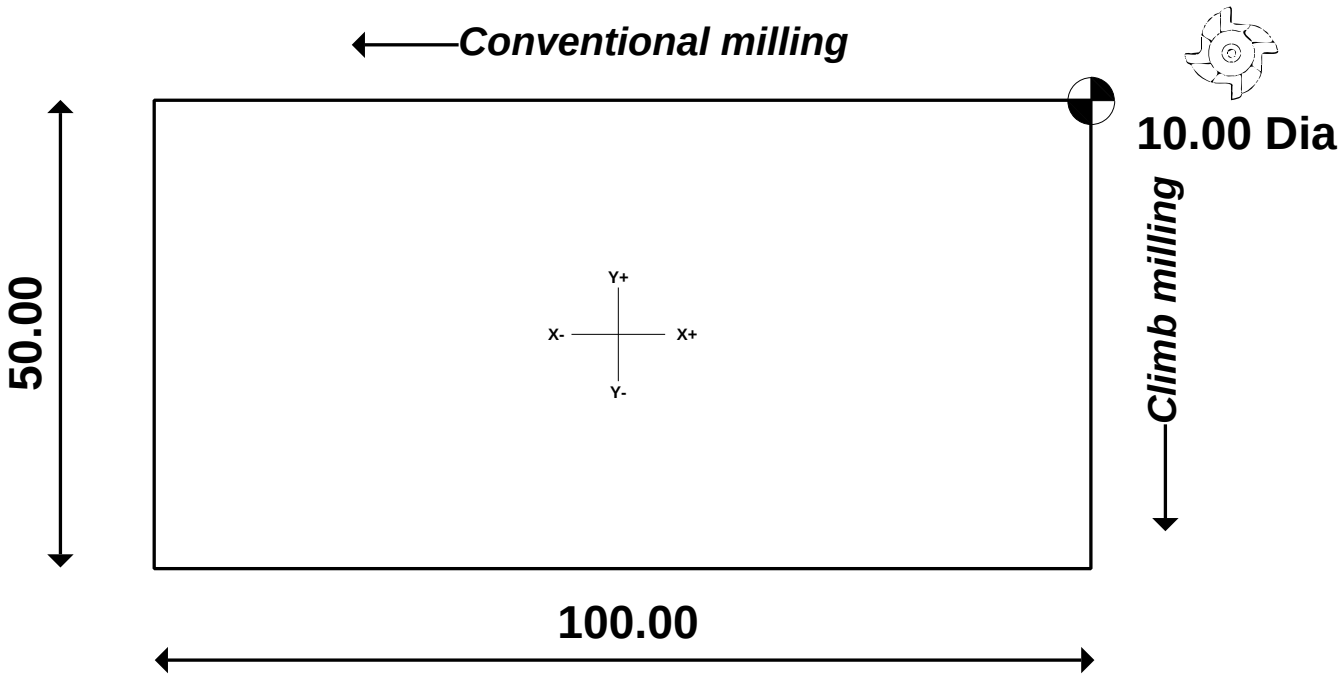
Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Mill round the outside of a block



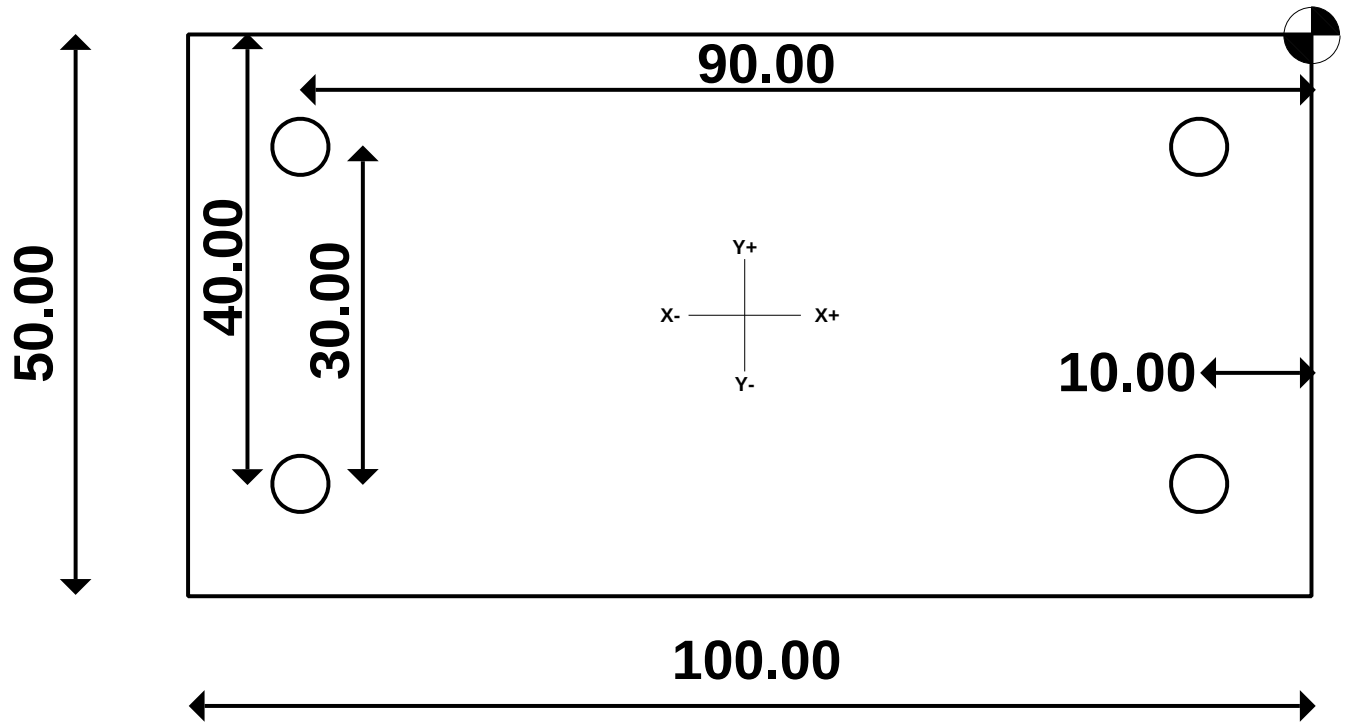
Climb milling

```
G21 G40
G54 G90
T1 M6
S1000 M3

N1 (10MM END MILL)
G00 G43 X5. Y10. Z25.
Z-10. M8
G01 Y-55. F200.
X-105.
Y5.
X-6.
G00 Z25.
M5
M30
```

Conventional milling

```
G21 G40
G54 G90
T1 M6
S1000 M3

N1 (10MM END MILL)
G00 G43 X10. Y5. Z25.
Z-10. M8
G01 X-105. F200.
Y-55.
X5.
Y6.
G00 Z25.
M5
M30
```

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Spot / Drill holes



Drilling cycle with dwell

use for centre drilling

G21 G40
G54 G90
T1 M6
S750 M3

N1 (10MM SPOT DRILL)
G00 G43 X-10. Y-10. Z25.
G82 Z-3. R1. P500 F150. M8
X-90.
Y-40.
X-10.
G80
M5
M30

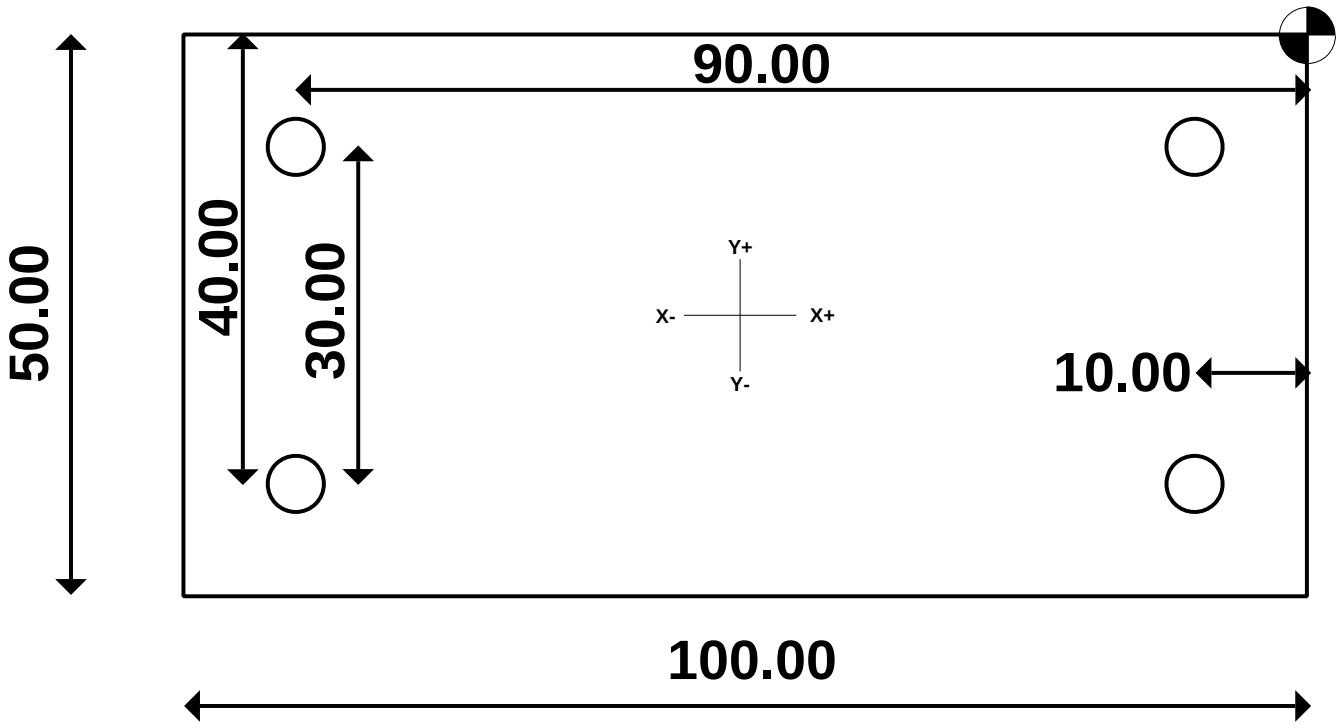
Standard drilling cycle

use for drill depths of less than 5x drill dia

G21 G40
G54 G90
T1 M6
S750 M3

N1 (10MM JOBBER DRILL)
G00 G43 X-10. Y-10. Z25.
G81 Z-10. R1. F150. M8
X-90.
Y-40.
X-10.
G80
M5
M30

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Tap holes



Tapping cycle

use for tapping M10x1.5 pitch

```
G21 G40
G54 G90
T1 M6
S100 M3

N1 (M10*1.5 TAP)
G00 G43 X-10. Y-10. Z25.
G84 Z-10. R3. F150. M8
X-90.
Y-40.
X-10.
G80
M5
M30
```

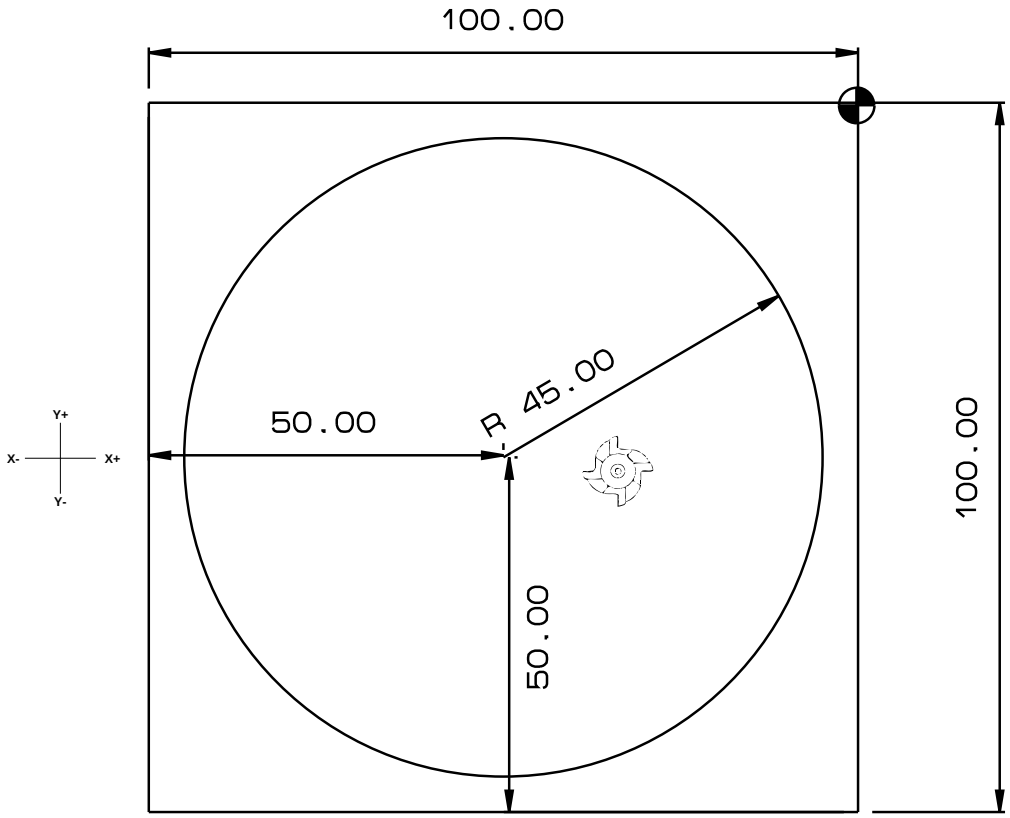
Feed (F) is calculated as RPM * pitch of thread

Tapping cycle

use for tapping M16x2.0 pitch

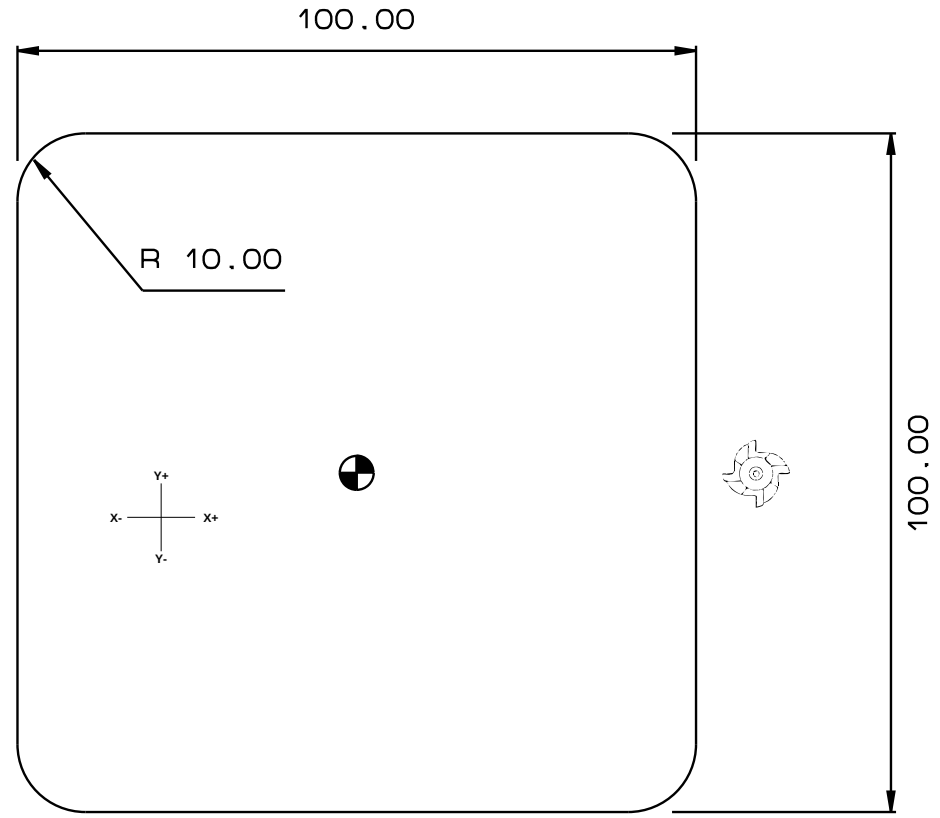
```
G21 G40
G54 G90
T1 M6
S100 M3

N1 (M16*2.0 TAP)
G00 G43 X-10. Y-10. Z25.
G84 Z-10. R3. F200. M8
X-90.
Y-40.
X-10.
G80
M5
M30
```

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Mill a bore



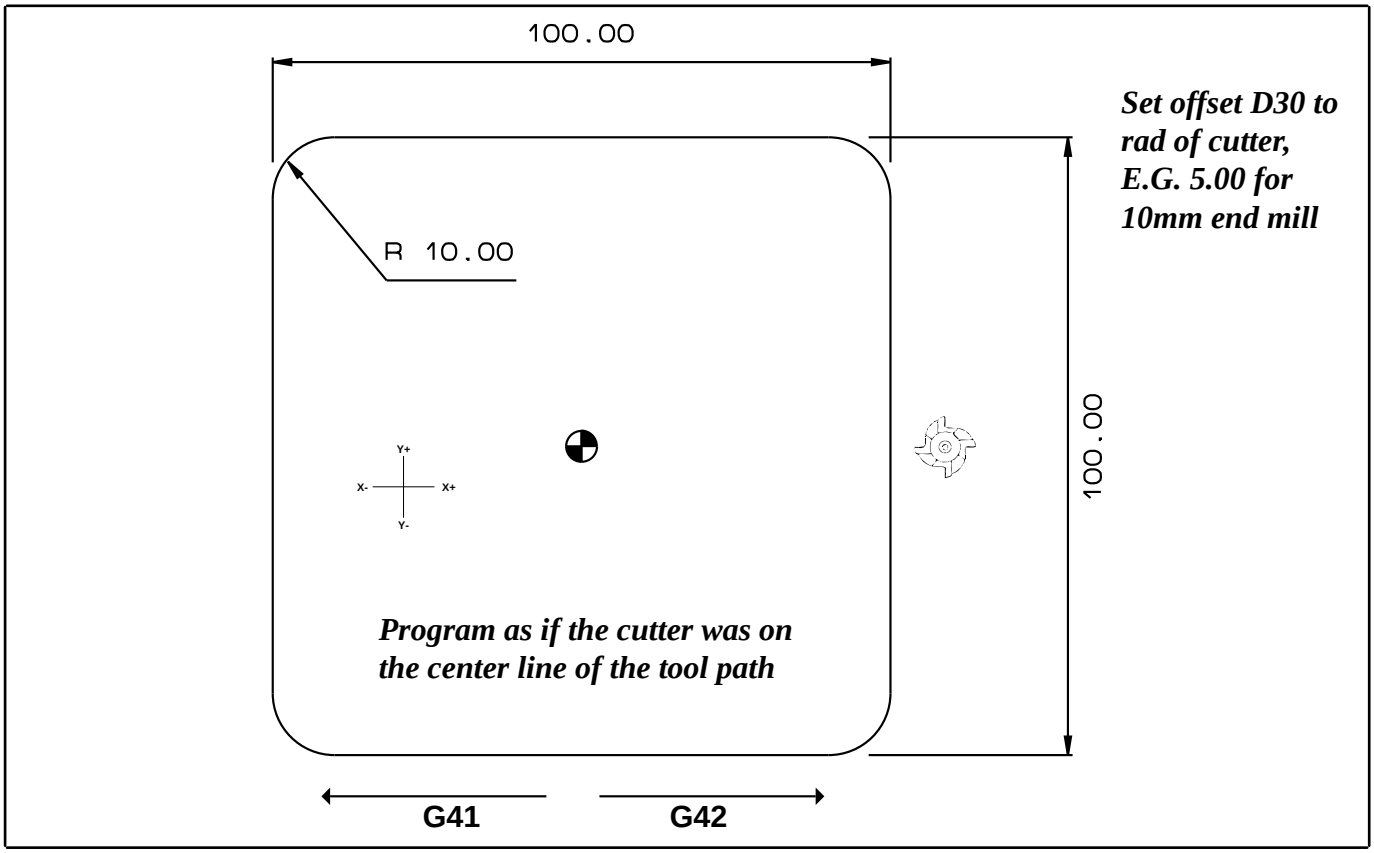
To mill in a clockwise direction use	*To mill in a anticlockwise direction use*
G21 G40 **G54 G90** **T1 M6** **S1000 M3** **N1 (10MM END MILL)** **G00 G43 X-50. Y-50. Z25.** **Z-5. M8** **G01 X-10. F200.** **G02 I-40.** **G01 X-50. F1000.** **G00 Z25. M9** **M5** **M30**	**G21 G40** **G54 G90** **T1 M6** **S1000 M3** **N1 (10MM END MILL)** **G00 G43 X-50. Y-50. Z25.** **Z-5. M8** **G01 X-10. F200.** **G03 I-40.** **G01 X-50. F1000.** **G00 Z25. M9** **M5** **M30**

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Mill round a block with rads on the corners



To mill in a clockwise direction use	*To mill in a anticlockwise direction use*
G21 G40	**G21 G40**
G54 G90	**G54 G90**
T1 M6	**T1 M6**
S1000 M3	**S1000 M3**
N1 (10MM END MILL)	**N1 (10MM END MILL)**
G54 G00 G90 G43 X60. Y0 Z25. H1 S1000 M3	**G00 G43 X60. Y0 Z25.**
Z-5. M8	**Z-5. M8**
G01 X55. F200.	**G01 X55. F200.**
Y-40.	**Y40.**
G02 X40. Y-55. R15.	**G03 X40. Y55. R15.**
G01 X-40.	**G01 X-40.**
G02 X-55. Y-40. R15.	**G03 X-55. Y40. R15.**
G01 Y40.	**G01 Y-40.**
G02 X-40. Y55. R15.	**G03 X-40. Y-55. R15.**
G01 X40.	**G01 X40.**
G02 X55. Y40. R15.	**G03 X55. Y-40. R15.**
G01 Y0	**G01 Y0**
X60.	**X60.**
G00 Z25. M5	**G00 Z25. M5**
M30	**M30**

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Mill outside a block using cutter compensation



Set offset D30 to rad of cutter, E.G. 5.00 for 10mm end mill

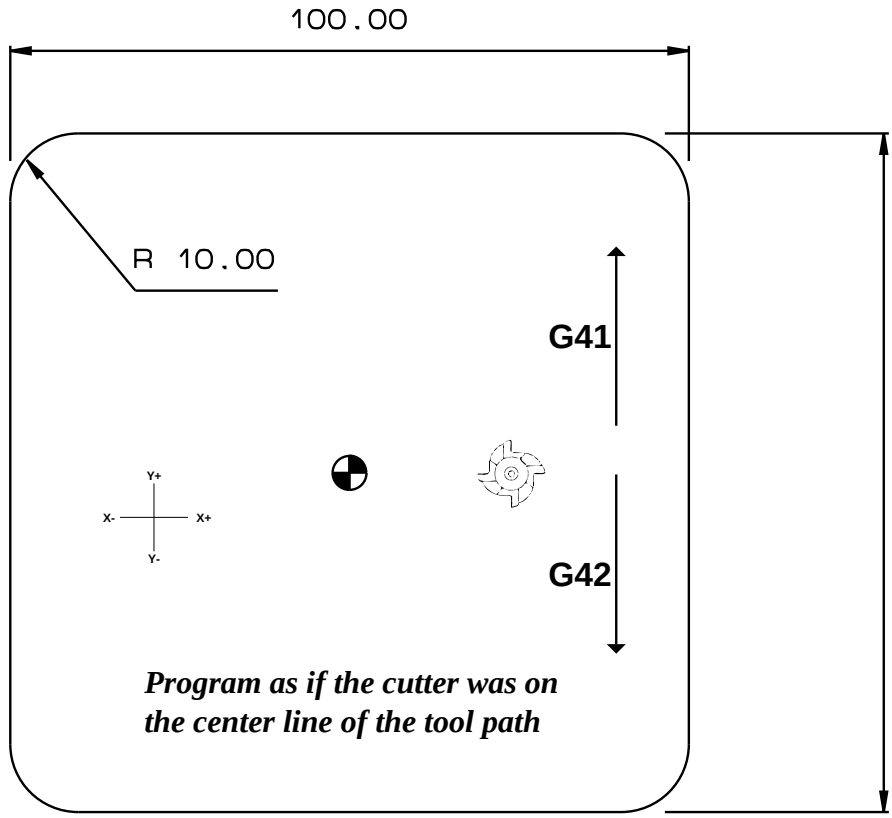
To mill in a clockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3
N1 (10MM END MILL)
G00 G43 X60. Y0 Z25. D30
Z-5. M8
G01 G41 X50. F200.
Y-40.
G02 X40. Y-50. R10.
G01 X-40.
G02 X-50. Y-40. R10.
G01 Y40.
G02 X-40. Y50. R10.
G01 X40.
G02 X50. Y40. R10.
G01 Y0
G40 X60.
G00 Z25. M5
M30
```

To mill in a anticlockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3
N1 (10MM END MILL)
G00 G43 X60. Y0 Z25. D30
Z-5. M8
G01 G42 X50. F200.
Y40.
G03 X40. Y50. R10.
G01 X-40.
G03 X-50. Y40. R10.
G01 Y-40.
G03 X-40. Y-50. R10.
G01 X40.
G03 X50. Y-40. R10.
G01 Y0
G40 X60.
G00 Z25. M5
M30
```

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Mill inside a block using cutter compensation



Set offset D30 to rad of cutter, E.G. 5.00 for 10mm end mill

Program as if the cutter was on the center line of the tool path

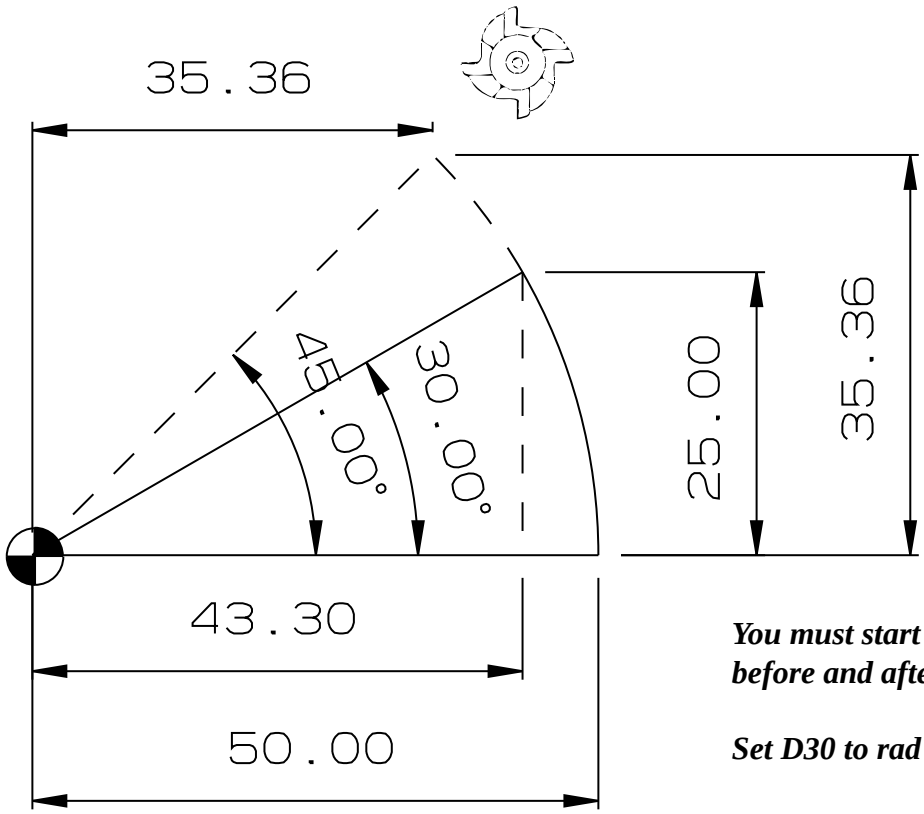
To mill in a clockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3
N1 (10MM END MILL)
G00 G43 X40. Y0 Z25. D30
Z-5. M8
G01 G42 X50. F200.
Y-40.
G02 X40. Y-50. R10.
G01 X-40.
G02 X-50. Y-40. R10.
G01 Y40.
G02 X-40. Y50. R10.
G01 X40.
G02 X50. Y40. R10.
G01 Y0
G40 X40.
G00 Z25. M5
M30
```

To mill in a anticlockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3
N1 (10MM END MILL)
G00 G43 X40. Y0 Z25. D30
Z-5. M8
G01 G41 X50. F200.
Y40.
G03 X40. Y50. R10.
G01 X-40.
G03 X-50. Y40. R10.
G01 Y-40.
G03 X-40. Y-50. R10.
G01 X40.
G03 X50. Y-40. R10.
G01 Y0
G40 X40.
G00 Z25. M5
M30
```

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	**Mill a 30° arc using compensation**



You must start cutting before and after the arc.

Set D30 to rad of cutter

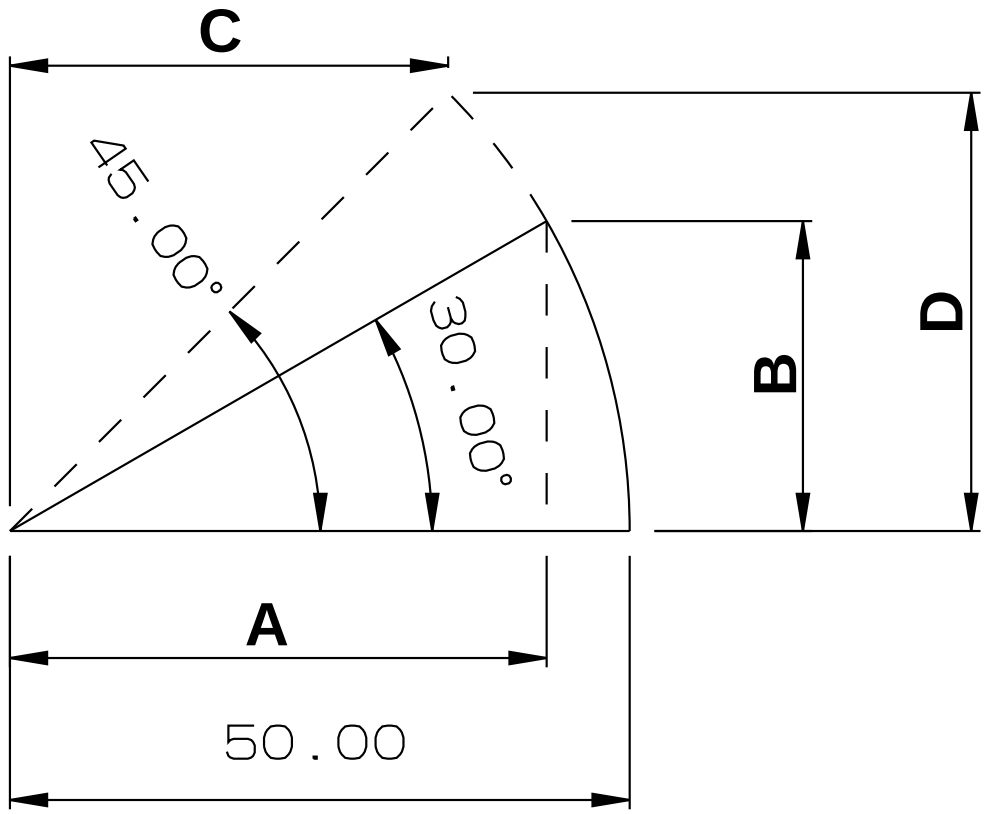
To mill in a clockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3

N1 (10MM END MILL)
G00 G43 X45.36. Y45.36 Z25. D30
Z-5. M8
G01 G42 X35.36 Y35.36. F200.
G02 X50. Y0 R50.
G01 Y-6.
G00 Z25.
G40 M5
M30
```

To mill in a anticlockwise direction use

```
G21 G40
G54 G90
T1 M6
S1000 M3

N1 (10MM END MILL)
G00 G43 X60. Y-6. Z25. D30
Z-5. M8
G01 G41 X50. F200.
Y0
G03 X35.36 Y35.36 R50.
G00 Z25.
G40 M5
M30
```

Autovalues Engineering	NC Code, Milling Using Mach3
How do I :-	Work out angles using SIN and COS



To find dimension 'A'

A = COS(30)*Rad
Rad = 50.00
COS(30) = .866
A = 50.00*.866
A = 43.30

To find dimension 'B'

B = SIN(30)*Rad
Rad = 50.00
SIN(30) = .5
B = 50.00*.5
B = 25.00

To find dimension 'C'

C = COS(45)*Rad
Rad = 50.00
COS(45) = .7071
C = 50.00*.7071
C = 35.36

To find dimension 'D'

D = SIN(45)*Rad
Rad = 50.00
SIN(45) = .7071
D = 50.00*.7071
D = 35.36