Class Name : **MATH 1050/1051 Fall 2018**

Instructor Name : **Nguyen**

Student Name : _____

Instructor Note :

1. The length of a rectangle is four times its width.
If the perimeter of the rectangle is 60 in, find its area.

2. For each ordered pair, determine whether it is a solution to $5x-3y=7$.

(x, y)	**Is it a solution?**	
	Yes	**No**
$(5, 6)$	○	○
$(-4, -1)$	○	○
$(3, -7)$	○	○
$(-6, 2)$	○	○

3. For each ordered pair, determine whether it is a solution to the system of equations.

$$\begin{cases} 6x-3y=9 \\ y=2x-3 \end{cases}$$

(x, y)	Is it a solution?	
	Yes	No
$(0, -3)$	○	○
$(4, -5)$	○	○
$(7, 11)$	○	○
$(-1, 8)$	○	○

4. Suppose that the function f is defined, for all real numbers, as follows.

$$f(x)=\begin{cases} -2 & \text{if } x\neq 1 \\ -3 & \text{if } x=1 \end{cases}$$

Find $f(-3), f(1)$, and $f(4)$.

$f(-3)$
$f(1)$
$f(4)$

5. The function f is defined below.

$$f(x)=\frac{x-4}{x^2-10x+24}$$

Find all values of x that are NOT in the domain of f.
If there is more than one value, separate them with commas.

6. Find the domain of the function.

$$h\ (x) = \sqrt{35 - 5x}$$

Write your answer using interval notation.

7. Find the domain of the function.

$$f(x) = \frac{\sqrt{1+x}}{-1-3x}$$

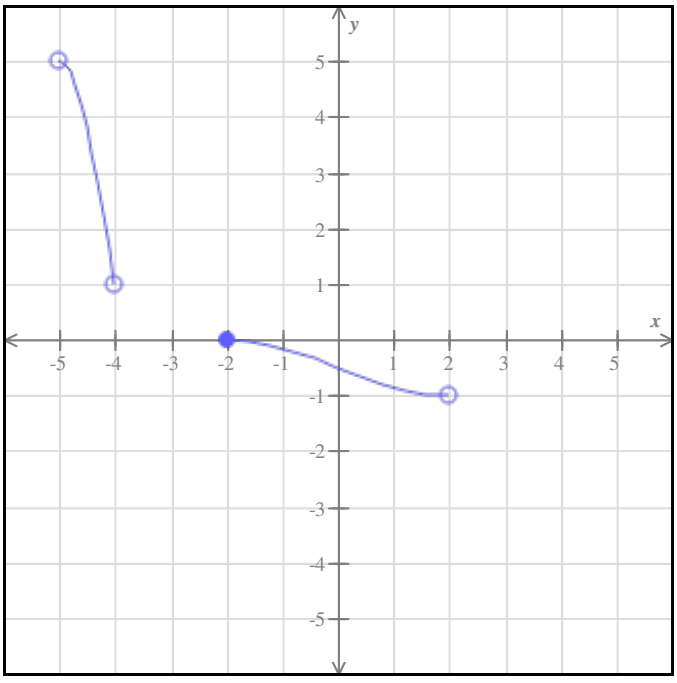
Write your answer as an interval or union of intervals.

8. Find the difference quotient $\frac{f(x+h)-f(x)}{h}$, where $h \neq 0$, for the function below.

$$f(x) = 4x^2 - 5x - 4$$

Simplify your answer as much as possible.

9. The entire graph of the function f is shown in the figure below.
Write the domain and range of f as intervals or unions of intervals.



10. Suppose that the functions g and h are defined for all real numbers x as follows.

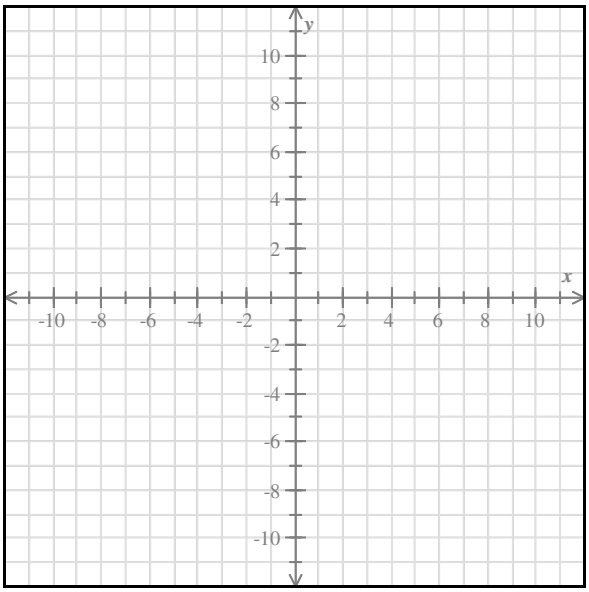
$$g(x) = 3x - 1$$
$$h(x) = x - 5$$

Write the expressions for $(g-h)(x)$ and $(g+h)(x)$ and evaluate $(g \cdot h)(2)$.

$(g-h)(x)$
$(g+h)(x)$
$(g \cdot h)(2)$

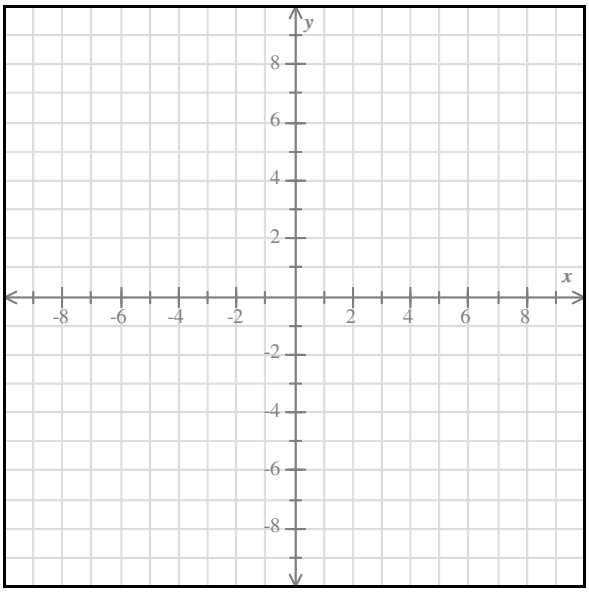
11. Graph the equation.

$$y = -2|x+3| - 5$$



12. Graph the inequality.

$$y \geq -2x + 5$$



13. Suppose that the functions q and r are defined as follows.

$$q(x) = x^2 + 9$$
$$r(x) = \sqrt{x + 8}$$

Find the following.

$$(q \circ r)(8)$$
$$(r \circ q)(8)$$

14. For each pair of functions f and g below, find $f(g(x))$ and $g(f(x))$.
Then, determine whether f and g are inverses of each other.

Simplify your answers as much as possible.
(Assume that your expressions are defined for all x in the domain of the composition.
You do *not* have to indicate the domain.)

(a) $f(x)=2x$	(b) $f(x)=\frac{x+1}{2}$
$g(x)=\frac{x}{2}$	$g(x)=2x-1$
$f(g(x))=$	$f(g(x))=$
$g(f(x))=$	$g(f(x))=$
- f and g are inverses of each other	- f and g are inverses of each other
- f and g are *not* inverses of each other	- f and g are *not* inverses of each other

15. The one-to-one functions g and h are defined as follows.

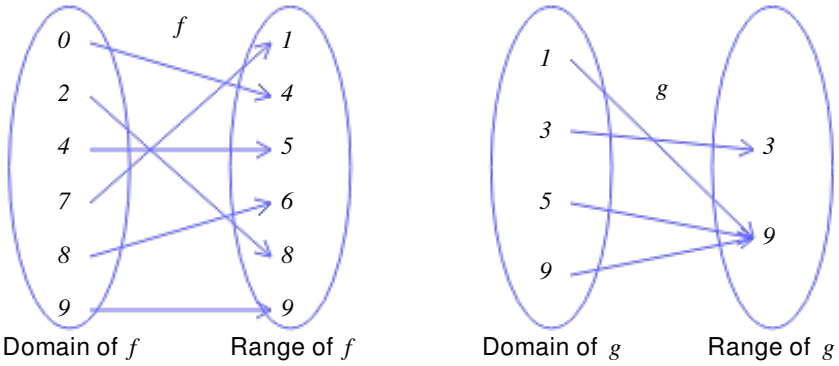
$$g=\{(-2,\ -3),\ (1,\ 4),\ (4,\ 1),\ (8,\ -1)\}$$

$$h(x)=\frac{x+2}{11}$$

Find the following.

$g^{-1}(4)$	$=$	
$h^{-1}(x)$	$=$	
$(h\circ h^{-1})(0)$	$=$	

16. Two functions f and g are defined in the figure below.



Find the domain and range of the composition $g \circ f$. Write your answers in set notation.

17. Suppose $H(x) = 5x^6 - 5$.
Find two functions f and g such that $(f \circ g)(x) = H(x)$.

Neither function can be the identity function.
(There may be more than one correct answer.)

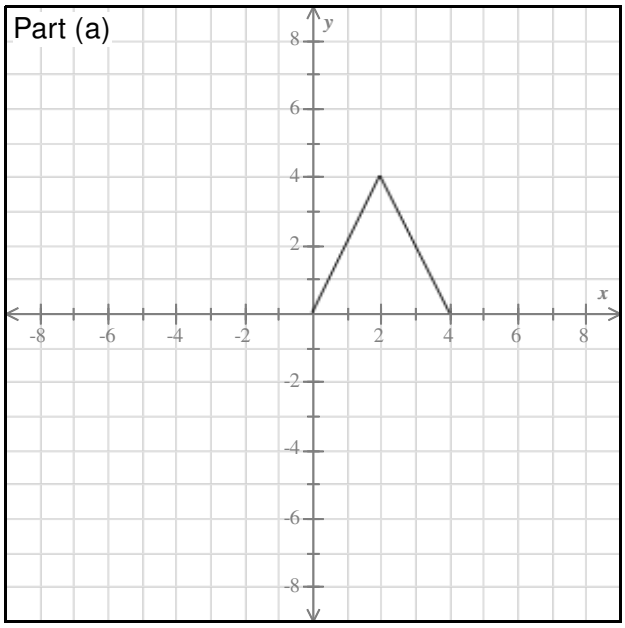
18. Find the average rate of change of $f(x) = -3x^2 + 9$ from $x = -5$ to $x = -1$.

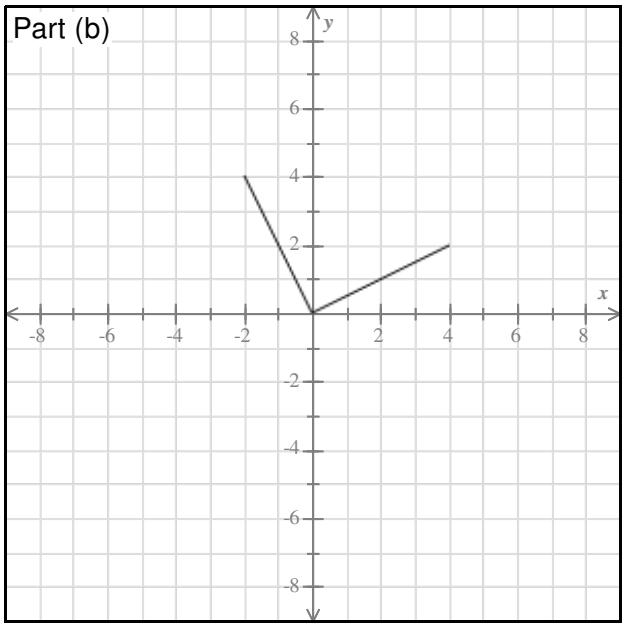
Simplify your answer as much as possible.

19. Complete the following.

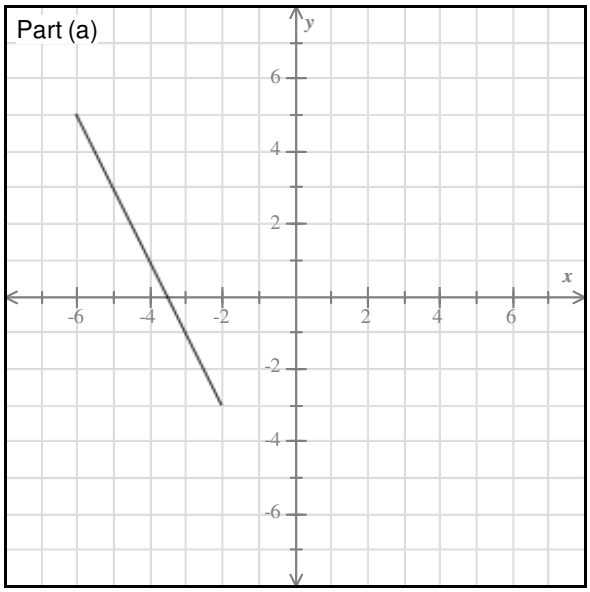
(a) The graph of $y = g(x)$ is shown. Draw the graph of $y = g(-x) + 3$.

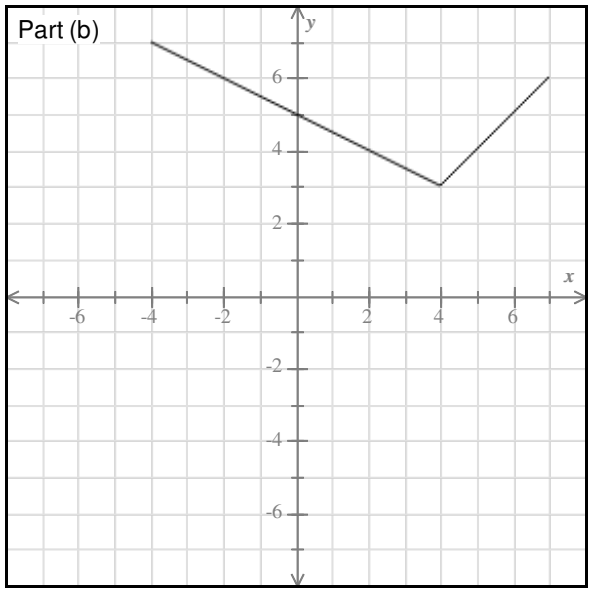
(b) The graph of $y = h(x)$ is shown. Draw the graph of $y = 2h(x) - 4$.





20. (a) The graph of $y = f(x)$ is shown. Draw the graph of $y = -f(x)$.
(b) The graph of $y = g(x)$ is shown. Draw the graph of $y = g(-x)$.



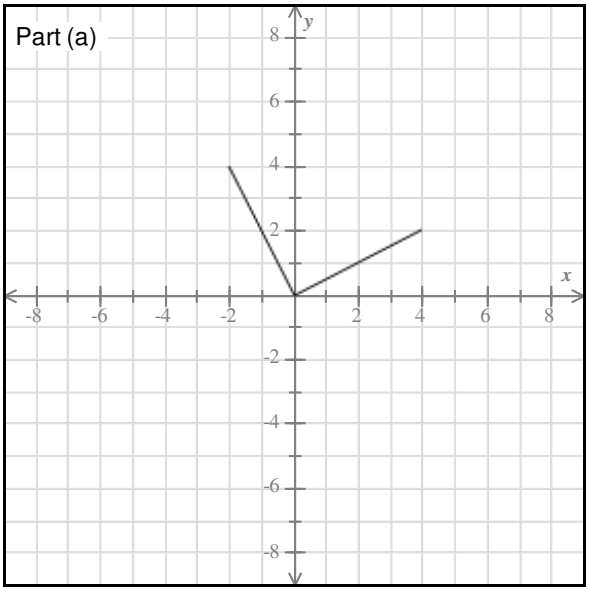


21. Transform each graph as specified below.

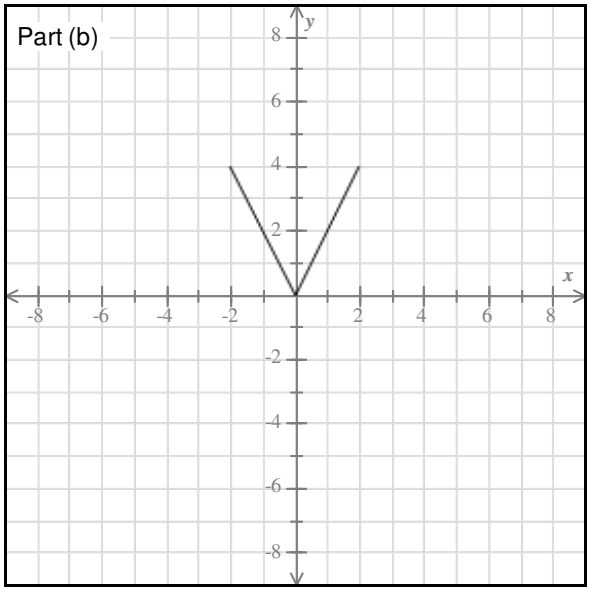
(a) The graph of $y = f(x)$ is shown. Graph $y = f(2x)$.

(b) The graph of $y = g(x)$ is shown. Graph $y = \frac{1}{2} g(x)$.

Part (a)



Part (b)



Obj. 6 #5 Answers for class MATH 1050/1051 Fall 2018

1. 144in^2

2.

(x, y)	Is it a solution?	
	Yes	No
$(5, 6)$	◉	○
$(-4, -1)$	○	◉
$(3, -7)$	○	◉
$(-6, 2)$	○	◉

3.

(x, y)	Is it a solution?	
	Yes	No
$(0, -3)$	◉	○
$(4, -5)$	○	◉
$(7, 11)$	◉	○
$(-1, 8)$	○	◉

4. $f(-3) = -2$
$f(1) = -3$
$f(4) = -2$

5. $x = 4,\ 6$

6. $(-\infty,\ 7]$

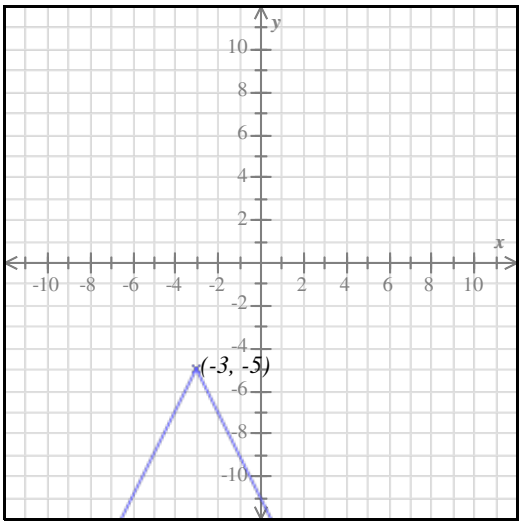
7. $\left[-1,\ -\frac{1}{3}\right) \cup \left(-\frac{1}{3},\ \infty\right)$

8. $8x + 4h - 5$

9. domain $= (-5,\ -4) \cup [-2,\ 2)$
range $= (-1,\ 0] \cup (1,\ 5)$

10. $(g - h)(x) = 2x + 4$
$(g + h)(x) = 4x - 6$
$(g \cdot h)(2) = -15$

11.



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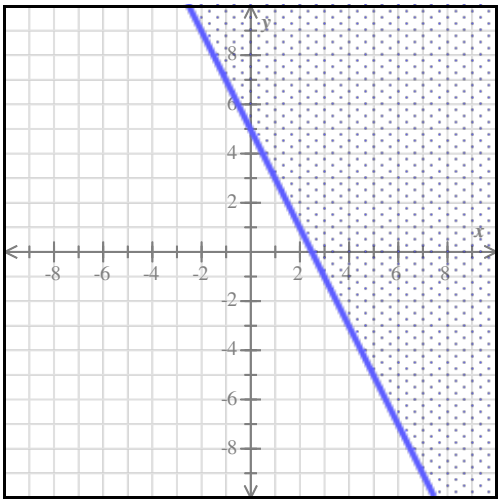


13. $(q \circ r)(8) = 25$
$(r \circ q)(8) = 9$

14.

(a) $f(x) = 2x$ $g(x) = \frac{x}{2}$ $f(g(x)) = x$ $g(f(x)) = x$ ● f and g are inverses of each other ○ f and g are *not* inverses of each other	(b) $f(x) = \frac{x+1}{2}$ $g(x) = 2x - 1$ $f(g(x)) = x$ $g(f(x)) = x$ ● f and g are inverses of each other ○ f and g are *not* inverses of each other

15.

$g^{-1}(4)$	=	1
$h^{-1}(x)$	=	$11x - 2$
$(h \circ h^{-1})(0)$	=	0

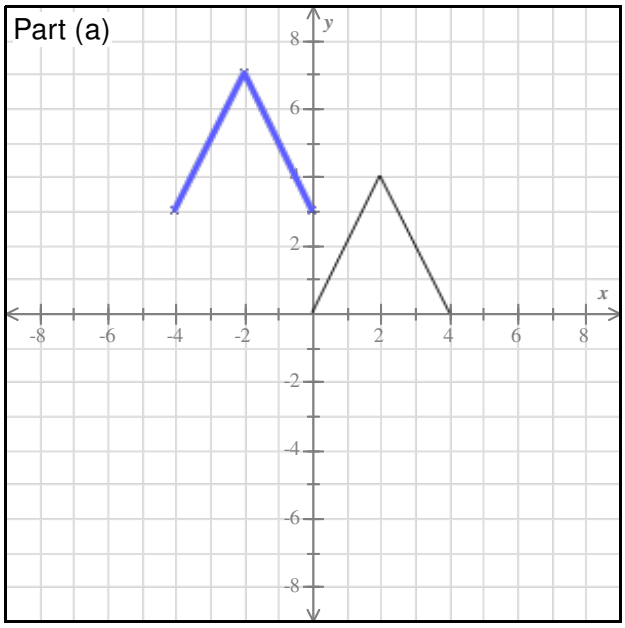
16. Domain of $g \circ f = \{4,\ 7,\ 9\}$
Range of $g \circ f = \{9\}$

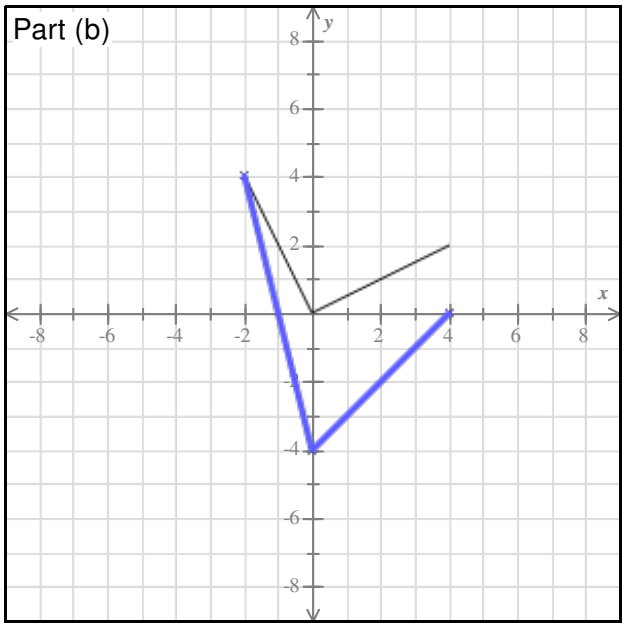
17.
$f(x) = x - 5$

$g(x) = 5x^6$

18. 18

19.





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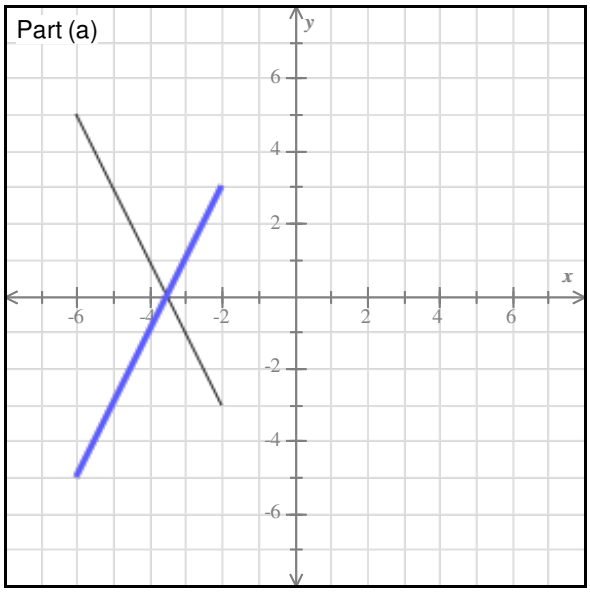

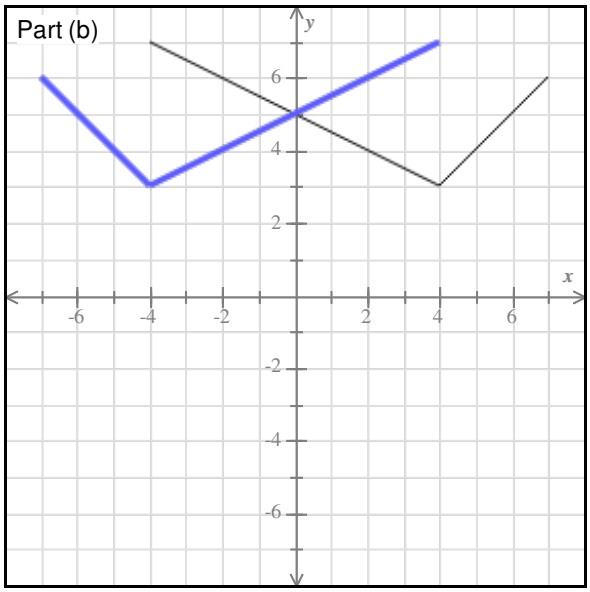

21.