

Analyzing Linear Functions

PROBLEM 1 As We Make Our Final Descent



At 36,000 feet, the crew aboard the 747 airplane begins making preparations to land. The plane descends at a rate of 1500 feet per minute until it lands.

1. Compare this problem situation to the problem situation in Lesson 2.1, *The Plane!* How are the situations the same? How are they different?

It has a rate given.

the rate is 1500 ft/min and the plane is descending.



2. Complete the table to represent this problem situation.

	Independent Quantity	Dependent Quantity
Quantity	time	height
Units	minutes	feet.
	0	36,000
	2	33,000
	4	30,000
	6	27,000
	12	18,000
	20	6000
Expression	t	$36,000 - 1500t$

Think about the pattern you used to calculate each dependent quantity value.

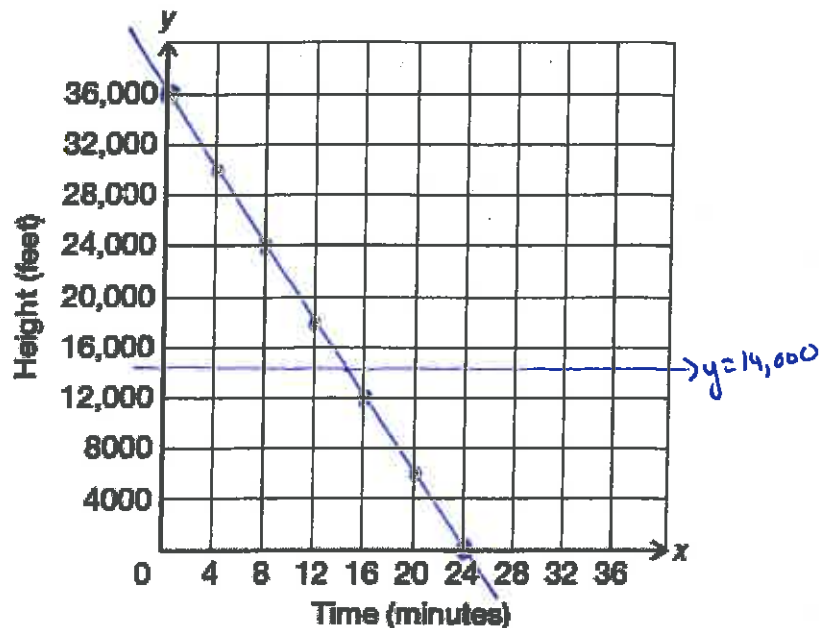
3. Write a function, $g(t)$, to represent this problem situation.

$$g(t) = 36,000 - 1500t$$





5. Graph $g(t)$ on the coordinate plane shown.



6. Determine how long will it take the plane to descend to 14,000 feet.

a. Use the table to determine how long it will take the plane to descend to 14,000 feet.

Some where between 12 and 20 minutes.

b. Graph and label $y = 14,000$ on the coordinate plane. Then determine the intersection point. Explain what the intersection point means in terms of this problem situation.

Intersection: $(15, 14,000)$

the plane reaches 14,000 ft at about 15 minutes.

c. Substitute 14,000 for $g(t)$ and solve the equation for t . Interpret your solution in terms of this problem situation.

$$\begin{array}{r}
 14,000 = 36,000 - 1500t \\
 -36,000 \quad -36,000 \\
 \hline
 -22,000 = -1500t \\
 \quad \quad \quad -1500 \quad \quad -1500 \\
 \hline
 \end{array}$$

$$t = 14.67 \text{ minutes.}$$

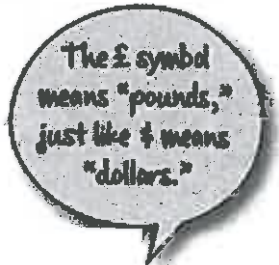
the plane reaches a height of 14,000 ft at 14.67 minutes.

Using a Calculator to Analyze Tables, Functions & Graphs

PROBLEM 2 Making the Exchange



The plane has landed in the United Kingdom and the Foreign Language Club is ready for their adventure. Each student on the trip boarded the plane with £300. They each brought additional U.S. dollars with them to exchange as needed. The exchange rate from U.S. dollars to British pounds is £0.622101 pound to every dollar.



$$\text{rate} = \frac{.622101 \text{ pound}}{\text{dollar}}$$

Independent Quantity: U.S. dollars = (x)

Dependent Quantity: British Pounds = $(f(x))$

Function: $f(x) = .622101x + 300$

Make a Table:

1. Press: Y=



2. Press: TBLSET



3. Press: TABLE

X	Y1
100	362.21
125	377.76
150	393.32
175	408.87
200	424.42
225	439.97
250	455.53

X=100



Complete the table:

U.S. Currency	British Currency
\$	£
100	362.21
150	393.32
175	408.87
250	455.53
267	466.10

← must make ΔTbl setting = 1

Analyze a Graph: Determining an Output Value

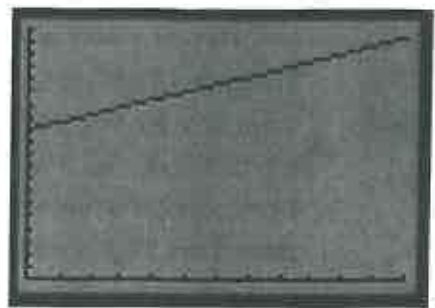
1. Press: **Y=**



2. Press: **WINDOW**



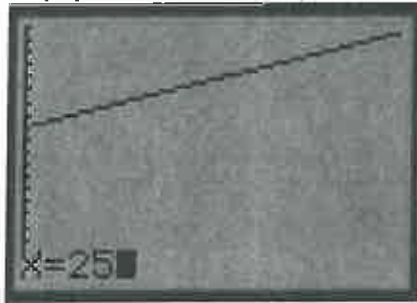
3. Press: **GRAPH**



4. Press: **CALC** and **1**



5. (input desired value)



6. Press: **ENTER**



Use the **VALUE** feature to calculate how many British Pounds will you have if she exchanges an additional:

a. ~~\$375~~
 \$221

$$f(221) = 437.48 \text{ pounds}$$

b. \$650

$$f(650) = 704.37 \text{ pounds}$$

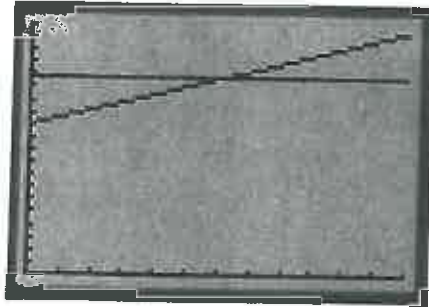
* Since 650 is outside the viewing window, you must adjust the X_{max} value in the window to a value larger than 650.

Analyze a Graph: Determining an Input Value

1. Press: **Y=**



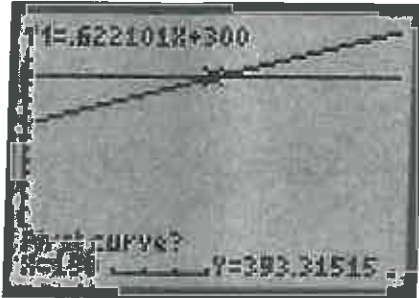
2. Press: **GRAPH**



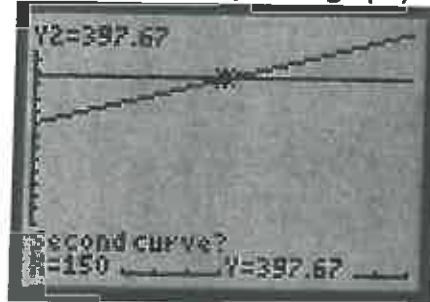
3. Press: **CALC** and **5**



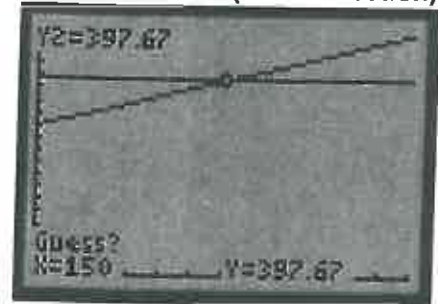
4. Press: **ENTER** (on 1st graph)



5. Press: **ENTER** (on 2nd graph)



6. Press: **ENTER** (at intersection)



Use the **INTERSECT** feature to calculate how many additional U.S. Dollars were exchanged if you have a total of:

a. £464.86

$$x = \$265.00$$

when $y = 464.86$

b. £694.41

when $y = 694.41$

$$x = \$634.00$$

* 694.41 is outside the viewing window, you need to adjust the x_{Max} and y_{Max} values under Window.

