

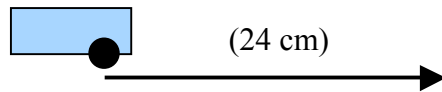
Robotics Worksheet #2:
More Practice with Straight Distance, Swing, and Point Turns

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 = $3.14 * \underline{5.6 \text{ cm}}$ (Diameter)

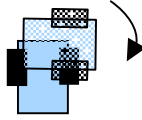
Circumference = _____

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:

$$\text{Circumference} = 3.14 * \underline{5.6 \text{ cm}} \text{ (Diameter)}$$

$$\text{Circumference} = \underline{\hspace{2cm}}$$

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

$$\text{Big Circumference} = 3.14 * \text{Distance Between Robot Wheels} * 2$$

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:

$$\text{Rotations} * 360 = \underline{\hspace{2cm}} \text{ (Degrees)}$$

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:

$$\text{Circumference} = 3.14 * \underline{\quad 5.6 \text{ cm} \quad} \text{ (Diameter)}$$

$$\text{Circumference} = \underline{\hspace{4cm}}$$

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

$$\text{Big Circumference} = 3.14 * \text{Distance Between Robot Wheels}$$

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:

$$\text{Rotations} * 360 = \underline{\hspace{2cm}} \text{ (Degrees)}$$

6. Decide which wheels to rotate:

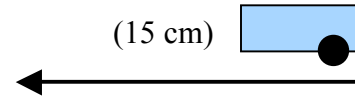
Turning Left ->

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 = $3.14 * \underline{\quad 5.6 \text{ cm} \quad}$ (Diameter)

Circumference = $\underline{\hspace{2cm}}$

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 = $\underline{\hspace{2cm}}$ (Degrees)