In this chapter we learn to use the graphical program MSWLogo. This is free software we downloaded from the LOGO Foundation web site at http://el.www.media.mit.edu/groups/logo-foundation/index.html. It can be located from the links area of “our” site www.k-12prep.math.ttu.edu.

Load LOGO from the same start window as with MAPLE. Commands are entered on the bottom line of the “Commander” window and recorded in the top portion of the window. The effect of the commands is seen in the full MWSLogo screen. Try the command HT (Enter) and see what happens.

The little triangle (wedge, or pointer if you wish) is called the turtle. Its home is the center of the graphics window facing due north (up). Now try the command ST. The "S" stands for "show", what do you think the "T" stands for?

Think of the turtle crawling around the screen with an ink pen attached to its tail and experiment with each of the following command sequences in the commander window. Pressing the return key produces the corresponding effects. In each case below describe the effect produced by the command sequence and state what you think the command is an abbreviation for. **Note the spacing is important!**

(If you draw a line you don’t want, try erasing it with the command PE, pen erase, followed by reversing the command that drew the line in the first place. Of course after doing this you must turn the pen back to the drawing position before any more lines can be drawn. The command for doing this is PPT, pen paint.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD 100</td>
<td></td>
</tr>
<tr>
<td>RT 90</td>
<td></td>
</tr>
<tr>
<td>FD 100</td>
<td></td>
</tr>
<tr>
<td>HOME</td>
<td></td>
</tr>
<tr>
<td>LT 90</td>
<td></td>
</tr>
</tbody>
</table>
Attach a printout of your picture. (Choose **Bitmap** from the bar menu then choose **Print**.)

Indicate with arrows, the path the turtle took to draw this picture. Does this represent a traversable network? Explain.

Explain where the number 141.42 came from. (Hint: the answer lies in ancient Greece.)

Continue the exercise with the following command sequences:
RT 90

Continue from here to list a sequence of commands that draws the following picture with no line being traced more than once.

Attach a printout of your picture. Draw arrows on it to indicate the path the turtle took. Remember that no path is to be taken more than once.

Congratulations you have just written your first program in LOGO. To celebrate let’s draw an appropriate picture. Continue the exercise as above.

CS ST

PU SETXY 0 -150 PD

LABEL “put your first name here without spaces

PU HOME PD
Provide the command sequence to finish the picture.

Continue the exercise as above.
Explain the effect of the command **SETXY**.

The following exercises show us that LOGO has calculating capabilities in addition to it’s graphing interface. In fact, as seen in some of the exercises, calculations can be used in conjunction with the graphing commands.

2+2

PRINT 2+2

SQRT 4

PRINT SQRT 4

FD SQRT 2500

POWER 10 3

PRINT POWER 10 3

RT 30 FD POWER 10 2

RT 30 BK POWER 10 3

RT 360-90

SIN 45

PRINT SIN 45
ARCTAN 1
PRINT ARCTAN 1
LT ARCTAN 1
FD 100*SIN 45
PRINT SQRT ((POWER 10 2)+(POWER 10 2))

Multiple commands can be put on the same command line separated by spaces and executed by a single pressing of the return key.

Sketch the result of the following command sequence:

```
HOME CS RT 45 FD 100 LT 90 FD 100 HOME
```

Now fill in the missing commands to draw a right triangle “in general position.” (You can’t use the HOME command.) You have to use some trig.

```
FD 100 RT 90 FD 100
RT
FD
```

This sequence is called a "program," or a "procedure."

Repeat the above exercise (right triangle in general position) with the following beginning command sequence: (see next page)
In each of the following exercises write a "procedure/program" which produces the given object in general position. Also no other marks should appear on the screen, including the turtle.

1. Equilateral triangle

2. Square

3. Pentagon

4. Octagon

5. Regular 5 pointed star
6. Regular 7 pointed star

7. Four stacked circles

Notice how some of the above had the same simple command sequence repeated a number of times. There is a built in shortcut for writing such programs. Execute the following command:

```
REPEAT 4[RT 90 FD 100]
```

Explain what this command appears to be doing.

8. Regular 20 sided polygon
9. Using the **REPEAT** command provide the “one Statement” command which produces each of the above figures

1. 

2. 

3. 

4. 

5. 

6. 

7. 