A spacecraft is initially orbiting a planet in a circular orbit at a certain radius, R, from the center of the planet. The speed of this initial orbit is exactly that given for a circular orbit controlled by gravity alone. Later, the spacecraft is moving in the same circle of radius, R, but now with twice the speed it had before. *Don't worry about how it got from one motion to the other*. The following options ask about how the spacecraft can *maintain* this new motion by (maybe) firing its rocket.

1) The spacecraft can maintain the new motion without firing the rocket.

2) The described motion is impossible, the spacecraft can't maintain this motion no matter what the rocket does.

3) The rocket should fire toward the rear to allow the spacecraft to maintain the higher speed.

4) The rocket should fire perpendicular to the motion to stay in the indicated circle.

5) The rocket should fire at some angle not exactly along or perpendicular to the orbit to maintain this new motion.

A spacecraft is initially orbiting a planet in a circular orbit at a certain radius, R, from the center of the planet. The speed of this initial orbit is exactly that given for a circular orbit controlled by gravity alone. Later, the spacecraft is moving in the same circle of radius, R, but now with twice the speed it had before. *Don't worry about how it got from one motion to the other*. The following options ask about how the spacecraft can *maintain* this new motion by (maybe) firing its rocket.

4) The rocket should fire perpendicular to the motion to stay in the indicated circle.

What direction should the rocket exhaust point?

1) Toward the planet.
2) Away from the planet.

Your shuttlecraft is in the same circular orbit as an alien artifact but on opposite sides of the planet. What should you do to investigate the mysterious object? Assume that the warp drive is off line.

Eliminate the impossible and whatever is left, no matter how strange, must be the answer (Holmes).

1) Fire your rocket engine to the front to stop and wait for the object to circle around to you.

2) Fire your rocket engine to the front to drop into a lower energy orbit and catch the object.

3) Fire your rocket engine to the rear to go around the same orbit but at a faster speed.

4) Fire your rocket engine toward the planet to boost into a higher energy orbit.

5) Fire your rocket engine away from the planet to go in a circle faster.