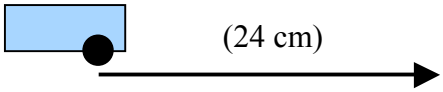
Robotics Worksheet #2:
More Practice with Straight Distance, Swing, and Point Turns

Directions: Given the known values of the diameter of a Robot wheel and the distance between wheels on the Robot, calculate the degrees of rotation needed and movement block programming for the robot to complete the following moves:

Given Values:

Robot wheel diameter:	5.6 cm
Distance between wheels:	_____ (You need to measure your Robot)
Pi:	3.14
Degrees in a Circle:	360

A. Drive straight line forward 24 cm.



Straight Line: (In 3 fun and easy steps!)

1. Figure out the circumference of the Wheel:

Circumference = 3.14 * _____5.6 cm_____ (Diameter)

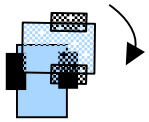
Circumference = _____

2. Figure out the number of rotations needed to go the distance

$$\frac{\text{Distance}}{\text{Circumference}} = \text{Rotations}$$

3. Change Rotations to Degrees for Motor Block Commands.

Rotations * 360 = _____ (Degrees)



B. Swing Turn Right 90 degrees.

Swing Turn: (In 5 fun but not so easy steps!)

1. Figure out the circumference of the Wheel:

Circumference = 3.14 * _____5.6 cm_____ (Diameter)

Circumference = _____

2. Calculate the Circumference of the big circle the robot would make if it turned all the way around in a swing turn.

Big Circumference = 3.14 * Distance Between Robot Wheels * 2

3. Calculate the arc segment the robot wheel has to travel to make the swing turn:

$$\frac{\text{Degree of Turn}}{360} * \text{Big Circumference} = \text{Arc Segment}$$

4. Figure Out wheel rotations needed to travel arc segment:

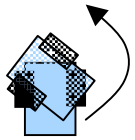
$$\frac{\text{Arc Segment}}{\text{Wheel Circumference}} = \text{Rotations}$$

5. Change Rotations to Degrees for Motor Block:

Rotations * 360 = _____ (Degrees)

6. Decide which wheel to rotate:

Turning Left -> use wheel on right side of robot
Turning Right -> use wheel on left side of robot



C. Point Turn Left 45 degrees.

Point Turn (In 5 easy and fun steps!)

1. Figure out the circumference of the Wheel:

Circumference = 3.14 * _____5.6 cm_____ (Diameter)

Circumference = _____

2. Calculate the Circumference of the big circle the robot would make if it turned all the way around in a point turn.

Big Circumference = 3.14 * Distance Between Robot Wheels

3. Calculate the arc segment the robot wheel has to travel to make the swing turn:

$$\frac{\text{Degree of Turn}}{360} * \text{Big Circumference} = \text{Arc Segment}$$

4. Figure Out wheel rotations needed to travel arc segment:

$$\frac{\text{Arc Segment}}{\text{Wheel Circumference}} = \text{Rotations}$$

5. Change Rotations to Degrees for Motor Block:

Rotations * 360 = _____ (Degrees)

6. Decide which wheels to rotate:

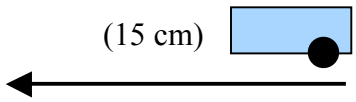
Turning Left ->

Right wheel forward Number of Degrees, Left wheel backward Number of Degrees.

Turning Right ->

Left wheel forward Number of Degrees, Right wheel backward number of Degrees.

D. Straight line backward 15 cm.



Straight Line: (In 3 fun and easy steps!)

1. Figure out the circumference of the Wheel:

Circumference = 3.14 * _____5.6 cm_____ (Diameter)

Circumference = _____

2. Figure out the number of rotations needed to go the distance

$$\frac{\text{Distance}}{\text{Circumference}} = \text{Rotations}$$

3. Change Rotations to Degrees for Motor Block Commands.

Rotations * 360 = _____ (Degrees)