# Module 2: Answers

1. What is the farther distance the Jet sonar module can measure?

**4-5 meters**

1. Tablets and cellphones can detect whether they are being used in a portrait or landscape orientation. What sensor is used to detect this?

**gyroscope**

1. What does a gyroscope measure?

**Rate of angular rotation about an axis.**

1. The Jet encoders can detect 3200 ticks per revolution. If a wheel has moved 1000 ticks forward and Jet has 6" wheels. How many inches has the robot moved forward?

**5.89 in.**

1. Explain why the motors cannot be directly connected to the Jetson TK1.

**The motors require a higher current than the pins on the Jetson can supply. The h-bridge shield can supply the current to run the motors.**

1. How do you read the encoder values?

**The encoder values are published to ROS topics /left\_encoder and /right\_encoder.**

1. Describe the reason for the 6-pin connector on the Jet motors.

**2 pins are used to run the motor. The other 4 pins are for the encoder: Vcc, ground, and 2 encoder pins.**

1. Describe the reason for the 4-pin connector on the sonar module.

**2 pins are Vcc and ground. 1 pins is to trigger the sonar pulse. The final pin is for measuring how long it takes for the sound to reflect back.**

1. You would like to measure how bumpy or smooth the ground is that Jet is running on. What sensor would be best suited for this?

**Accelerometer**

1. What is gyroscope drift?

**Over time, a gyroscope will accumulate error and drift away from the actual position.**