Text-Messaging Plans
Proportional Relationships Task

1. ComCo Cell Phone Company offers a choice of cell phone plans. **Plan A** is one of their most popular plans. With this plan, the company charges $0.50 per text.

A. Complete the table to show the cost for each of the indicated number of texts.

Plan A	
texts (x)	**cost (y)**
0	$0
50	$25
100	
150	
200	
250	
300	
350	
400	
450	
500	

B. What is the **constant of proportionality** in the table?

C. Write an equation for the total monthly cost, y, for x number of texts.

D. Using the equation you wrote in part (C), find the cost of sending 17 texts. *Show your work.*

Answer Statement _____

E. Using the equation you wrote in part (C), find how many texts were sent if the cell phone bill was $58. *Show your work.*

Answer Statement _____

2. You will be making a graph of the monthly cost for **Plan A.**

1. Label the *x*- and *y*-axes on your graph.

2. Select a colored pencil. Plot each ordered pair (*x, y*) from Table 1 on the coordinate plane.

3. Connect the points that you have plotted.

3. ComCo Cell Phone Company offers another cell phone plan called **Plan B**. With this plan, the customer is charged $0.10 per text plus a $10 monthly charge. Complete the table to show the cost for each of the indicated number of texts.

A. Complete the table to show a customer's monthly costs, using the given number of texts. *Don't forget to add the $10 monthly charge!*

Plan B	
texts (x)	**cost (y)**
0	$10
50	$15
100	
150	
200	
250	
300	
350	
400	
450	
500	

B. Identify any multiplicative relationships you see in the table.

C. Does **Plan B** represent a proportional relationship between *texts* and *costs*? Explain why or why not.

4. You will be making a graph of the monthly cost for **Plan B.**

1. Use the same coordinate plane that shows your graph for Plan A.

2. Select a different colored pencil. Plot each ordered pair (*x, y*) from Table 2 on the coordinate plane.

3. Connect the points that you have plotted.

5. Follow-Up Questions
Show all your work!

a. A customer on Plan A got a monthly phone bill of $22.50. How many texts did she send? Explain how you know this.

Answer Statement _____

b. Susan is considering which plan would give her the best deal. She estimates that she sends about 125 texts per month. Which plan would be best for Susan? Why?
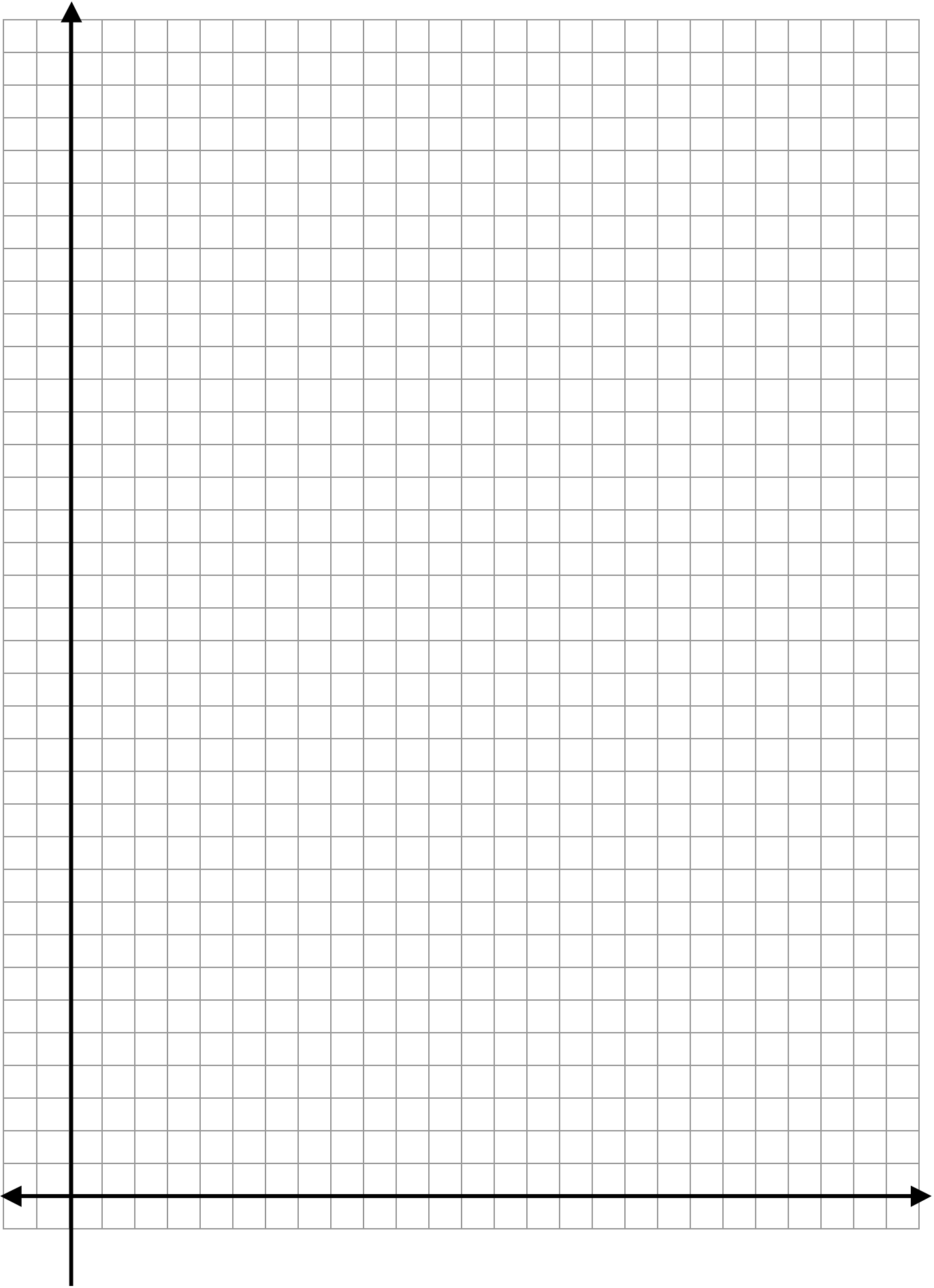

Answer Statement _____

c. Do both of the lines on your graph represent proportional relationship? Explain how you know.

d. For what amount of texts would the cost for each plan be the same? (Hint: Look at your graph.)

Answer Statement _____

e. For Plan A, what does the point (75, 37.50) represent?

f. For Plan B, what does the point (20, 12) represent?

Text-Messaging Plans
Proportional Relationships Task – **Key**

Task 1

A. Complete the table to show the cost for each of the indicated number of texts.

Plan A	
texts (x)	**cost (y)**
0	$0
50	$25
100	**$50**
150	**$75**
200	**$100**
250	**$125**
300	**$150**
350	**$175**
400	**$200**
450	**$225**
500	**$250**

B. What is the constant of proportionality in this table?

k = 0.5

C. Write an equation for the total monthly cost, y, for x number of texts.

y = 0.5 x

D. Using the equation you wrote in part (C), find the cost of 17 texts. *Show your work.*

y = 0.5x
y = 0.5(17)
y = 8.5

It will cost $8.50 to send 17 texts.

E. Using the equation you wrote in part (C), find how many texts were sent if the cell phone bill was $58. *Show your work.*

y = 0.5x

$$\frac{58}{0.5} = \frac{0.5x}{0.5}$$

116 = x

116 texts were sent for $58.

<u>Task 3</u>

B. Complete the table to show the cost for each of the indicated number of texts.

Plan B	
texts (x)	**cost (y)**
0	$10
50	$15
100	**$20**
150	**$25**
200	**$30**
250	**$35**
300	**$40**
350	**$45**
400	**$50**
450	**$55**
500	**$60**

B. Identify any multiplicative relationships you see in the table.

There are no multiplicative relationships.

C. Does *Plan B* represent a proportional relationship between *texts* and *costs?* Explain why or why not.

No, plan B does not represent a proportional relationship between the number of texts and the cost because there is no constant multiplicative relationship between texts and cost.

<u>Follow-Up Questions</u>

a. A customer on Plan A got a monthly phone bill of $22.50. How many texts did she send? Explain how you know this.

Plan A equation:

$y = 0.5x$

$\dfrac{22.50}{0.5} = \dfrac{0.5x}{0.5}$

$45 = x$

The customer sent 45 texts. I know this because I used the equation I found for plan A. I substituted the cost in for *y* and solved for *x*.

b. Susan is considering which plan would give her the best deal. She estimates that she sends about 125 texts per month. Which plan would be best for Susan. Why?

Plan A equation:

$y = 0.5x$

$y = 0.5(125)$

$y = \$60$

Plan B:

cost = $0.10 per text + $10

cost = 0.10(125) + 10

cost = 12.5 + 10

cost = $22.50

Plan B is the better deal for Susan because it would only cost her $22.50, where Plan A would cost her $60.

c. Do both of the lines on your graph represent proportional relationships? Explain how you know.

No, they do not. Plan A represents a proportional relationship but Plan B does not. Both plans graphs show straight lines, but Plan A crosses through the origin and Plan B does not cross through the origin.

d. For what amount of texts would the cost for each plan be the same? (Hint: Look at your graph.)

The two lines intersect at (25, 12.5). For both plans, 25 texts will cost $12.50.

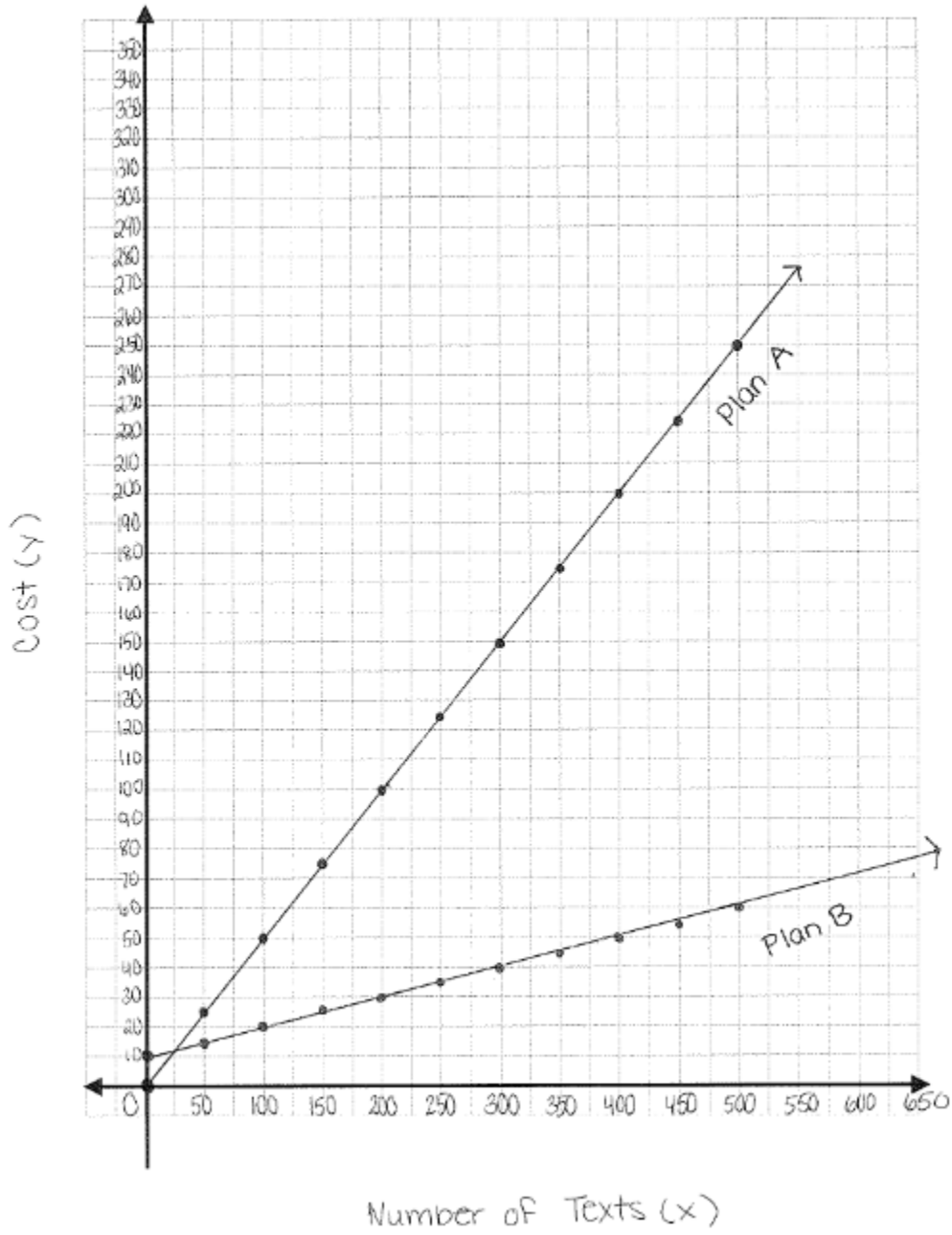e. For Plan A, what does the point (75, 37.50) represent?

It represents that 75 texts can be sent for the cost of $37.50.

f. For Plan B, what does the point (20, 12) represent?

It represents that 20 texts can be sent for the cost of $12.00.

Graph

Text Messing Plans: Plan A vs. Plan B

Cost (y)

Number of Texts (x)

Task 1 (17 points)

A. Table = 9 points (1 for each correct entry)
B. 1 point for correct constant of proportionality
C. 1 point for correct equation
D. 3 points (1 for correct answer, 1 for showing work, 1 for writing an answer statement)
E. 3 points (1 for correct answer, 1 for showing work, 1 for writing an answer statement)

Task 3 (11 points)

A. Table = 9 points (1 for each correct entry)
B. 2 points (1 for correct answer, 1 for explanation)

Follow-Up Questions (13 points)

a. 3 points (1 for correct answer, 1 for showing work, 1 for writing an answer statement)
b. 4 points (1 for correct answer, 2 for showing work for *each plan*, 1 for writing an answer statement)
c. 2 points (1 for correct answer, 1 for explanation)
d. 2 points (1 for correct answer, 1 for explanation)
e. 1 point for correct answer
f. 1 point for correct answer

Graph (4 points)

Point Value	Title	Data	Labeling	Neatness
4 **Advanced**	Title is creative and clearly relates to the problem being graphed. It is printed at the top of the graph.	Data in the table is neat, accurate, and easy to read.	All parts of the graph are labeled neatly, clearly, and in an organized way.	Exceptionally well designed, neat, and attractive. A ruler was used.
3 **Proficient**	Title clearly relates to the problem being graphed and is printed at the top of the graph.	Data in the graph is accurate and easy to read.	Two sides of the graph are labeled.	Neat and relatively attractive. A ruler was used to make the graph more readable.
2 **Basic**	A title is present at the top of the graph.	Data in the graph is not accurate and/or cannot be read.	One side of the graph is labeled.	Lines are neatly drawn, but a ruler was not used
1 **Minimal**	A title is not present	Data in the graph is not accurate.	The graph is not labeled.	Appears messy and "thrown" together in a hurry.