This packet belongs to: _____

CC GEOMETRY Midterm Review January 2020

WHEN/WHERE: Tuesday, January ____. Time: _____ in room _____

BRING WITH YOU:

- Your graphing calculator
- Compass!
- Two pencils and two pens (black & blue only)
- As much mathematical knowledge as possible

REVIEW:

- Wednesday, 1/15 in class
- Thursday, 1/16 in class
- Friday, 1/17 in class

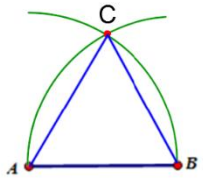
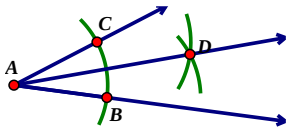
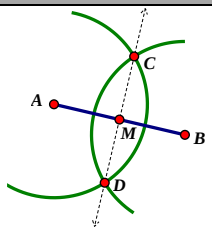
WHAT IT COUNTS FOR:

- Does *not* count as part of your 2nd marking period grade
- Counts as 4% of your final average for the year.

FORMAT:

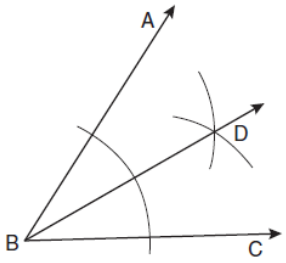
- 10 Multiple-choice questions (2 points each)
- 5 Short-response, show all work (2 points each)
- 5 Short-response, show all work (4 points each)
- 2 Long-response, show all work questions (6 points each)

TOPIC	THINGS TO STUDY	PAGE(S)
UNIT 1A: CONSTRUCTIONS	• Construct an Equilateral Triangle • Copy and Bisect an Angle • Construct a Perpendicular Bisector • Points of Concurrencies	2
UNIT 1B: UNKNOWN ANGLES	• Solving for Unknown angles (vertical angles, linear pairs, angles at a point, etc.) • Angles in a triangle • Isosceles triangles • Parallel lines and transversals (alternate interior angles, corresponding angles, alternate exterior angles, same side interior angles) • Exterior angle theorem	2-3
UNIT 2: TRANSFORMATIONS/RIGID MOTIONS	• Rotations, reflections, translations • Symmetry- Reflectional, Rotational (Angles of Rotation) • Sequence of rigid motions • Transformations on the coordinate plane • Construct line of reflection • Congruence in terms of rigid motions	3--6
UNIT 3: TRIANGLE CONGRUENCE	• Congruence Criteria—SAS, ASA, SSS, SAA and HL, • CPCTC	6-7
UNIT 4: QUADRILATERALS	• Properties of quadrilaterals • Parallelogram proofs	8-10
UNIT 5: SIMILARITY	• Scale drawings (Constructing Dilations) • Scale factors • Similarity Transformations • Similarity Theorems (AA, SAS, SSS) • Side Splitter • Dilating a line • Similarity proofs	11-15

Identify the following Basic Constructions		
		

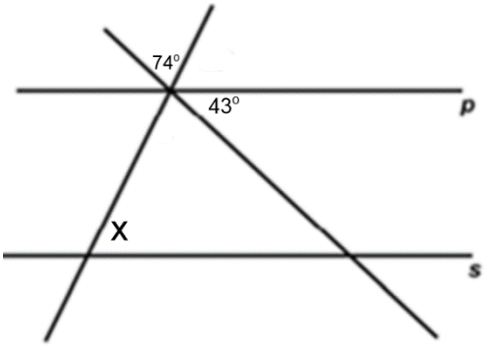
1. Based on the construction below, which statement must be true?

1) $m\angle ABD = \frac{1}{2} m\angle CBD$
2) $m\angle ABD = m\angle CBD$
3) $m\angle ABD = m\angle ABC$
4) $m\angle CBD = \frac{1}{2} m\angle ABD$



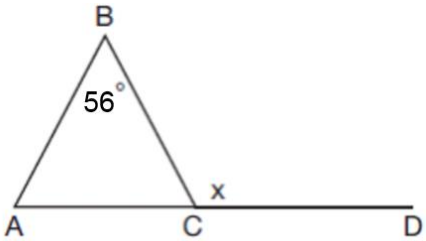
Vertical Angles	Angle Sum of a Triangle	Angles on a Line	Parallel Lines cut by Transversal	Isosceles Triangle
Vertical Angles are _____.	Angles in a triangle add to _____°.	Angles on a line add to _____°.	Alternate Interior angles are _____. Corresponding angles are _____.	2 = _____. 2 = _____ angles.

2. In the diagram below, $p \parallel s$. Determine the value of x.



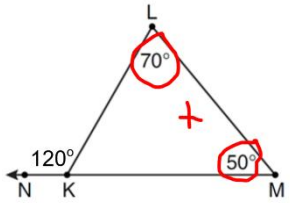
3. Given $\triangle ABC$ with $m\angle B = 56^o$ and side $\overline{AC}$ extended to *D*, as shown below. Which value of *x* makes $\overline{AB} \cong \overline{CB}$?

1) 59º
2) 62º
3) 118º
4) 121º



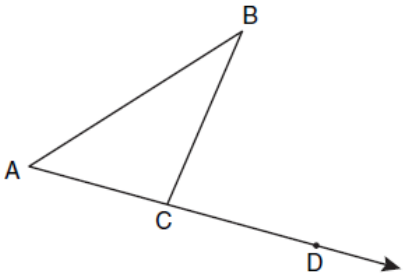
Exterior Angle Theorem

The measure of an ***exterior angle*** of a triangle is equal to the _____ of the measures of the two _____ interior angles of the triangle.



$$m\angle LKN = m\angle L + m\angle M$$

4. In the diagram below, ΔABC is shown with $\overline{AC}$ extended through point *D*. If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the measure of $\angle ABC$? Explain your solution.



Rigid Motions			
Preserve _____ and _____ measure.	Reflection	Rotation	Translation

5. The image of $\triangle DEF$ is $\triangle D'E'F'$. Under which transformation will the triangles *not* be congruent?

1) a reflection through the origin

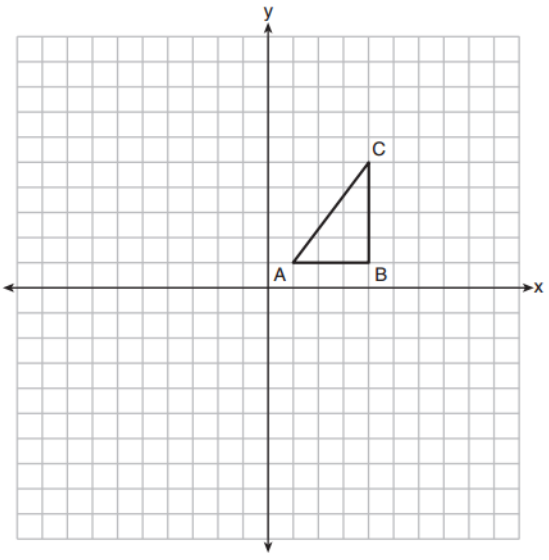
2) a reflection over the line $y = x$

3) a dilation with a scale factor of 1 centered at $(2, 3)$

4) a dilation with a scale factor of $\frac{3}{2}$ centered at the origin

Horizontal Lines	Vertical Lines
Equation in the form _____ $= \#$	Equation in the form _____ $= \#$

6. Triangle *ABC* is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over $x = -1$.

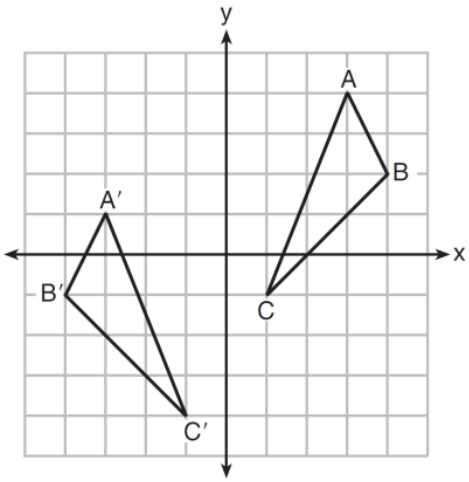


Explain why $\triangle ABC \cong \triangle A'B'C'$:

Describing Rigid Motions!		
Reflection needs • Line or point of reflection	Rotation needs • Center • Angle (#degrees) • Direction (counter-clockwise is positive, clockwise is negative)	Translation needs • A vector with distance and direction

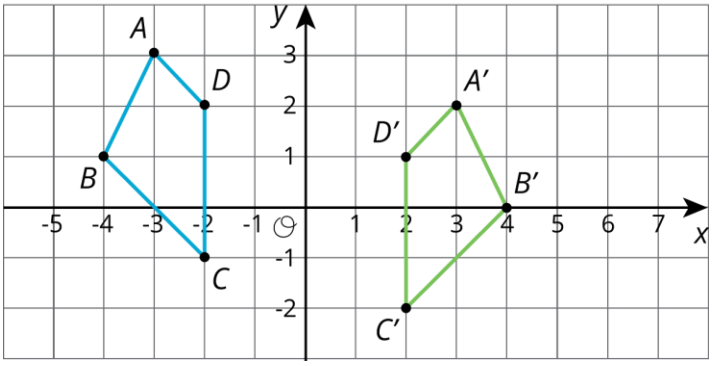
7. As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.

a) Determine and state the sequence of transformations.



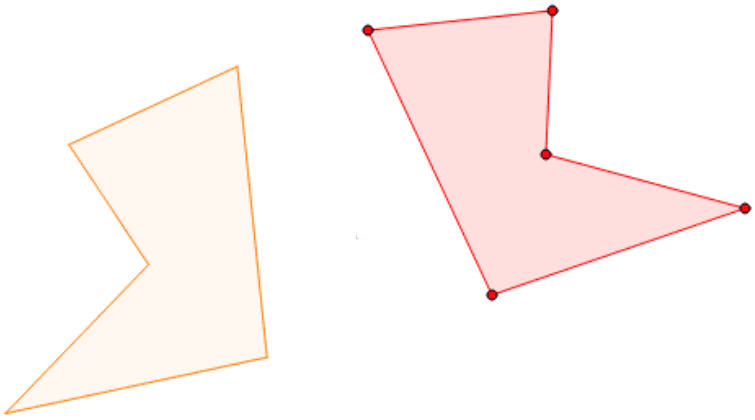
b) Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motions to explain your answer.

c) Determine and state the sequence of transformations that mapped trapezoid ABCD to A'B'C'D'.

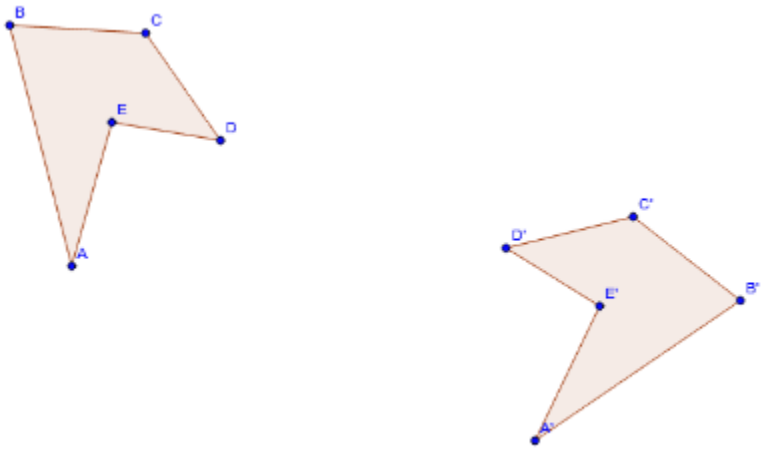


Using a compass and a straight edge, construct a line of reflection for the following figures:

A.



B.



Formula to determine the MINIMUM Rotation for a REGULAR polygon to map onto itself
$\text{minimum} \angle = \frac{360}{\#\,sides}$ Any _____ of this angle will also map the polygon onto itself.

8. A regular hexagon is rotated *n* degrees about its center, carrying the hexagon onto itself. The value of *n* could be

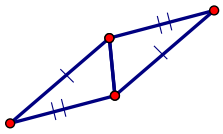
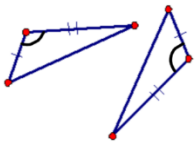
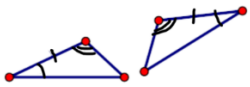
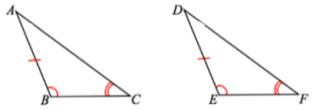
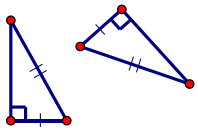
1) 30°
2) 60°
3) 140°
4) 150°

9. A regular decagon is rotated *n* degrees about its center, carrying the decagon onto itself. The value of *n* could be

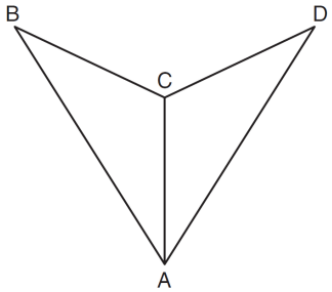
1) 10°
2) 150°
3) 225°
4) 252°

10. Which polygon has a minimum rotation of 72° about its center to carry the polygon onto itself?
1) square
2) pentagon
3) heptagon
4) octagon

TRIANGLE PROOFS

Identify the 5 Methods to Prove Triangles are Congruent				
				

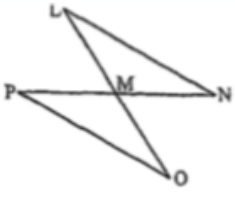
12. As shown in the diagram below, $\overline{AC}$ bisects $\angle BAD$ and $\angle B \cong \angle D$. Which method could be used to prove $\Delta ABC \cong \Delta ADC$?



1) $ASA \cong ASA$
2) $AAS \cong AAS$
3) $SAS \cong SAS$
4) $SSS \cong SSS$

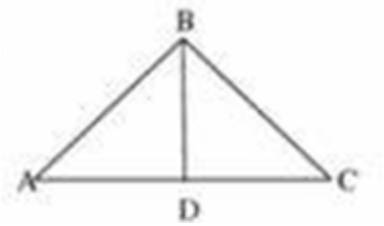
13. In the accompanying diagram, M is the midpoint of $\overline{LO}$ and $\overline{NP}$. Which triangle congruency can be used to prove $\Delta LMN \cong \Delta OMP$?

(1) $AAA \cong AAA$
(2) $SSS \cong SSS$
(3) $ASA \cong ASA$
(4) $SAS \cong SAS$



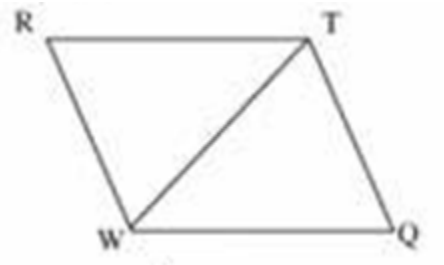
PROOF PRACTICE:

14. Given: $\overline{BD} \perp \overline{AC}$
D is the midpoint of $\overline{AC}$
Prove: $\Delta ABD \cong \Delta CBD$



STATEMENT	REASON

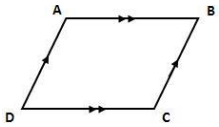
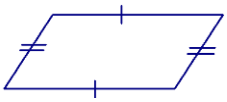
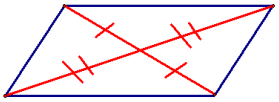
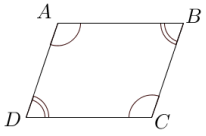
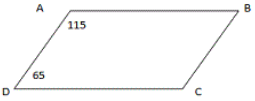
15. Given: $\overline{RT} \cong \overline{WQ}$ and $\overline{RT} \parallel \overline{WQ}$
Prove: $\overline{RW} \cong \overline{TQ}$



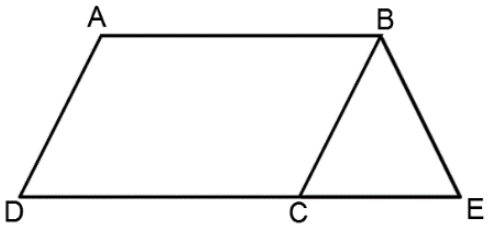
STATEMENT	REASON

QUADRILATERAL PROOFS

Under each diagram state the property of a parallelogram being illustrated by the labels of the diagram.

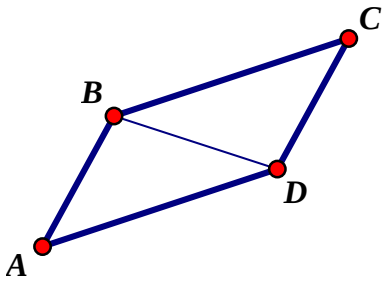
Parallelogram Properties				
				

16. In the diagram of parallelogram $ABCD$ shown below, $\overline{DC}$ is extended to *E*, and $\overline{BE}$ is drawn such that $\overline{BC} \cong \overline{BE}$. If $m\angle A = 112^o$. Determine the measure of $\angle EBC$.

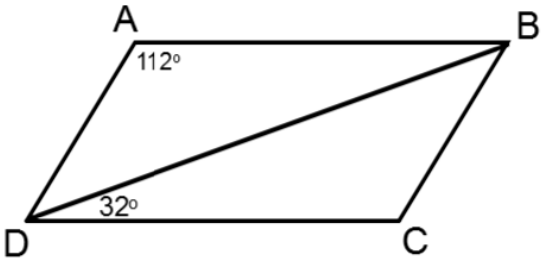


17. The diagram below shows parallelogram $ABCD$ with diagonal $\overline{BD}$, $m\angle C = 65^o$, and $m\angle ABD = 80^o$. Determine the following angle measures and explain each:

Angle Measure	Explanation
$m\angle A =$ _____	
$m\angle ADB =$ _____	



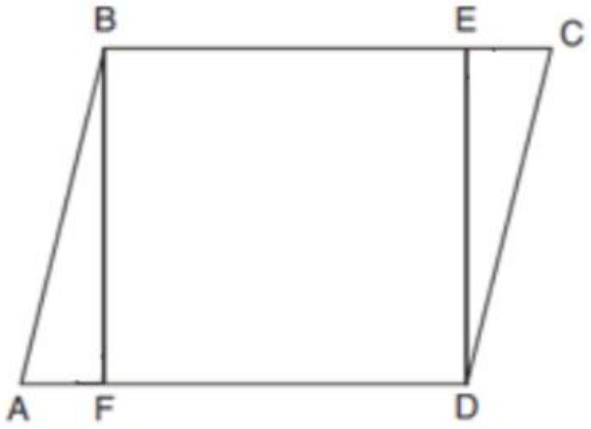
18. The diagram below shows parallelogram *ABCD* with diagonal $\overline{BD}$, $m\angle A = 112^o$ and $m\angle BDC = 32^o$. What is the measure of $\angle CBD$? Explain any property used to reach your solution.



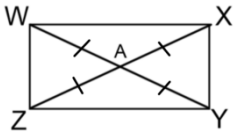
PROOF PRACTICE:

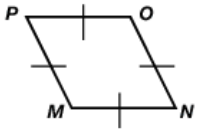
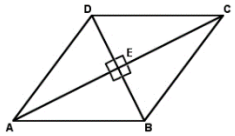
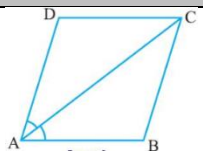
18. Given: Parallelogram *ABCD*, $\measuredangle ABF \cong \measuredangle CDE$

Prove: $AF \cong EC$



STATEMENT	REASON

Rectangle has all the properties of a parallelogram PLUS:	
	

Rhombus has all the properties of a parallelogram PLUS:		
		

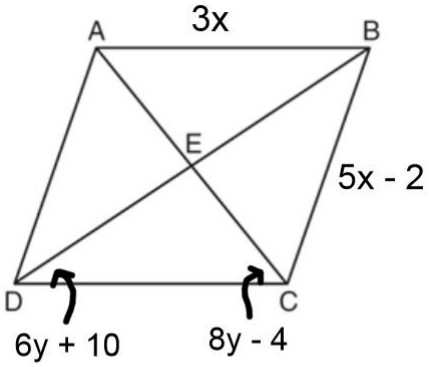
17. Which of the following group of quadrilaterals have congruent diagonals?

I. Parallelogram
II. Rectangle
III. Rhombus
IV. Square

1) All of the above
2) II, III and IV
3) II and IV, only
4) III and IV, only

18. In the diagram below, quadrilateral *ABCD* is a rhombus with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at *E*. $AB = 3x$, $BC = 5x - 2$, $m\angle CDB = 6y + 10$, and $m\angle DCA = 8y - 4$

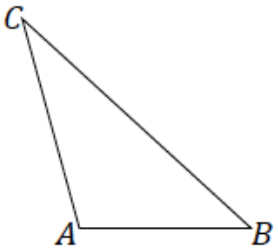
(a) Find x:



(b) Find y:

Dilations

19. Use construction tools to create a scale drawing of ΔABC with a scale factor of $k = 2$. Use B as the center of dilation. [Leave all construction marks].



Steps to Construct a Dilation
with $k > 1$

1. Use ruler to make a line from center through any vertex(A) and continue past the vertex.

2. Bullseye on center(B), measure to vertex (A) , make a small arc.

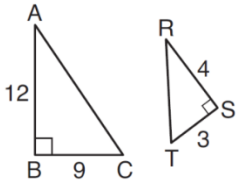
3. Move bullseye to small arc at A, keep frozen and make 2nd small arc on extended online.

4. This will be A' for a dilation of 2. (Repeat small arcs if $k > 2$)

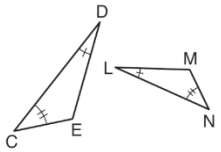
A dilation is a _____ transformation. A dilation preserves _____ measure.

3 ways to prove triangles are similar			Similar triangles
$AA \sim$	$SAS \sim$	$SSS \sim$	Corresponding Sides are ____ _____ Corresponding angles are _____.

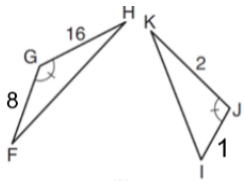
20. Using the information given below, which set of triangles, **cannot** be proven similar?



(1)



(2)



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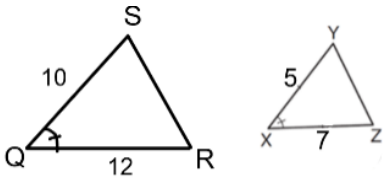
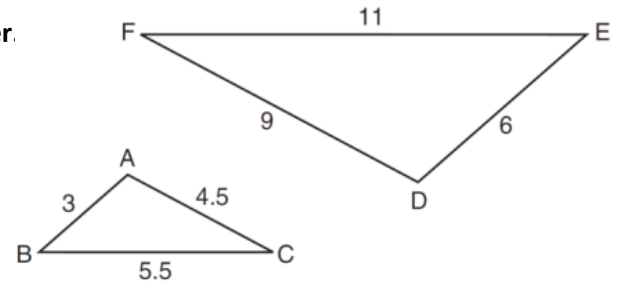


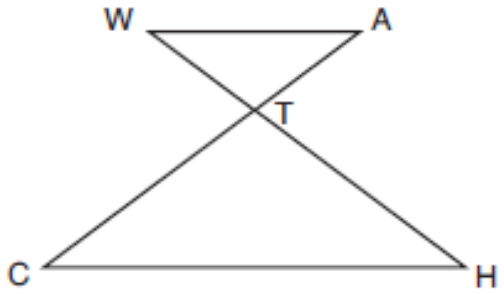
(4)

21. Based on the diagram shown, is $\Delta ABC \sim \Delta DEF$? **Justify your answer**.

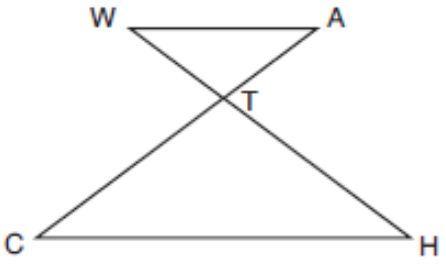


22. In the accompanying diagram, $\overline{WA} \parallel \overline{CH}$ and $\overline{WH}$ and $\overline{AC}$ intersect at point *T*.

a) Prove that $\Delta WAT \sim \Delta HCT$.



b) Use the information from above and the diagram shown. Given $WA = 3.4\,\text{cm}$, $WT = 2.3\,\text{cm}$ $TH = 5.25\,\text{cm}$, find the length of CH to the nearest hundredth of a centimeter.

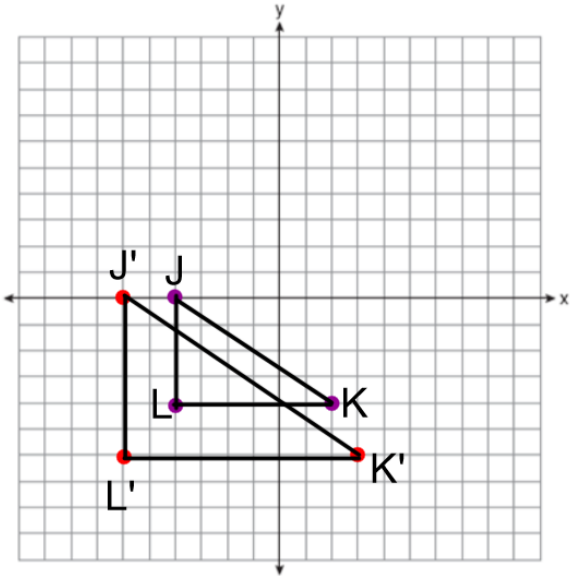


To find Center of Dilation	To Find Scale Factor	Describing the dilation
Connect 2 pairs of corresponding points and find the point of intersection.	$k = \frac{\quad}{\quad}$ (count lengths using only vertical/horizontal segments)	**Need:** **Center** **Scale Factor**

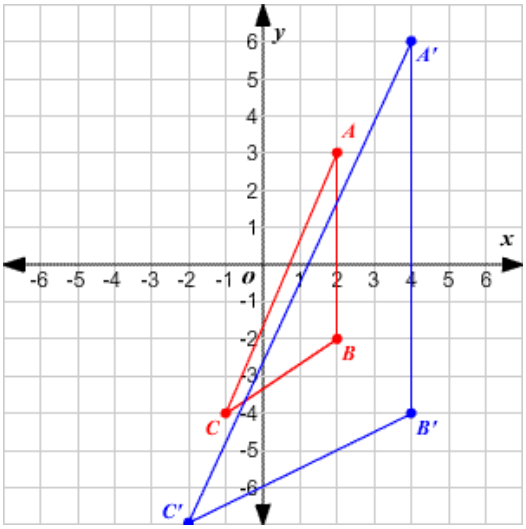
23. In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a SINGLE transformation.

a) Precisely describe the single transformation that was performed.

b) Explain why ΔJKL is similar to $\Delta J'K'L'$.



24. In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a SINGLE transformation. Precisely describe the single transformation that was performed.

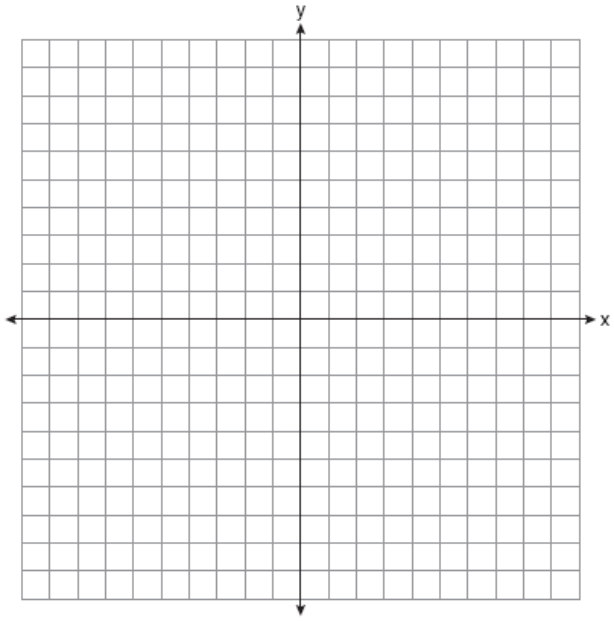


Dilating Lines and Segments	
If CENTER ON THE LINE **Keep _____ the SAME.**	If CENTER OFF THE LINE **Keep the _____ the same.** (because image is parallel to pre-image) **Multiply the ___ - _____ by the scale factor (k).**

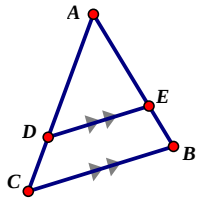
25. Line *a* is represented by the equation $5x+2y=14$. Write equation in $y = mx + b$ form.

a) Determine and state the equation of line *p*, the image of line *a*, after a dilation of scale factor $\frac{1}{5}$ centered at the point $(4,-3)$. [The use of the set of axes below is optional.]

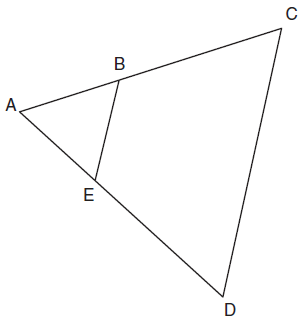
b) Explain your answer.



c) Determine and state the equation of line *q*, the image of line *a*, after a dilation of scale factor 3 centered at the origin.

Triangle Side Splitter working with BASES($\|$ sides)	**Steps to Solve problems involving the bases (parallel sides)**
	• Separate the _____ Δ and the _____ Δ • Create a proportion using _____ sides

26. In the diagram below of $\triangle ACD$, *E* is a point on $\overline{AD}$ and *B* is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$. If $AE = 2$, $DE = 6$, and $EB = 9$, find the length of $\overline{CD}$.



27. Solve for x: