FIGURE 17.1 Maximum braking traction occurs when tire slip is between 10% and 20%. A rotating tire has 0% slip and a locked-up wheel has 100% slip.

FIGURE 17.2 Traction is determined by pavement conditions and tire slip.
FIGURE 17.3 A good driver can control tire slip more accurately than an ABS if the vehicle is traveling on a smooth, dry road surface.

FIGURE 17.4 A wedge of gravel or snow in the front of a locked wheel can help stop a vehicle faster than would occur if the wheel brakes were pulsed on and off by an antilock brake system.

FIGURE 17.5 Being able to steer and control the vehicle during rapid braking is one major advantage of an antilock brake system.
FIGURE 17.6 A typical stop on a slippery road surface without antilock brakes. Notice that the wheels stopped rotating and skidded until the vehicle finally came to a stop.

FIGURE 17.7 ABS configuration includes four channel, three channel, and single channel.

FIGURE 17.8 A typical integral ABS unit that combines the function of the master cylinder, brake booster, and antilock brake system in one assembly.
FIGURE 17.9 A schematic drawing of a typical antilock brake system.

FIGURE 17.10 Typical inputs and outputs for brake control modules.

FIGURE 17.11 Wheel speed sensors for the rear wheels may be located on the rear axle, on the transmission, or on the individual wheel knuckle.
FIGURE 17.12  A schematic of a typical wheel speed sensor.

FIGURE 17.13  Wheel speed sensors produce an alternating current (AC) signal with a frequency that varies in proportion to wheel speed.

FIGURE 17.14  A typical passive variable-reluctance sensor produces a sine wave (continuously variable) output signal which is then converted to a square wave inside the PCM and/or the electronic brake control module (EBCM).
FIGURE 17.15 A digital wheel speed sensor produces a square wave output signal.

FIGURE 17.16 An ABS three-way solenoid can increase, maintain, or decrease brake pressure to a given brake circuit.

FIGURE 17.17 The isolation or hold phase of an ABS on a Bosch 2 system.
FIGURE 17.18 During the pressure reduction stage, pressure is vented from the brake circuit so the tire can speed up and regain traction.

FIGURE 17.19 The control module reapplies pressure to the affected brake circuit once the tire achieves traction so that normal braking can continue.

FIGURE 17.20 A typical ABS hydraulic control assembly.
FIGURE 17.21 Sensors are used to detect when the distance is closing fast enough that a collision may be possible and the system intervenes and automatically applies the brakes if needed.

A tone ring and a wheel speed sensor on the rear of a Dodge Caravan.

The wiring from the wheel speed sensor should be inspected for damage.
To test a wheel speed sensor, disconnect the sensor connector to gain access to the terminals.

Pulling down the rubber seal reveals the connector.

The ABS controller (computer) on this vehicle supplies a 2.5-volt reference signal to the wheel speed sensors.
The meter reads about 2.4 volts, indicating that the ABS controller is supplying the voltage to the wheel speed sensor.

The test probes are touched to the terminals leading to the wheel speed sensor and the resistance is 1,103.2 ohms or 1,103.2 ohms.

The meter should (and does) read "OL," indicating that the wheel speed sensor and pigtail wiring is not shorted to ground.
To measure the output of the wheel speed sensor, select AC volts on the digital multimeter.

Rotate the wheel and tire assembly by hand while observing the AC voltage output on the digital multimeter.

A good wheel speed sensor should be able to produce at least 100 mV (0.1 V) when the wheel is spun by hand.
After testing, carefully reinstall the wiring connector into the body and under the rubber grommet.