

The Robot Doctor

Lesson 103: Robot Measurements

Common Core Standards:

- Conversion to Metric Units and Unit Prefixes (milli, kilo, etc...)
- Scientific Notation
- Angles and Conversion to Radians
- Basic Speed, Distance and Time relations
- Basic Trigonometry:
 - Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

Review:

Robots usually use the metric system for measurements

Meters for measuring distance, radians for measuring angles and seconds for measuring time

Standard Prefixes:

		Smaller			Larger	
centi-	10 ⁻²	hundredth		kilo-	10 ³	thousands
milli-	10 ⁻³	thousandth		mega-	10 ⁶	millions
micro-	10 ⁻⁶	millionth		giga-	10 ⁹	billions
nano-	10 ⁻⁹	billionth		tera-	10 ¹²	trillions

$$speed = \frac{distance}{time}$$

$$\sin(\theta) = \frac{opposite}{hypotenuse}$$

$$\cos(\theta) = \frac{adjacent}{hypotenuse}$$

$$\tan(\theta) = \frac{opposite}{adjacent}$$

$$360^\circ = 2\pi \text{ radians}$$

Lesson 103 Challenge Questions

1) If we had a robot with a sonar sensor - how long would it take us to get the return pulse – or echo - from an object? We know the object is 10 meters away – and we know that the speed of sound in air is 343 meters per second.

2) We have a robot arm that is 50cm long and it is at an angle of 0.5 radians from the floor – how high of a table can it reach?