Math 6d: Homework 13

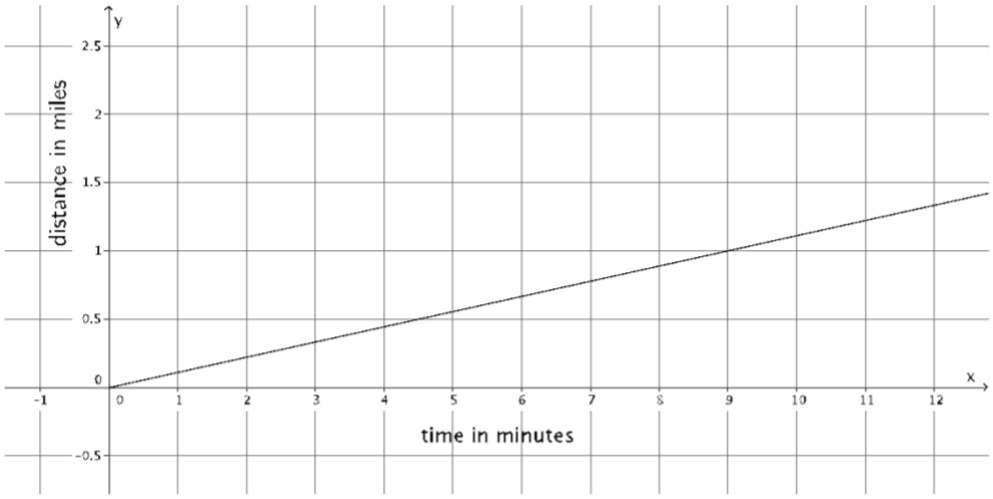
Due: January 13

Please be prepared to hand in.

1.

a. Juan can walk to school, a distance of 0.75 mile, in 8 minutes. Assuming he walks at a constant rate, write the linear equation that represents the situation.

b. The figure below represents Lena's constant rate of walking. Who walks faster? Explain.



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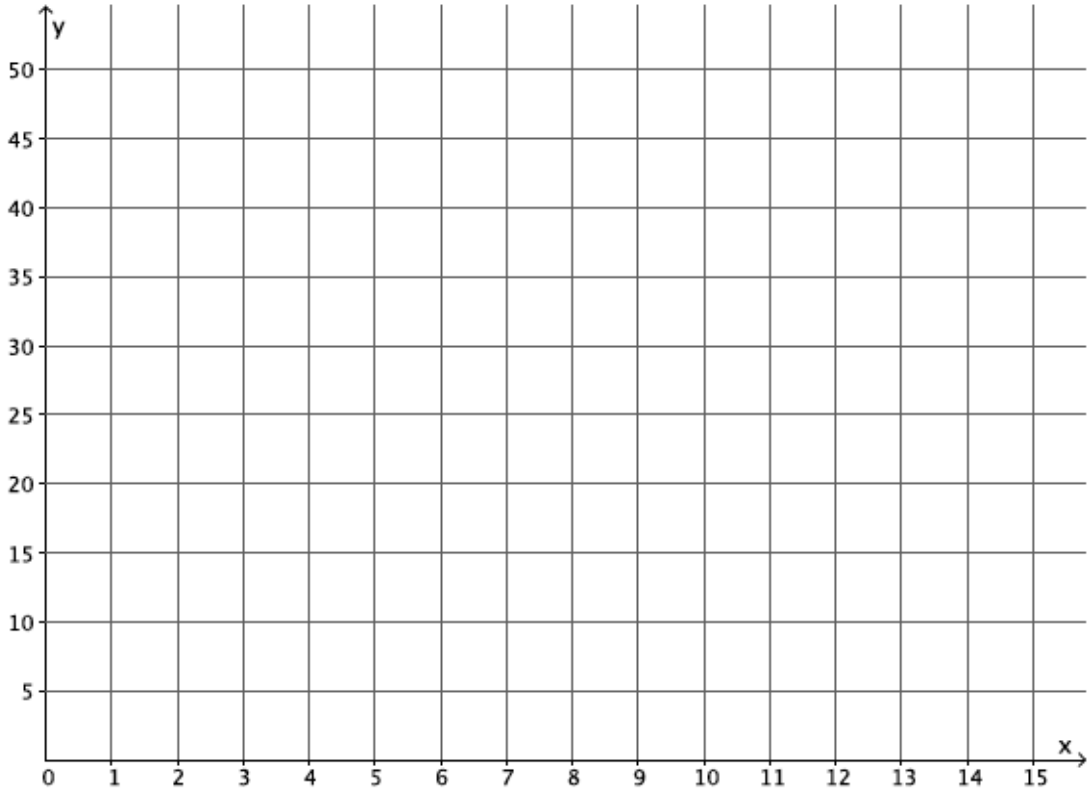
2. Jeremy rides his bike at a rate of *12* miles per hour. Below is a table that represents the number of hours and miles Kevin rides. Assume both bikers ride at a constant rate.

Time in Hours (x)	Distance in Miles (y)
1.5	17.25
2	23
3.5	40.25
4	46

a. Which biker rides at a greater speed? Explain your reasoning.

b. Write an equation for a third biker, Lauren, who rides twice as fast as Kevin. Use y to represent the number of miles Lauren travels in x hours.

c. Create a graph of the equation in part (b).



d. Calculate the slope of the line in part (c), and interpret its meaning in this situation.

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3. Do the equations $y = -\frac{5}{4}x + 2$ and $10x + 8y = 16$ define the same line? Explain

4. Show that if the two lines given by $ax + by = c$ and $a'x + b'y = c'$ are the same when $b = 0$ (vertical lines), then there exists a nonzero number s so that $a' = sa$, $b' = sb$, and $c' = sc$.

5. Show that if the two lines given by $ax + by = c$ and $a'x + b'y = c'$ are the same when $a = 0$ (horizontal lines), then there exists a nonzero number s so that $a' = sa$, $b' = sb$, and $c' = sc$.

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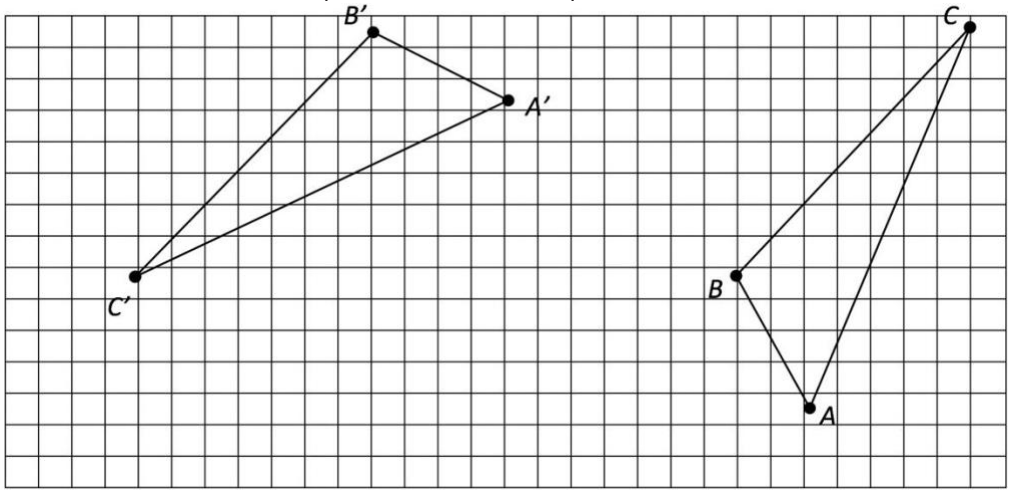
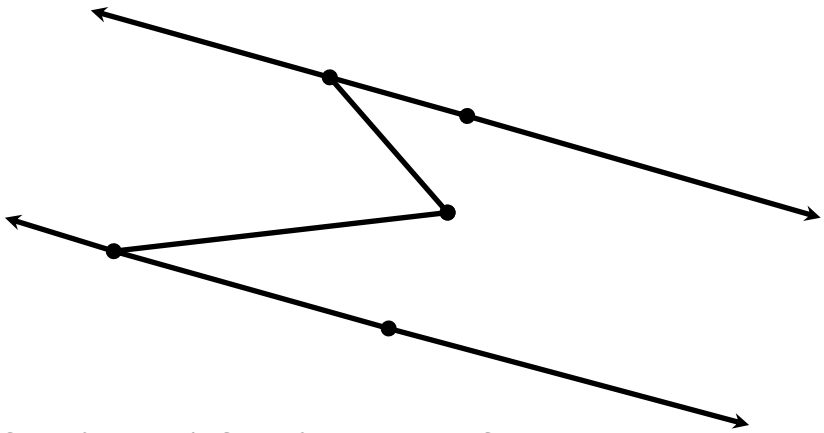
6. $\triangle ABC \cong \triangle A'B'C'$. Use the picture to answer the question below.



Describe a sequence of rigid motions that would prove a congruence between $\triangle ABC$ and $\triangle A'B'C'$.

7. Use the diagram to answer the question below.

$k \parallel l$



Line k is parallel to line l. $m\angle EDC = 41°$ and $m\angle ABC = 32°$. Find the $m\angle BCD$. Explain in detail how you know you are correct. Add additional lines and points as needed for your explanation.

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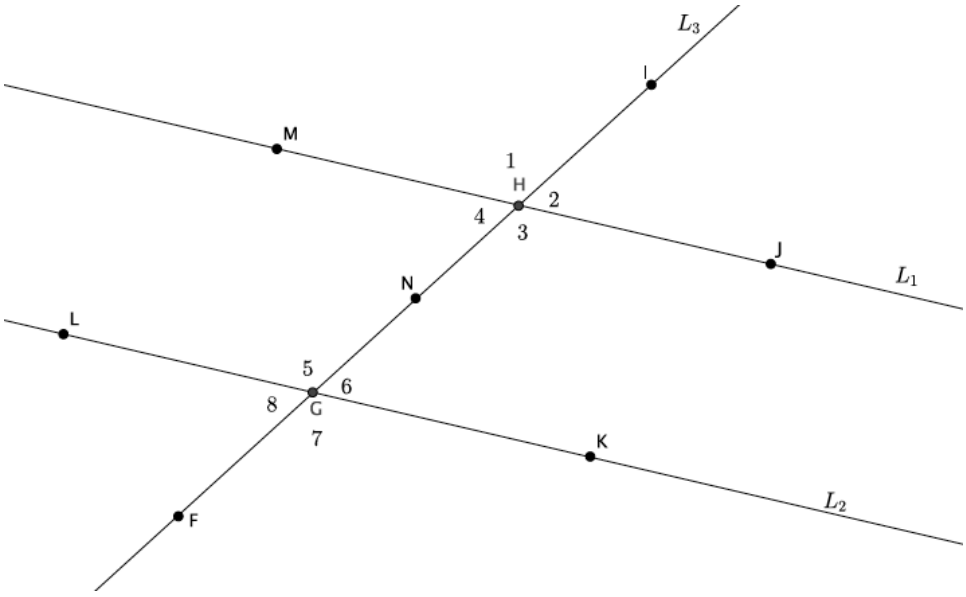
8. Use the diagram below to answer the questions that follow. Lines L_1 and L_2 are parallel, $L_1 \parallel L_2$. Point N is the midpoint of segment GH.



If the measure of $\angle IHM$ is $125°$, what is the measure of $\angle IHJ$? $\angle JHN$? $\angle NHM$?

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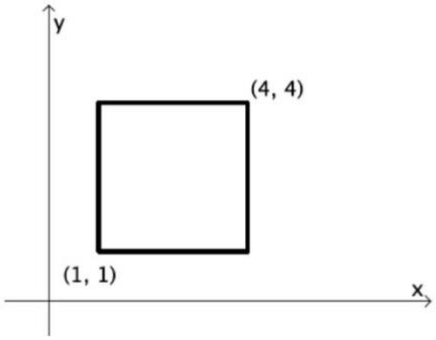
9. Consider the rectangular region:



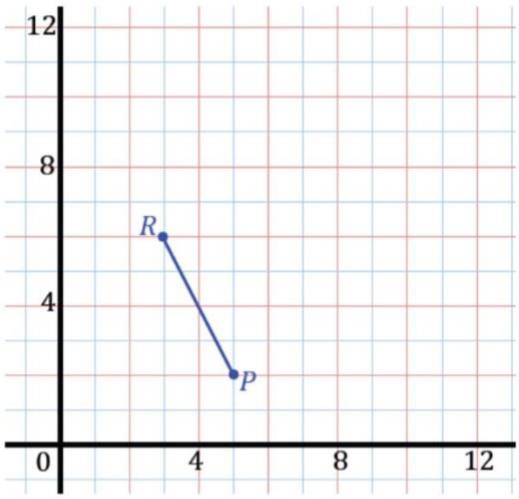
a. Does a line with slope $\frac{1}{2}$ passing through the origin intersect this region? If so, what are the boundary points it intersects? What is the length of the segment within the region?

b. Does a line with slope 3 passing through the origin intersect this region? If so, what are the boundary points it intersects?

10. If the line segment connecting point $P(5, 2)$ to point $R(3, 6)$ is rotated $90°$ counterclockwise about point R:

a. Where will point P land?

b. What is the slope of the original segment, $\overline{PR}$?



c. What is the slope of the rotated segment? Explain how you know.

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11. Given points $A(3, -5)$ and $B(19, -1)$, find the coordinates of point C that sit $\frac{3}{8}$ of the way along $\overline{AB}$, closer to A than to B.

12. Given points $A(3, -5)$ and $B(19, -1)$, find the coordinates of point C such that $\frac{CB}{AC} = \frac{1}{7}$.