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# HALDERMAN

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## Author & Automotive Expert James D. Halderman

### What's new with Jim?

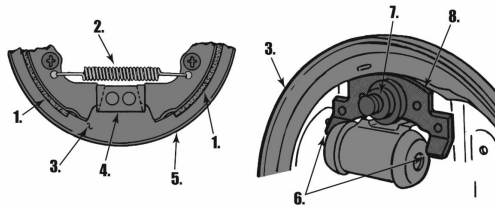
*Everything is organized for you!*

Wow what a school year this has been. I hear from professors and instructors that they made more changes to their teaching in the last 12 months than they had in the past 12 years. I don't think we will ever go back to the way things were before Covid 19.



Name: \_\_\_\_\_

A5 Part ID Worksheet  
Drum Brake Components



- |          |          |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ | 8. _____ |

My team is working hard to help by updating the content on my website. According to the ASE Education Foundation program standards (standard 12), up to 25% of the instructional hours can be met by applicable work-based learning activities, e-learning or a combination through the use of a learning management system (LMS). Check it out.

Send Glen, my assistant, an email at [glen@jameshalderman.com](mailto:glen@jameshalderman.com) with your school information and he will give you FREE access for two

### Where's Jim?

Due to the Coronavirus, all events have been canceled and I have no travel plans planned for the rest of the year.

Keep up with me at:

[www.jameshalderman.com](http://www.jameshalderman.com)

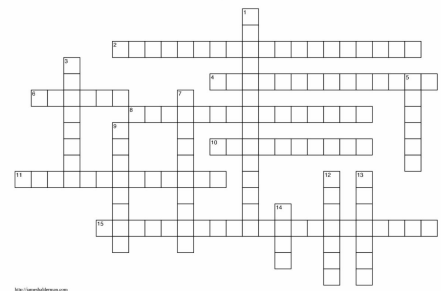
[Email Jim](#)

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### Puzzle of the month

Find this month's puzzle of the month at this [link](#) and test your students knowledge on brakes.

days so you look around and see if the website will meet your needs.

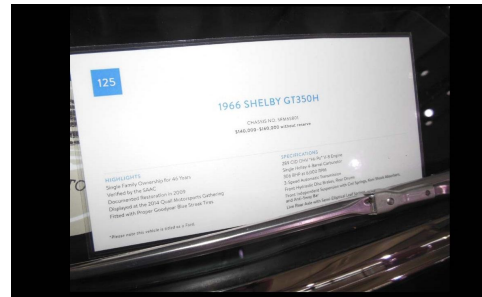


- ACROSS**
- Leverage creates a \_\_\_\_\_ that, at the brake pedal, is called the pedal ratio.
  - Inertia, in the form of \_\_\_\_\_, plays a major part in a vehicle's braking performance.
  - The \_\_\_\_\_ in brake systems are used to increase force, so they are either first- or second-class.
  - One measurement of the coefficient of friction is the \_\_\_\_\_ coefficient.
  - Most vehicles have a forward \_\_\_\_\_, which means that even when stopped, more than 50% of their weight is supported by the front wheels.
  - \_\_\_\_\_ is a fundamental form of mechanical energy.
  - The amount of friction between two objects or surfaces is commonly expressed as a value called the \_\_\_\_\_.
- DOWN**
- One measurement of the coefficient of friction is the \_\_\_\_\_ coefficient.
  - The primary mechanical principle used to increase application force in every brake system is \_\_\_\_\_.
  - \_\_\_\_\_ is the ability to do work.
  - A \_\_\_\_\_ of 5 to 1 is common for manual brakes, which means that a force of 10 lb at the brake pedal will result in a force of 50 lb at the pedal pushrod.
  - \_\_\_\_\_ is the resistance to movement between two surfaces in contact with one another.
  - \_\_\_\_\_ is defined by Isaac Newton's first law of motion, which states that a body at rest tends to remain at rest, and a body in motion tends to remain in motion in a straight line unless acted upon by an outside force.
  - In the science of mechanics, a lever is a simple machine that consists of a rigid object, typically a metal bar that pivots about a fixed point called a \_\_\_\_\_.
  - \_\_\_\_\_ is the transfer of energy from one physical system to another, especially the transfer of energy to an object through the application of force.

## Auto Trivia

What does the "H" stand for in a Shelby GT350H?

- Hurst
- Horsepower
- Hertz
- High-Performance



*\*Answer at the bottom*

## FAQ

### What Are the Types of DOT 4 Brake Fluid?

There are several types or specifications under the DOT 4 designation including the following:

- **DOT 4**-Specified for use in many European vehicles and some domestic vehicles.
- **DOT 4- (long life)**
- **DOT 4+** -Specified for use in many Mercedes and Volvo vehicles.
- **DOT 4 LV** (low viscosity)-Specified for use in some BMW vehicles.
- **DOT 4 racing brake fluid**-Usually blue in color to make it easy to see when all of the old fluid has been purged from the system during a brake fluid replacement procedure.



## Sample ASE certification-type question

Most manufacturers recommend that disassembled brake parts should be cleaned with \_\_\_\_\_.

- Throttle body cleaner

- b. Denatured alcohol
- c. Stoddard solvent
- d. Detergent and water

### Answer/Explanation

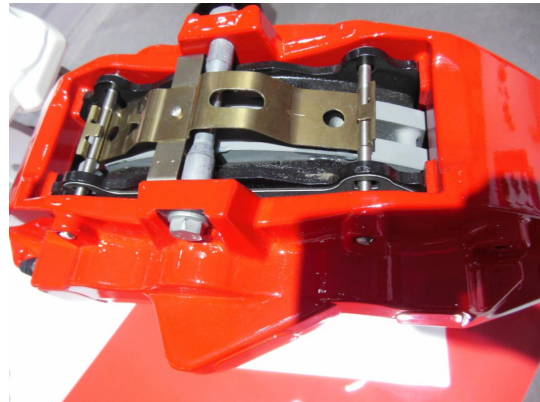
**The correct answer is b.** Denatured alcohol (ethyl alcohol with an additive that makes it poisonous to drink) should be used to clean brake parts because it evaporates easily and does not leave a film. Answer a (throttle-body cleaner) is not correct because even though it is often used to clean brake parts, it is not the recommended solvent to use because it may leave a film that could be harmful to brake components. Answer c (Stoddard solvent) should not be used because it is a petroleum-based material and therefore it could cause seal swelling and it leaves a film when dried. Answer d (detergent and water) is not recommended to use on brake parts because any remaining moisture would combine with the brake fluid causing contaminants.

## Tech Tip

### Using “Loaded Calipers” Saves Time

Many technicians find that disassembly, cleaning, and rebuilding calipers can take a lot of time. Often the bleeder valve breaks off or the caliper piston is too corroded to reuse. The technician then has to get a replacement piston, caliper overhaul kit (piston seal and boot), plus the replacement friction pads and hardware kit. To save time (and sometimes money), many

technicians are simply replacing the old used calipers with “loaded calipers.” Loaded calipers are remanufactured calipers that include (come loaded with) the correct replacement friction pads and all the necessary hardware. Therefore, only one part number is needed for each side of the vehicle for a complete disc brake overhaul.



## Case Study

### Three Brake Jobs in 40,000 Miles

A service technician was asked to replace the front disc brake pads on a Pontiac Grand Am because the sensors were touching the rotors and making a squealing sound. This was the third time that the front brakes needed to be replaced. Previous brake repairs had been limited to replacement of the front disc brake pads only. When the caliper was removed and the pads inspected, it was discovered that front disc brake pads were worn even though the vehicle had few miles since the last time the pads were replaced.



The technician spotted something at the rear of the vehicle that told the whole story—a trailer hitch. The owner confirmed that a heavy jet ski was towed in hilly terrain. The technician recommended:

- Overhauling the front disc brake calipers to prevent the possibility of the front pads dragging.
- Also an inspection of the rear brakes.

The rear brakes were glazed and out of adjustment. The technician received permission to replace the rear brakes, replace both front calipers, and install quality disc brake pads. When the customer returned, the technician advised the customer to use a lower gear in the transmission on long downhill roads to help keep the brakes from overheating and failing prematurely.

### Summary

- **Complaint**—The front calipers needed replacement more often than expected.
- **Cause**—The front calipers were not retracting and the rear brakes were not working as designed.
- **Correction**—Front calipers were replaced and the rear brakes were serviced. Plus the owner was advised to use the gear selector when descending long grades to reduce the load on the brakes.

## Straight Talk

### Reader Asks About Tires

*From the April 25 Wheels Section of the Dayton Daily News*

#### Wheels:

*Gary asks:*

*“I have a small Toyota Pickup that needs tires. I have Firestone Destination A/T2 on it now. I love these tires and they have been good for me, but others in my family want me to look at other brands. What are your suggestions?”*



#### Halderman:

The Firestone Destination A/T2 is an all-terrain truck and SUV tire built for on and off-road traction. This tire is rated all-weather use plus 3 Peak Mountain Snowflake certification and has a 55,000-mile limited warranty. It appears that this tire meets your needs because you have been happy with them. Some basic advice to people looking for tires include:

1. Determine the specified tire size for the vehicle and try to select the exact same size to avoid any issues with speedometer reading and the shifting of the automatic transmission.
2. Perform an Internet search at sites, such as Tire Rack, and look for the ratings and recommendation for your exact vehicle.
3. I recommend all-season tires because winter tires should only be used if the temperature is below 45 degrees. Also avoid purchasing summer tires because these should only be used if the temperature is above 45 degrees.

4. The 3 Peak Mountain Snowflake certification is important if the vehicle is being used in the winter where snow performance is needed and it exceeds the snow traction over most all-season tires. The 3 Peak Mountain Snowflake certification tires are required to be used in some mountain states and in some Canadian provinces during the winter.
5. Ask your local service technician or tire store or the dealer for their recommendation.

*Have an automotive question? Get a straight answer by writing to Jim at [jim@jameshalderman.com](mailto:jim@jameshalderman.com)*

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**Answer To This Month's Trivia:  
C. Hertz**

Contact Us

