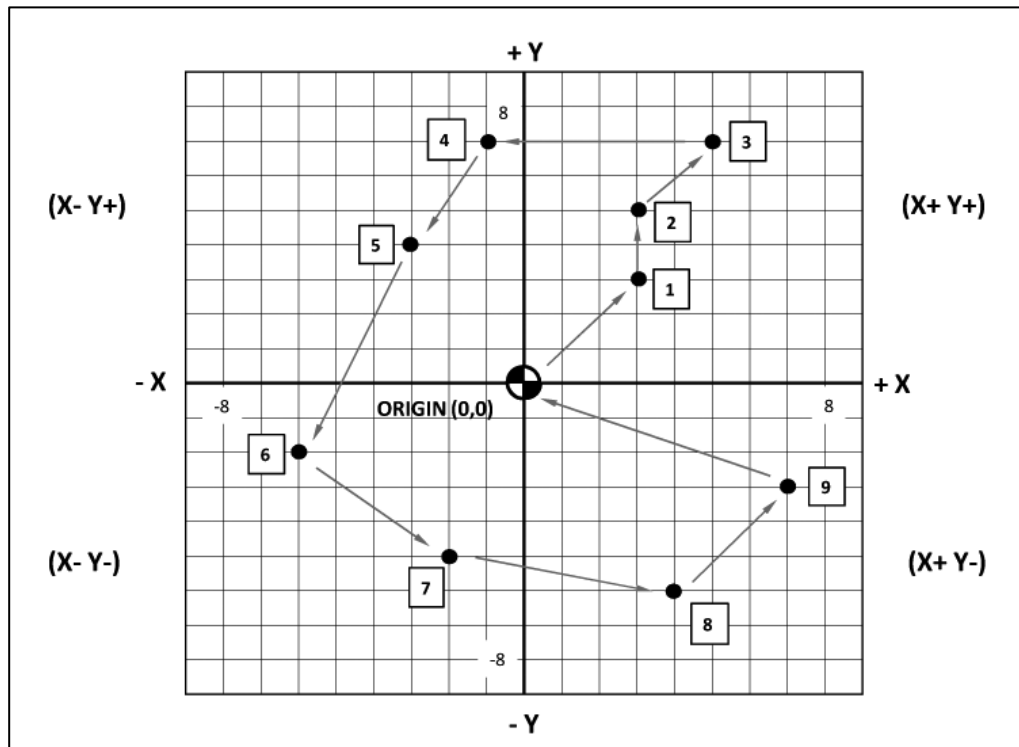


# CNC PROGRAMMING WORKBOOK



## LESSON-1

### ABSOLUTE & INCREMENTAL POSITIONING

## LESSON-1 – Introduction

**Okay let's get started.**

**Step 1** - Plug in your headphones or make sure your speakers are plugged in and turned on.

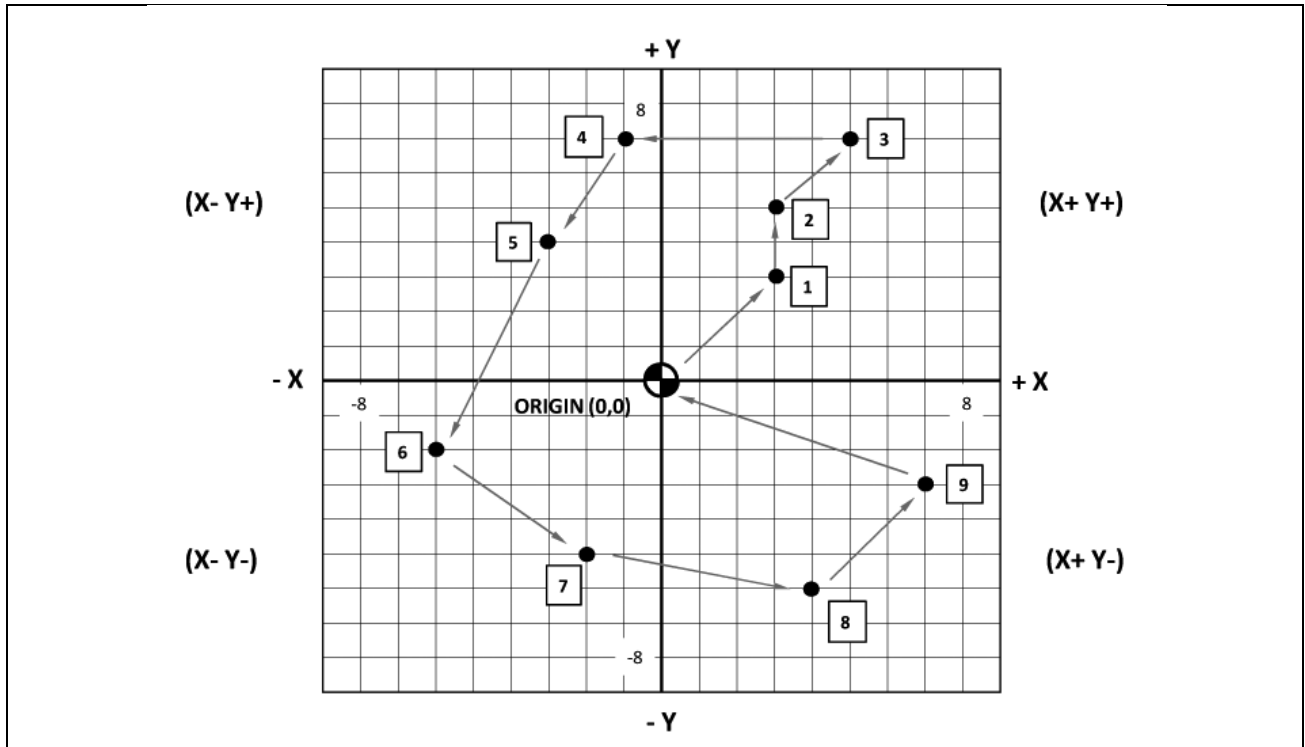
**Step 2** - Put the DVD into your computer and launch the menu.

**Step 3** - Click on Getting Started and watch the video through to the end. Feel free to pause and rewind the video if you need to watch something again.

**Step 4** - Click on Lesson 1 and then click on Lesson-1 – Unit-1, as indicated it is 9 minutes long.

**Step 5** - Proceed through the Videos in the proper order and make sure to follow along with the Workbook. Good luck and have fun.

# LESSON-1 – EXERCISE #1 - ABSOLUTE & INCREMENTAL POSITIONING



## G90 ABSOLUTE PROGRAMMING

All axis motions are based on a fixed zero reference point, known as ABSOLUTE ZERO (part zero). Each coordinate is in relation to this absolute zero using Cartesian Co-ordinates.

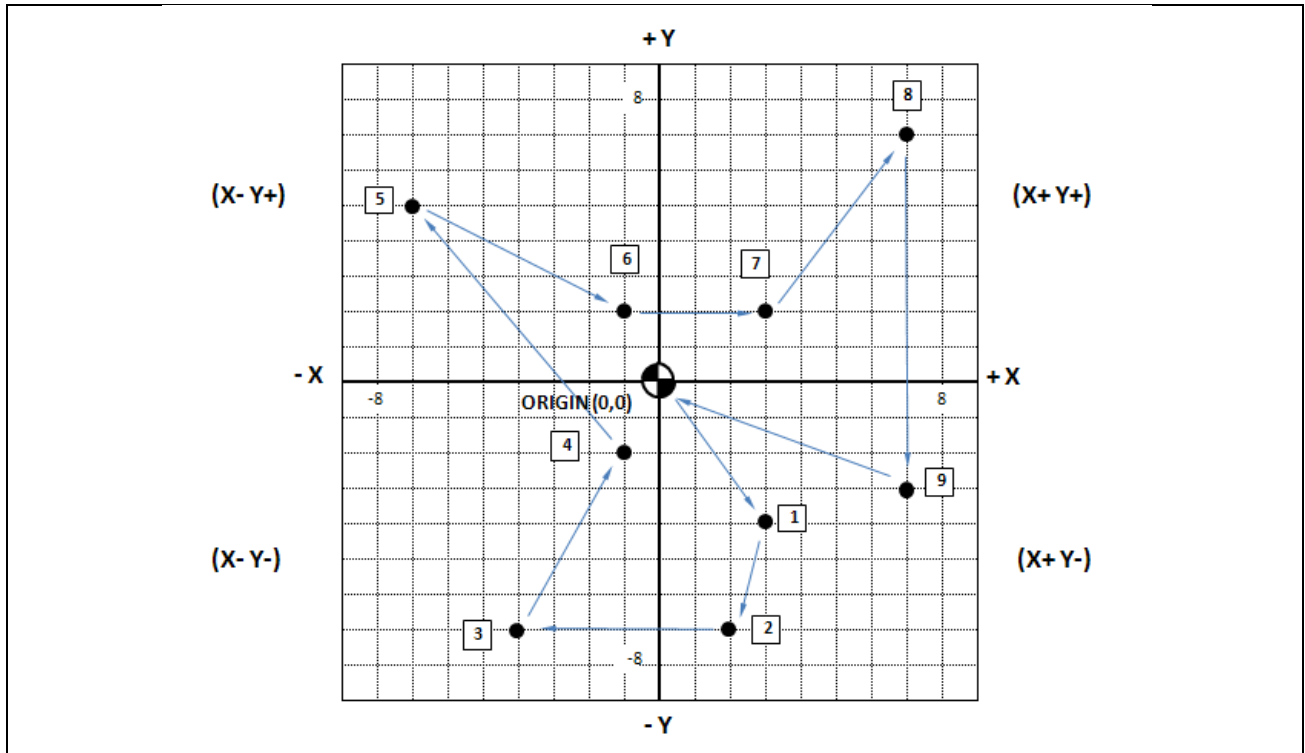
## G91 INCREMENTAL PROGRAMMING

All axis motions are based on the distance to the next location. Each coordinate is based on how far the cutter is to move from start to finish.

*✍ STARTING AT THE POINT O (ORIGIN), DESCRIBE THE PATH FROM O THROUGH ALL 9 POINTS AND BACK TO THE POINT O USING G90 & G91*

G90	X	Y	G91	X	Y
O (Origin)	0	0	O → 1	3	3
1	3	3	1 → 2	0	2
2	3	5	2 → 3	2	2
3	5	7	3 → 4	-6	0
4	-1	7	4 → 5	-2	-3
5	-3	4	5 → 6	-3	-6
6	-6	-2	6 → 7	4	-3
7	-2	-5	7 → 8	6	-1
8	4	-6	8 → 9	3	3
9	7	-3	9 → O	-7	3

## LESSON-1 – EXERCISE #2 - ABSOLUTE & INCREMENTAL POSITIONING



### G90 ABSOLUTE PROGRAMMING

All axis motions are based on a fixed zero reference point, known as ABSOLUTE ZERO (part zero). Each coordinate is in relation to this absolute zero using Cartesian Co-ordinates.

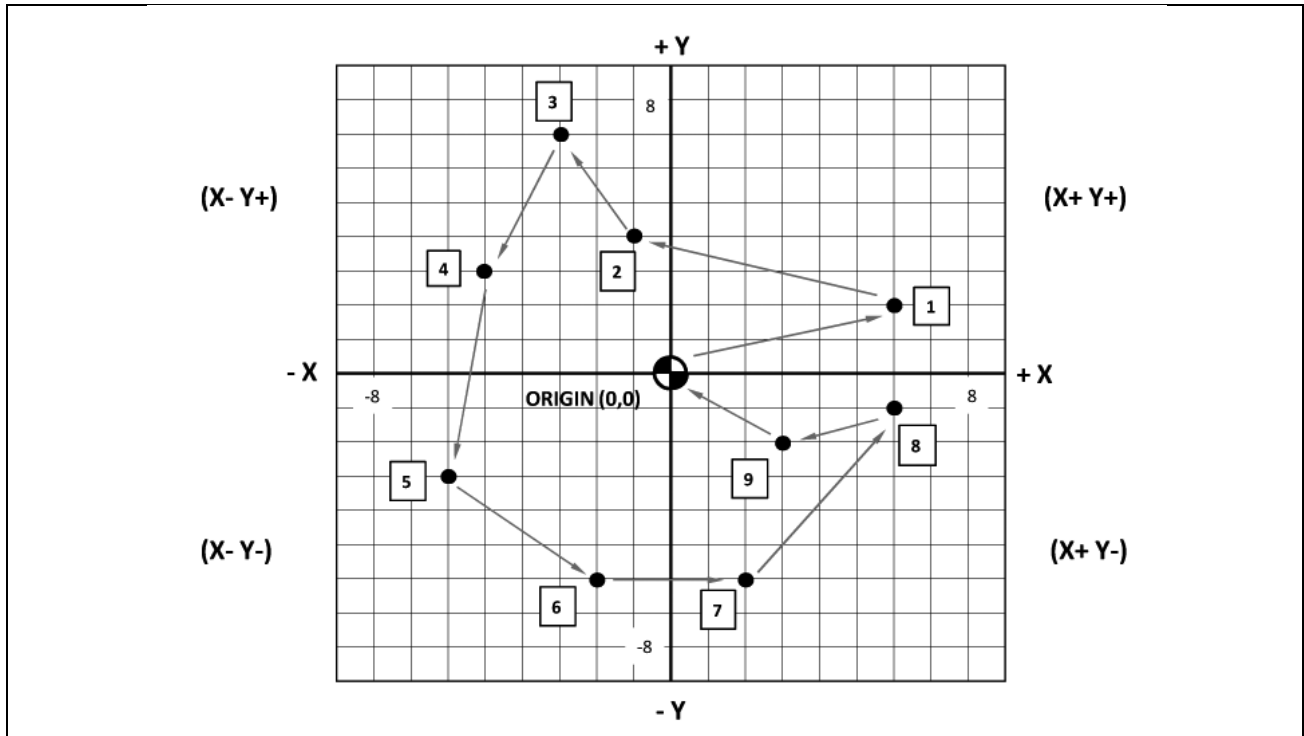
### G91 INCREMENTAL PROGRAMMING

All axis motions are based on the distance to the next location. Each coordinate is based on how far the cutter is to move from start to finish.

*STARTING AT THE POINT O (ORIGIN), DESCRIBE THE PATH FROM O THROUGH ALL 9 POINTS AND BACK TO THE POINT O USING G90 & G91*

G90	X	Y	G91	X	Y
O (Origin)			O → 1		
1			1 → 2		
2			2 → 3		
3			3 → 4		
4			4 → 5		
5			5 → 6		
6			6 → 7		
7			7 → 8		
8			8 → 9		
9			9 → O		

## LESSON-1 – EXERCISE #3 - ABSOLUTE & INCREMENTAL POSITIONING



### **G90 ABSOLUTE PROGRAMMING**

All axis motions are based on a fixed zero reference point, known as ABSOLUTE ZERO (part zero). Each coordinate is in relation to this absolute zero using Cartesian Co-ordinates.

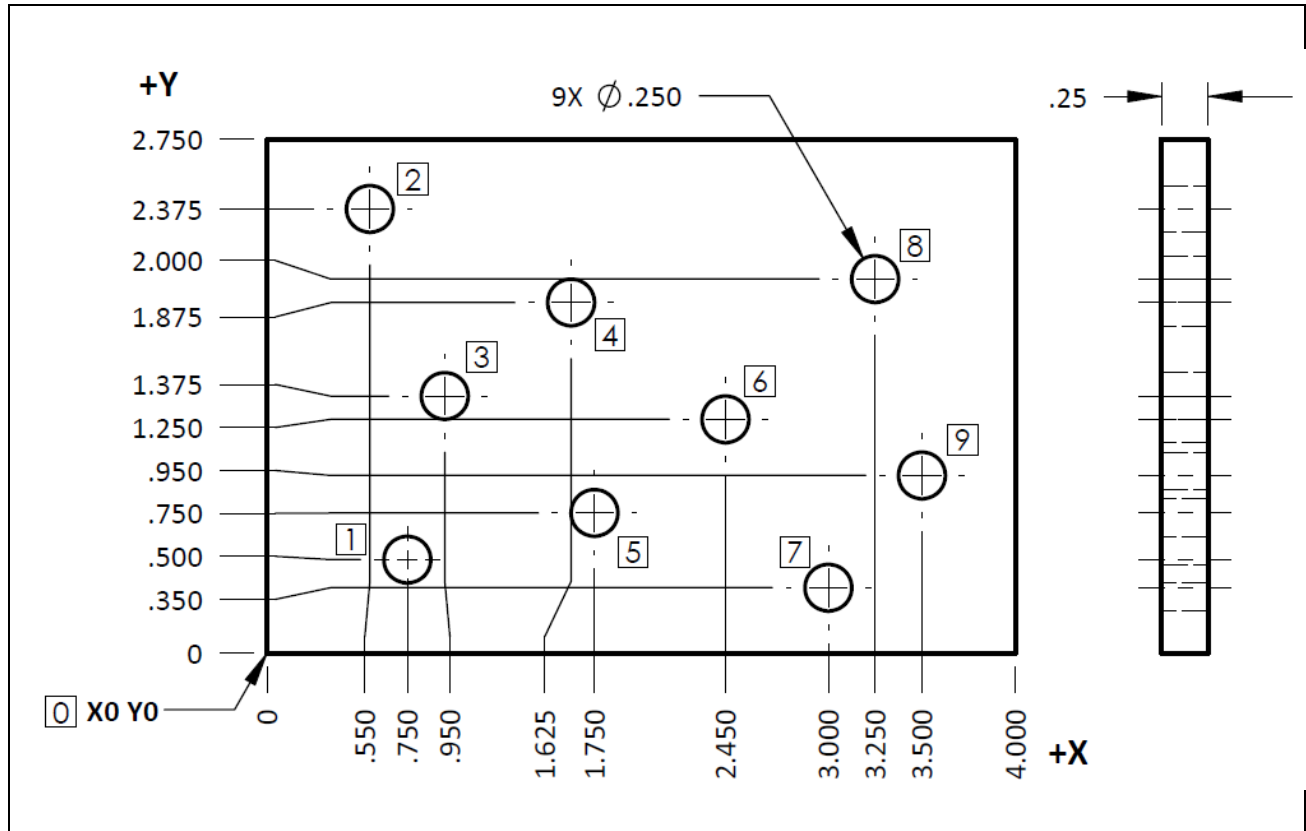
### **G91 INCREMENTAL PROGRAMMING**

All axis motions are based on the distance to the next location. Each coordinate is based on how far the cutter is to move from start to finish.

*✍ STARTING AT THE POINT O (ORIGIN), DESCRIBE THE PATH FROM O THROUGH ALL 9 POINTS AND BACK TO THE POINT O USING G90 & G91*

G90	X	Y	G91	X	Y
<b>O (Origin)</b>			<b>O → 1</b>		
<b>1</b>			<b>1 → 2</b>		
<b>2</b>			<b>2 → 3</b>		
<b>3</b>			<b>3 → 4</b>		
<b>4</b>			<b>4 → 5</b>		
<b>5</b>			<b>5 → 6</b>		
<b>6</b>			<b>6 → 7</b>		
<b>7</b>			<b>7 → 8</b>		
<b>8</b>			<b>8 → 9</b>		
<b>9</b>			<b>9 → O</b>		

## LESSON-1 – EXERCISE #4 - ABSOLUTE & INCREMENTAL POSITIONING



*✎ STARTING AT THE POINT O (ORIGIN), DESCRIBE THE PATH FROM O THROUGH ALL 9 POINTS AND BACK TO THE POINT O USING G90 & G91*

G90	X	Y	G91	X	Y
O (Origin)	0	0	O → 1	0.750	0.500
1	0.750	0.500	1 → 2	-0.200	1.875
2	0.550	2.375	2 → 3	0.400	-1.000
3	0.950	1.375	3 → 4		
4			4 → 5		
5			5 → 6		
6			6 → 7		
7			7 → 8		
8			8 → 9		
9			9 → 0		