?
- k. Have you ever seen an automobile stunt jump either in person, in a video, or in a photograph?
- l. If so then you know why they put a ramp up for the landing. Does the car come in nose up or down as the car follows the projectile trajectory?
- m. If the 1967 Mustang follows the projectile trajectory, at what angle is it going to land? (Assuming no air friction).
- n. With air friction, is the angle of the landing Mustang going to be greater than or less than #20 (m)? Explain.
- o. Do you think Memphis could stick the landing? Do you think the tires would even touch the road? Why?
- p. What would happen to the front of the car during the landing?
- q. Do you think the Mustang's suspension (and Memphis) could handle the force of impact?

21. What happens to Castlebeck at the end of the movie? Does he finally arrest Memphis?

22. What happens to Calitri at the end of the movie? What was his acceleration at the end?