Section 3.1 The Rectangular Coordinate System and Equations in Two Variables
Math 102 Course Outline Unit IV Objective:
- Generate ordered pair solutions for linear equations.

Math 102 Course Outline Unit III Objective:
- Construct tables to model problems.

A table of ordered pair solutions for a function may be accessed using the TABLE feature. To use the TABLE feature, students need to first "set up" the table.

To display the TABLE SETUP screen, press 2ND TBLSET.
- TblStart (table start) defines the initial value for the independent variable, x. TblStart applies only when the independent variable is generated automatically, when *Indpnt* is set to *Auto.*
- ∆Tbl (table step) defines the increment for the independent variable. *Indpnt* and *Depend* define how the independent and dependent variables will be displayed. There are four possible settings. The two most commonly used one are described here.

   1. ***Indpnt* Auto and *Depend* Auto**
      Values will be displayed automatically in both the independent variable column and in all dependent variable columns.
   2. ***Indpnt* Ask and *Depend* Auto**
      The table will be empty. Enter a value for the independent variable and all the corresponding dependent variable values will be calculated and displayed automatically.

INSTRUCTOR NOTES:

   ❖ This is a good time to discuss the concepts of *independent variable* and *dependent variable* with your class. The independent variable, x, is the one we are assigning values to. The dependent variable is y, because its value depends on x.
   ❖ Remind students that the linear equation in two variables must be solved for y; in other words, in the form $y = mx + b$.

Example 1: Create a table of values that satisfy the equation $y = 3x - 4$. Set TblStart at -3, increment by 1 unit, and allow the calculator to set up the table of values automatically.

Direct students to scroll through the table using the up and down arrow keys to obtain other ordered pair solutions to the equation $y = 3x - 4$.

```
TABLE SETUP
 TblStart=-3
 ∆Tbl=1
Indpnt: Auto  Ask
Depend: Auto  Ask
```

X	Y₁	
-3	-13	
-2	-10	
-1	-7	
0	-4	
1	-1	
2	2	
3	5	
X=-3		

Example 2: Create a table of values that satisfy the equation $3x - 2y = 6$. Set TblStart at -4, increment by 2 units, and allow the calculator to set up the table of values automatically.

Solution: First solve the equation for *y*, obtaining $y = \frac{3}{2}x - 3$. Enter $y = \frac{3}{2}x - 3$ into the Y= screen. Then set TblStart at -4 and ΔTbl at 2. *Indpnt:* is set on Auto. See the screen displays below. Again remind students that they can scroll through the table using the up and down arrow keys to obtain other ordered pair solutions to the equation $y = \frac{3}{2}x - 3$.

```
Plot1  Plot2  Plot3
\Y1■3/2X-3
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
```

```
TABLE SETUP
 TblStart=-4
 ▵Tbl=2■
Indpnt: Auto  Ask
Depend: Auto  Ask
```

```
 X    │ Y1   │
-4    │ -9   │
-2    │ -6   │
 0    │ -3   │
 2    │  0   │
 4    │  3   │
 6    │  6   │
 8    │  9   │
X= -4
```

Example 3: Jahmal has a job selling computers at *Computer Central*. He receives a monthly salary of $2500 plus 5% commission on sales. His monthly earnings are given by the equation $E = 0.05x + 2500$. Create a table of values that satisfy the equation $E = 0.05x + 2500$ for the values *x* = 0, *x* = 250, *x* = 500, *x* = 1000, and *x* = 3500. Interpret the meaning of each ordered pair solution in the table in the context of the problem.

Solution: Enter the expression 0.05*x* + 2500 into the Y= screen. Change the TABLE SETUP so that *Indpnt:* is set to Ask. Whatever settings students previously had for TblStart and ΔTbl don't affect the outcome when the independent variable is set on Ask.

(Again, this is a good time to discuss independent and dependent variables.)

When students go to the TABLE feature, they will see a blank screen.

```
Plot1  Plot2  Plot3
\Y1■.05X+2500■
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
```

```
TABLE SETUP
 TblStart=-4
 ▵Tbl=2
Indpnt: Auto  Ask
Depend: Auto  Ask
```

```
 X    │ Y1   │
      │      │
      │      │
X=
```

Students now enter the value of each variable x for which the y-value is to be determined, in this case $x = 0$, $x = 250$, $x = 500$, $x = 1000$, and $x = 3500$. When students press the input value for x followed by ENTER, the corresponding value of y will be displayed. Enter each subsequent x-value in the list to find the corresponding values for y.

See the screen displays below.

X	Y1	
0	2500	
X=0		

X	Y1	
0	2500	
250	2512.5	
500	2525	
1000	2550	
3500	2675	
X=		

Require students to interpret each ordered pair value. For example, (0, 2500) means that even if Jahmal has no monthly sales, he will still earn $2500 for the month. If the value of his sales for the month is $3500, his monthly earnings will be $2675.

INSTRUCTOR NOTES:

❖ Δ Tbl may be set on non-integer values: Δ Tbl = 0.5, Δ Tbl = 2.75, Δ Tbl = $\dfrac{4}{3}$.

❖ Explain to students that after they complete a table using the Ask feature, they may want to return the settings to *Indpnt:* Auto.

❖ Frequently students inadvertently switch the settings in the Y= screen so that the cursor is on Plot1 instead of Y1, Y2, etc. The Plot1 acts as a toggle switch: it's either off or on. If Plot1 is highlighted, just place the cursor over Plot1, press ENTER, and Plot1 will be turned off.

Plot1 Plot2 Plot3
\Y₁■.05X+2500
\Y₂=
\Y₃=
\Y₄=
\Y₅=
\Y₆=
\Y₇=

Plot2 Plot3
\Y₁■.05X+2500
\Y₂=
\Y₃=
\Y₄=
\Y₅=
\Y₆=
\Y₇=

Plot1 Plot2 Plot3
\Y₁■.05X+2500
\Y₂=
\Y₃=
\Y₄=
\Y₅=
\Y₆=
\Y₇=