

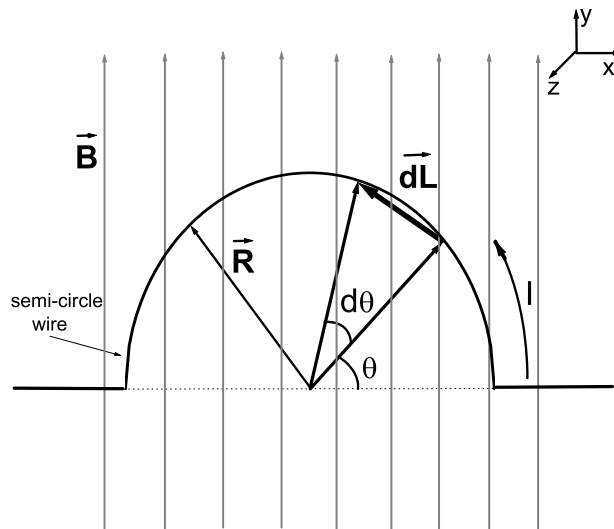
Unit 25 homework after session 1

- Read chapter 29 in the text book *Understanding Physics*.
- Work textbook problems 29-1, 29-4, 29-10, 29-22.

Unit 25 homework after session 2

- Read chapter 29 in the text book *Understanding Physics*.
- Work textbook problems 29-32, 29-33.
- Work problem SP1 below.

SP1: Consider the length of current-carrying wire with a semi-circular kink in it shown in the diagram below. Predicting and calculating the force on the wire when placed in a magnetic field is a good practice in the use of physical reasoning about the action of the Lorentz force and the use of the spreadsheet to do numerical calculations. You'll need to use the equation you derived in Activity 25-13(d) for your calculations.



(a) Assume that the magnetic field is positive in the $+y$ direction and that positive current is traveling counter-clockwise. Use qualitative reasoning to determine the direction of the net force on the wire. Explain your reasoning.

(b) Use the equation you derived in Activity 25-13 (d). Break the wire into at least 15 segments and perform a numerical calculation of the net force on the wire using a spreadsheet. (Your spreadsheet should look like the sample shown on the next page.) Assume that $B = 40.0$ Teslas over the region, $I = 0.15$ A in a counter clockwise direction, and $R = 6.5$ cm. Plot the force on each segment of wire as a function of the segment number. Why is the force much smaller for some segments than for other segments? Print out and hand in a copy of your spreadsheet. One per person. Each spreadsheet should be unique.

I=			
B=			
Δl=			
seg #	θ	$\sin\theta$	ΔF=
1	6		
2	18		
3	30		
.			
.			
.			
15	174		
Force=			

All Unit 25 homework problems and the unit 25 activity guide are due on the first day of Unit 26.