

## **Have You Made Full Use of the OCR Feature?**

Make a scan, enhance it and save it. Are these all the features you know about CamScanner? If so, you have missed too many cool experiences. CamScanner offers you lots of features rather than scanning. What we are sharing today is the OCR(Optical Character Recognition) feature.

### **What can you do with OCR feature?**

#### 1. Searching

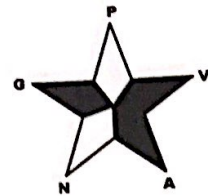
What can you do if you want to search for a document but just can't remember the names of some docs? Use this feature to recognize all the texts on your scans. Next time you just need to enter some key words in the search box and all the documents within the words will be found.

#### 2. Text extraction

Just purchase the one-time paid version and you can enjoy the text extraction for lifetime! Ever want to edit some texts on a paper document or a PDF file? Import it into CamScanner and all texts can be extracted as .txt file after OCR!

### **Why wait? Follow the steps to start using OCR!**

1. Sign in to CamScanner to sync all your docs -> All texts will be auto recognized after syncing.
2. If you don't want to sign in, you can open one single page of any doc-> Tap the Recognize button -> All recognized texts will be shown in a dialog box-> Tap Share to export the texts.



## Translations of Linear Functions

### Objective:

Students will examine the effects of horizontal and vertical shifts on linear functions.

### Connections to Previous Learning:

Students should know how to graph equations of lines, write equations of lines from their graphs, and transform equations from one form to another.

### Connections to TEKS:

111.32 b3A, b3B, b4A, b4B, c1C, c2A, c2C, c2D, c2E

### Connections to AP:

The AP Calculus objective of analysis of functions

### Time Frame:

50 minutes

### Materials:

Worksheet for each student, graph paper

### Teacher Notes:

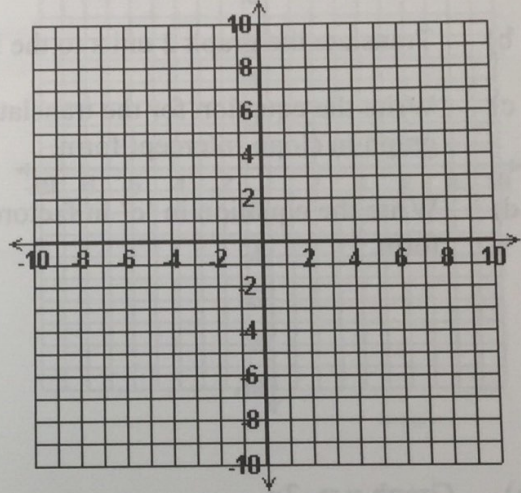
This is a discovery activity. Students will work several specific problems and then are asked to draw a general conclusion. By looking at horizontal and vertical translations of linear functions and connecting them to the  $y = m(x - h) + k$  notation, students will more easily understand the translations of quadratic functions in the form  $y = a(x - h)^2 + k$ , as well as similar translations of other parent functions.

As an extension, the students can determine at least one additional translation which results in the graphs given in the answer key.

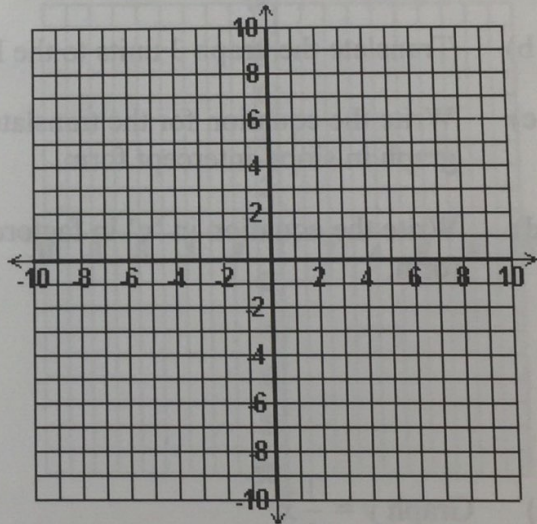


## Translations of Linear Functions

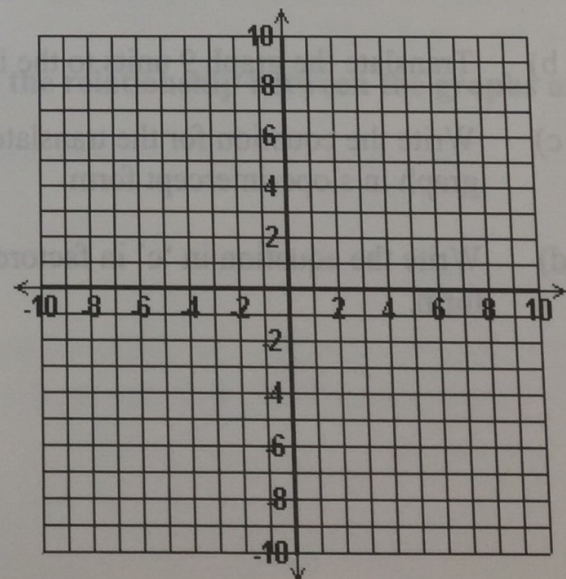
1. a) Graph  $y = 2x$
- b) Translate the graph 4 units to the right.
- c) Write the equation for the translated graph in slope-intercept form.
- d) Write the equation in 'c' in factored form,  $y = m(x - h)$ .



2. a) Graph  $y = 3x$
- b) Translate the graph 2 units to the right.
- c) Write the equation for the translated graph in slope-intercept form.
- d) Write the equation in 'c' in factored form.



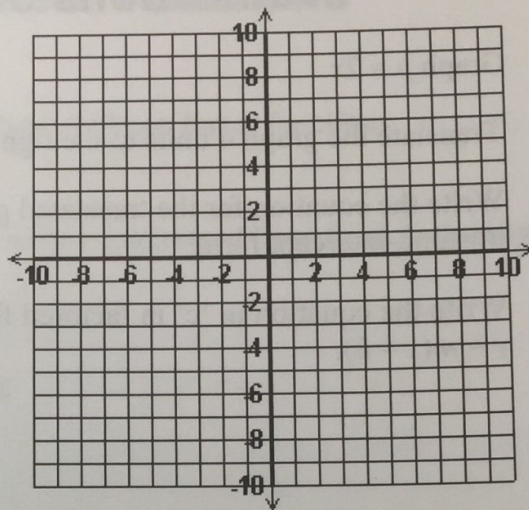
3. a) Graph  $y = \frac{1}{2}x$
- b) Translate the graph 6 units to the right.
- c) Write the equation for the translated graph in slope-intercept form.
- d) Write the equation in 'c' in factored form.



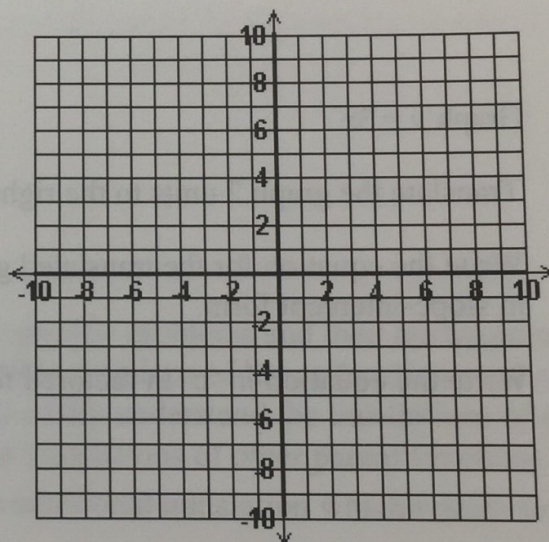


Based on your work in questions 1-3, what conclusions can be drawn about the relationship between the graphs of  $y = mx$  and  $y = m(x - h)$ ,  $h > 0$ ?

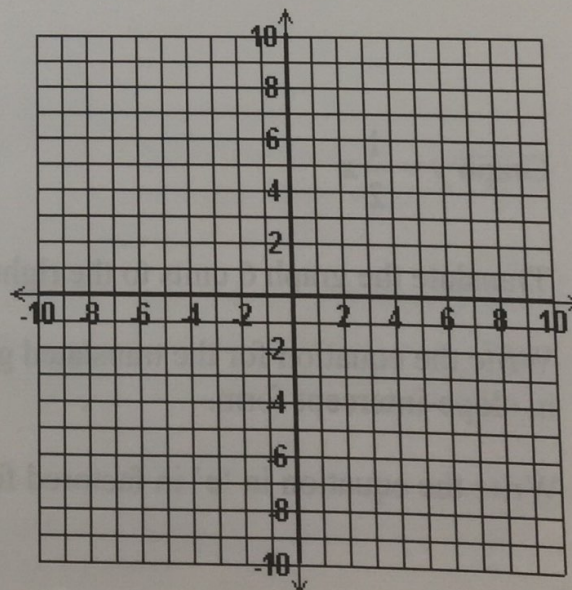
4. a) Graph  $y = 4x$   
 b) Translate the graph 2 units to the left.  
 c) Write the equation for the translated graph in slope-intercept form.  
 d) Write the equation in 'c' in factored form.



5. a) Graph  $y = -2x$   
 b) Translate the graph 3 units to the left.  
 c) Write the equation for the translated graph in slope-intercept form.  
 d) Write the equation in 'c' in factored form.



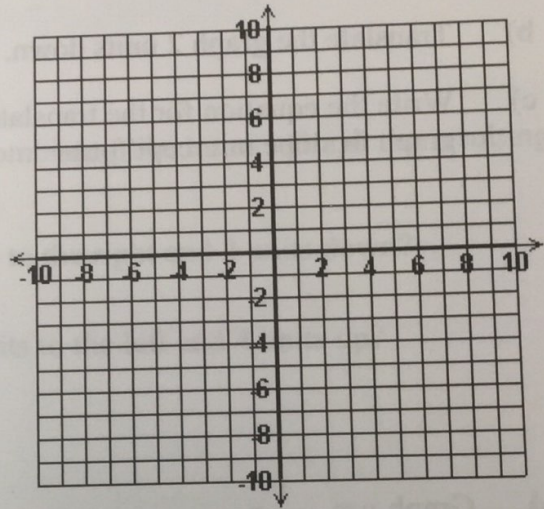
6. a) Graph  $y = \frac{1}{3}x$   
 b) Translate the graph 9 units to the left.  
 c) Write the equation for the translated graph in slope-intercept form.  
 d) Write the equation in 'c' in factored form.



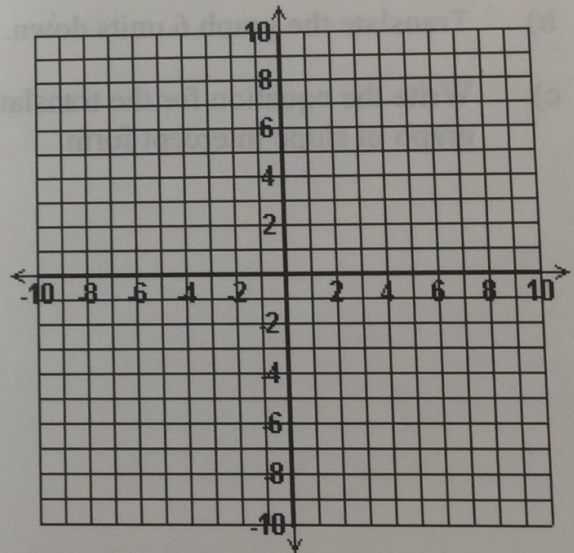


Based on your work in 4-6, what conclusions can be drawn about the relationship between the graphs of  $y = mx$  and  $y = m(x + h)$ ,  $h < 0$ ?

7. a) Graph  $y = -3x$   
 b) Translate the graph 2 units up.  
 c) Write the equation for the translated graph in slope intercept form.



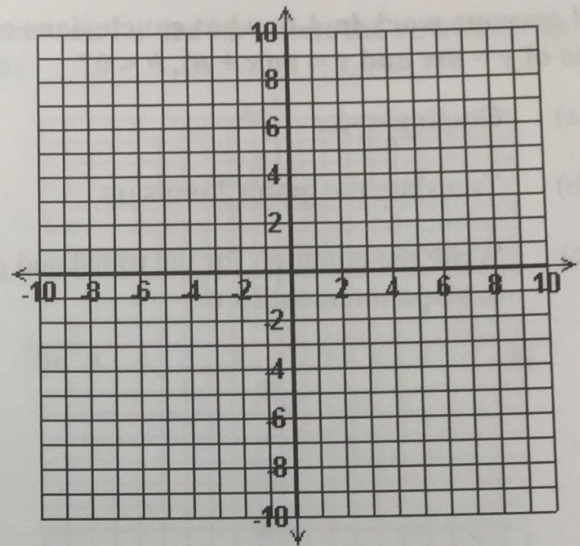
8. a) Graph  $y = \frac{1}{4}x$   
 b) Translate the graph 5 units up.  
 c) Write the equation for the translated graph in slope intercept form



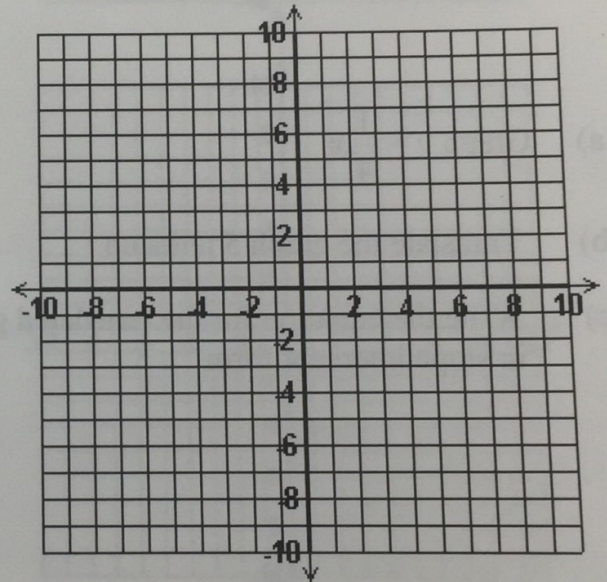
Based on 7 and 8, what conclusion can be drawn about the relationship between the graphs of  $y = mx$  and  $y = mx + k$ ,  $k > 0$ ?



9. a) Graph  $y = 5x$   
 b) Translate the graph 2 units down.  
 c) Write the equation for the translated graph in slope intercept form.



10. a) Graph  $y = -\frac{1}{2}x$   
 b) Translate the graph 6 units down.  
 c) Write the equation for the translated graph in slope intercept form.



What conclusion can be drawn about the relationship between the graphs of  $y = mx$  and  $y = mx + k$ ,  $k < 0$ ?

11. a) Based upon your previous conclusion, speculate how the graphs of  $y = 2x$  and  $y = 2(x - 3) + 4$  are related.  
 b) Graph  $y = 2x$   
 c) Simplify  $y = 2(x - 3) + 4$  by distributing and combining like terms. Graph the resulting equation to check your answer to 'a'.

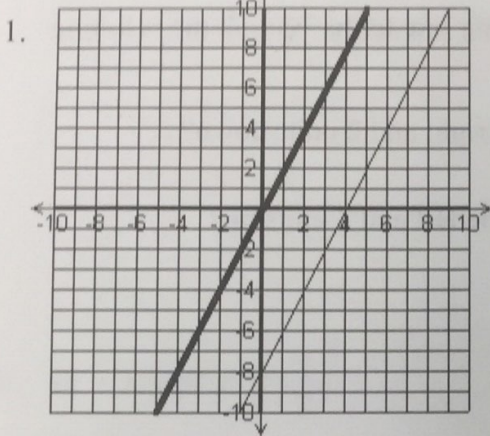
12. a) Based upon your previous conclusions, speculate how the graphs of  $y = -3(x + 1) - 5$  and  $y = -3x$  are related.
- b) Graph  $y = -3x$
- c) Simplify  $y = -3(x + 1) - 5$  by distributing and combining like terms. Graph the resulting equation to check your answer to 'a'.
13. How would you translate the equation,  $y = 5x$ , 4 units to the right and 2 units down?
14. How would you translate the equation  $y = \frac{-1}{3}x$  6 units to the left and 4 units up?



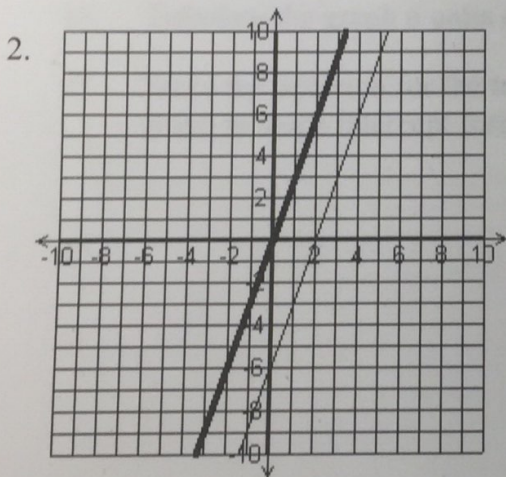


## Translations of Linear Functions

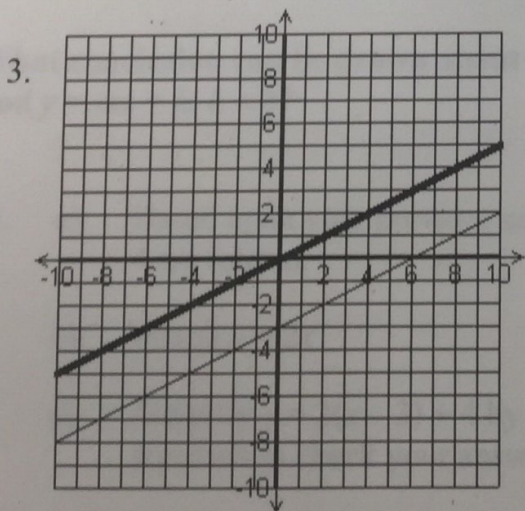
Answers:



- c)  $y = 2x - 8$
- d)  $y = 2(x - 4)$



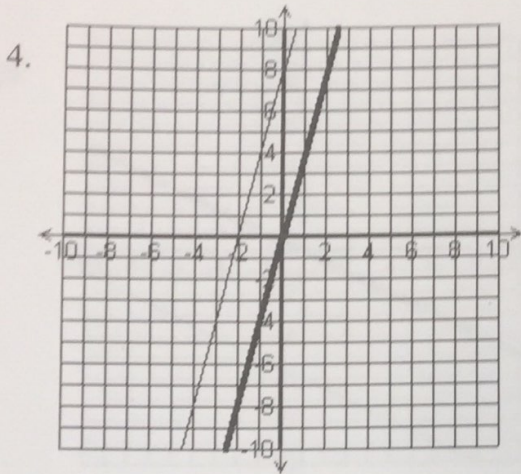
- c)  $y = 3x - 6$
- d)  $y = 3(x - 2)$



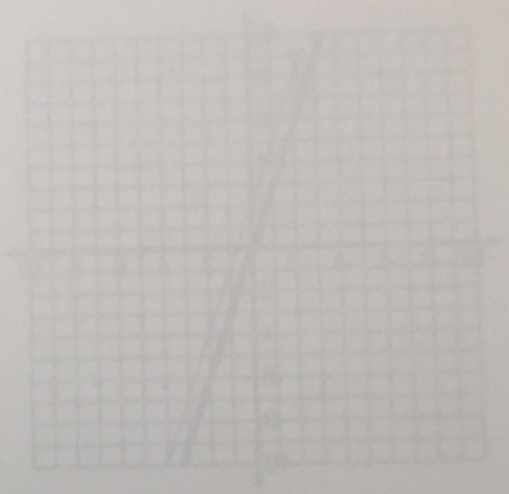
- c)  $y = \frac{1}{2}x - 3$
- d)  $y = \frac{1}{2}(x - 6)$

**Conclusion:** The second equation will translate the graph of the first equation  $h$  units to the right.

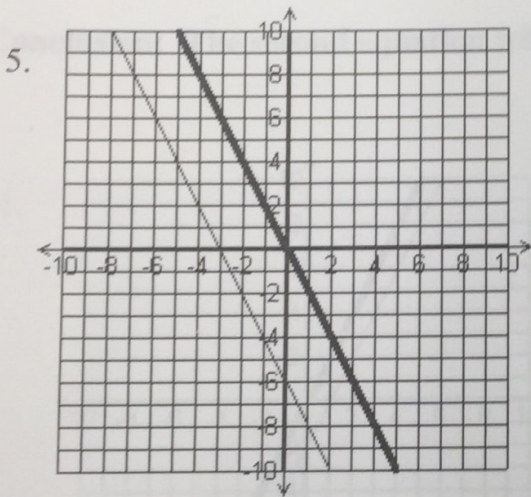




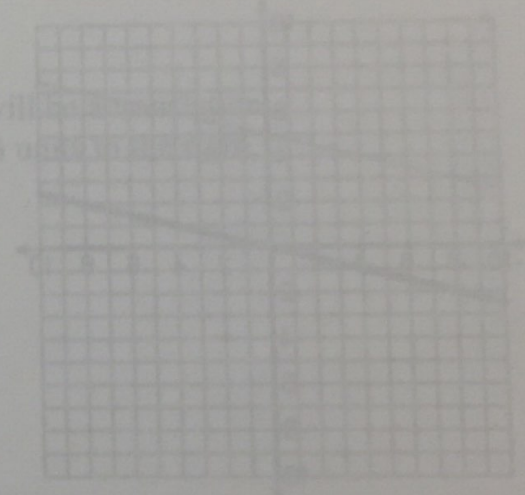
- c)  $y = 4x + 8$
- d)  $y = 4(x + 2)$



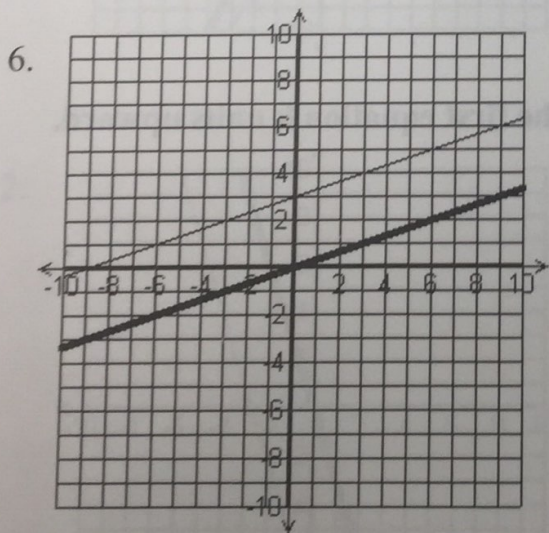
Translation: The graph of the first equation is shifted downward.



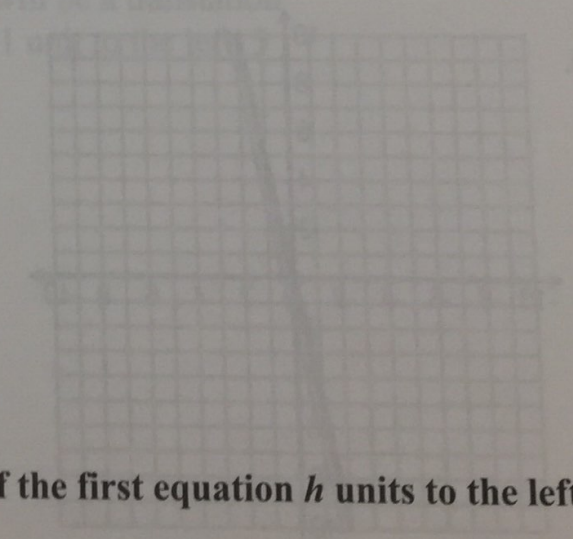
- c)  $y = -2x - 6$
- d)  $y = -2(x + 3)$



Second graph will translate the graph of the first graph, 3 units to the left and 4 units upward.



- c)  $y = \frac{1}{3}x + 3$
- d)  $y = \frac{1}{3}(x + 9)$



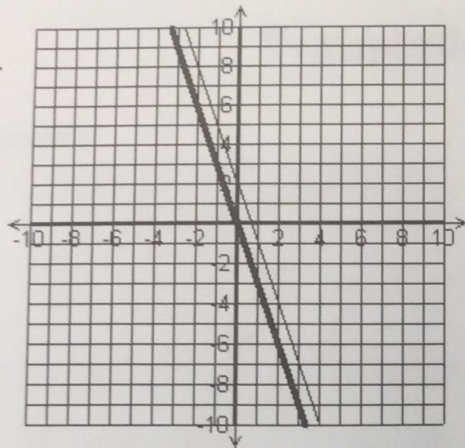
Conclusion: The second equation will translate the graph of the first equation  $h$  units to the left.

**Conclusion:** The second equation will translate the graph of the first equation  $h$  units to the left.



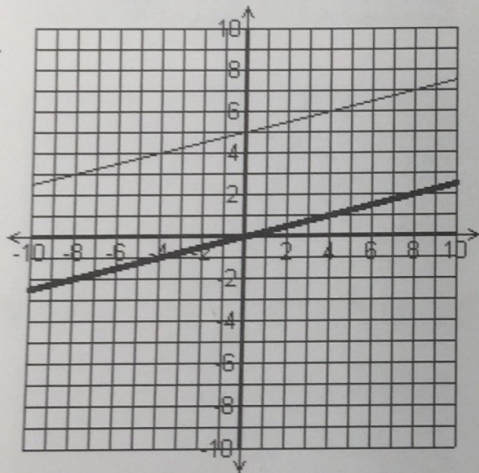


7.



c)  $y = -3x + 2$

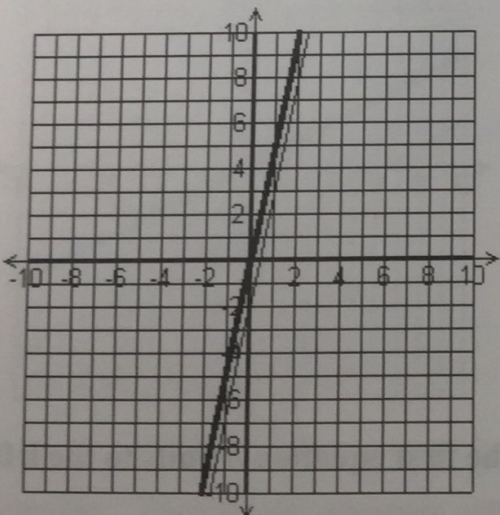
8.



c)  $y = \frac{1}{4}x + 5$

**Conclusion:** The second equation will translate the graph of the first equation  $k$  units upward.

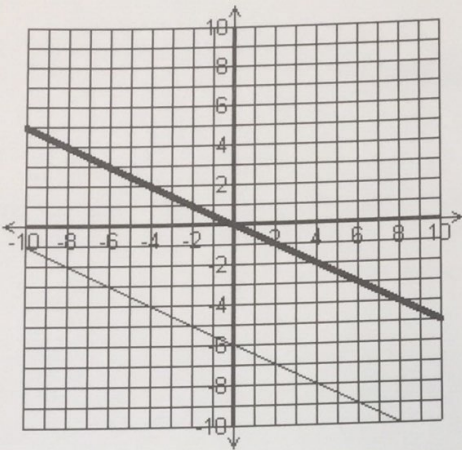
9.



c)  $y = 5x - 2$



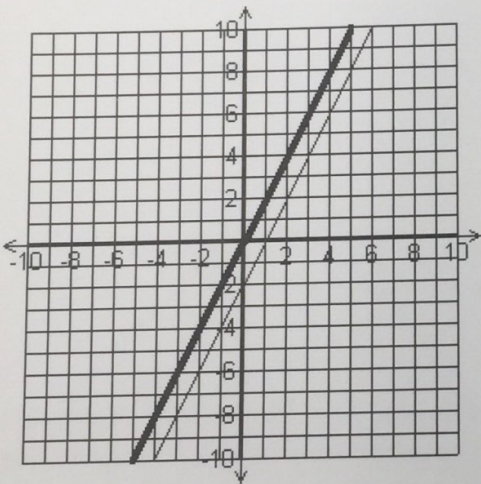
10.



c)  $y = -\frac{1}{2}x - 6$

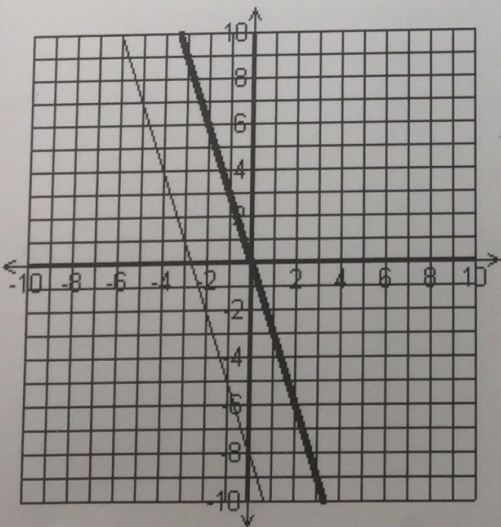
**Conclusion:** The second equation will translate the graph of the first equation  $k$  units downward.

11.



a) Second graph will be a translation of the first graph, 3 units to the right, 4 units upward.

12.



a) Second graph will be a translation of the first graph, 1 unit to the left, 5 units downward.

13.  $y = 5(x - 4) - 2$

14.  $y = \frac{-1}{3}(x + 6) + 4$

