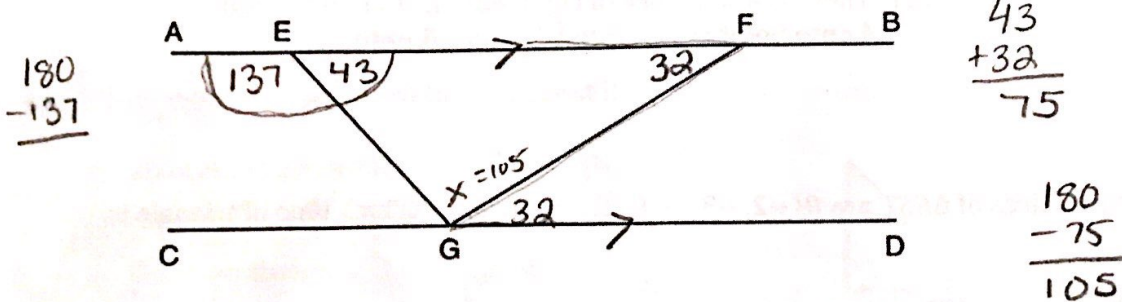


Geometry Common Core Midterm Review

Name: _____ Date: _____ Period: _____

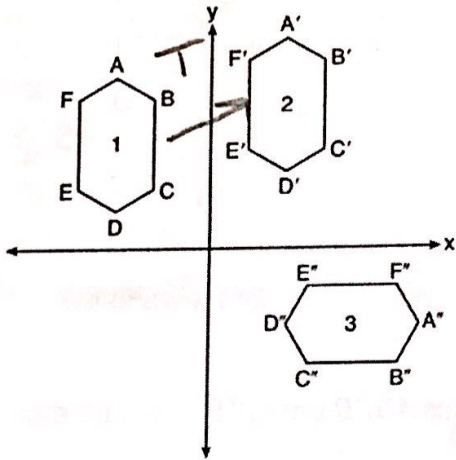
1. In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$ and \overline{GE} and \overline{GF} are drawn.



If $m\angle EFG = 32^\circ$ and $m\angle AEG = 137^\circ$, what is $m\angle EGF$?

$$\angle EGF = 105^\circ$$

2. In the diagram below, congruent figures 1, 2, and 3 are drawn.



Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?

- (1) a reflection followed by a translation
- (2) a rotation followed by a translation
- (3) a translation followed by a reflection
- (4) a translation followed by a rotation

3. Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?

(1) octagon (8) $\frac{360}{8} = 45^\circ$

(3) hexagon (6) $\frac{360}{6} = 60^\circ$

(2) decagon (10)

$\frac{360}{10} = 36^\circ$

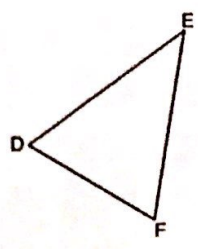
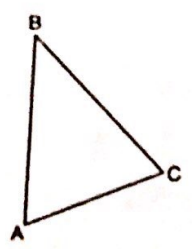
(4) pentagon (5)

$\frac{360}{5} = 72^\circ$

MIDTERM EXAM DATES

Tuesday, 1/15
Wednesday, 1/16
Thursday, 1/17

4. Which statement is sufficient evidence that $\triangle DEF$ is congruent to $\triangle ABC$?



- (1) $AB = DE$ and $BC = EF$
- (2) $\angle D \cong \angle A, \angle B \cong \angle E, \angle C \cong \angle F$
- (3) There is a sequence of rigid motions that maps \overline{AB} onto \overline{DE} , \overline{BC} onto \overline{EF} and \overline{AC} onto \overline{DF} .
- (4) There is a sequence of rigid motions that maps point A onto point D , \overline{AB} onto \overline{DE} , and $\angle B$ onto $\angle E$.

5. The coordinates of the vertices of $\triangle RST$ are $R(-2, -3), S(8, 2)$, and $T(4, 5)$. Which type of triangle is $\triangle RST$?

- (1) right
- (2) acute

negative reciprocal slopes

- (3) obtuse
- (4) equiangular

$$\left. \begin{aligned} \frac{RS}{-3-2} &= \frac{-5}{-10} = \frac{1}{2} \\ \frac{ST}{2-5} &= \frac{-3}{-3} = 1 \\ \frac{RT}{-3-5} &= \frac{-8}{-8} = 1 \end{aligned} \right\} \begin{aligned} \frac{ST}{2-4} &= \frac{-3}{-2} = \frac{3}{2} \\ \frac{RT}{-2-4} &= \frac{-6}{-6} = 1 \end{aligned}$$

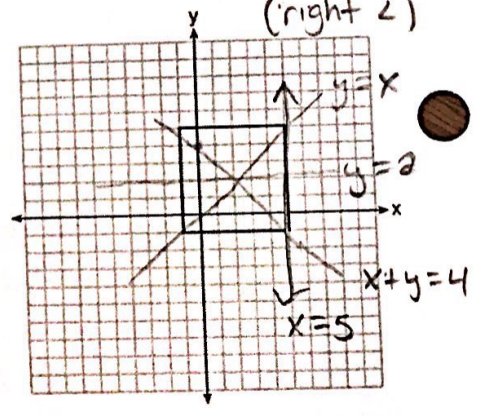
negative reciprocals (right \angle)

6. In the diagram to the right, a square is graphed in the coordinate plane. A reflection over which line does not carry the square onto itself?

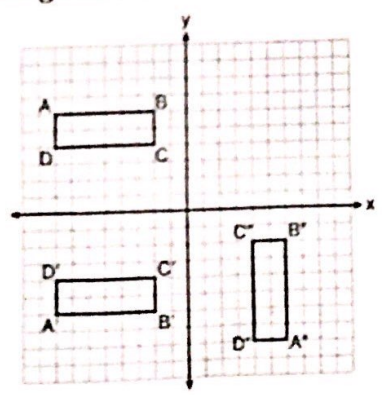
- (1) $x = 5$
- (2) $y = 2$

- (3) $y = x$
- (4) $x + y = 4$

$y = -x + 4$



7. A sequence of transformations maps rectangle $ABCD$ onto rectangle $A''B''C''D''$, as shown in the diagram below.



Which sequence of transformations maps $ABCD$ onto $A'B'C'D'$ and then maps $A'B'C'D'$ onto $A''B''C''D''$?

- (1) a reflection followed by a rotation
- (2) a reflection followed by a translation
- (3) a translation followed by a rotation
- (4) a translation followed by a reflection

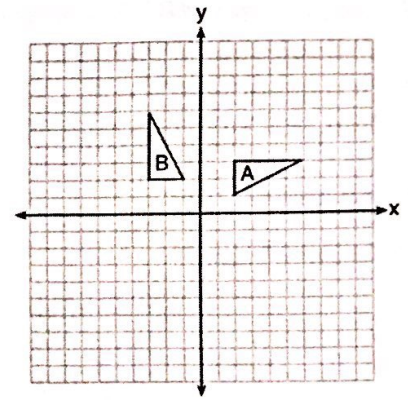
8. In the diagram below, which single transformation was used to map triangle A onto triangle B?

(1) line reflection

(2) rotation

(3) dilation

(4) translation



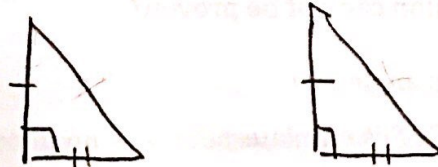
9. Two right triangles must be congruent if

(1) an acute angle in each triangle is congruent

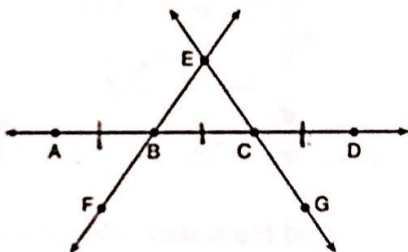
(2) the lengths of the hypotenuses are equal

(3) the corresponding legs are congruent

(4) the areas are equal



10. In the diagram below, \overline{FE} bisects \overline{AC} at B, and \overline{GE} bisects \overline{BD} at C.



Which statement is always true?

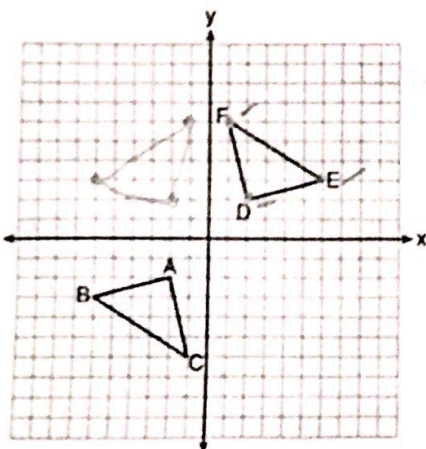
(1) $\overline{AB} \cong \overline{DC}$

(2) $\overline{FB} \cong \overline{EB}$

(3) \overline{BD} bisects \overline{GE} at C

(4) \overline{AC} bisects \overline{FE} at B

11. Triangle ABC and triangle DEF are graphed on the set of axes below.



Which sequence of transformations maps triangle ABC onto triangle DEF?

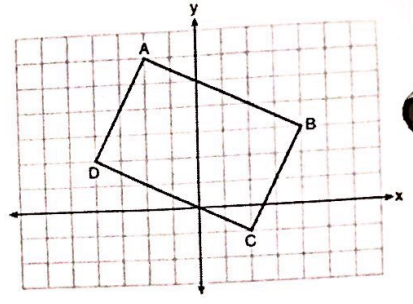
(1) a reflection over the x-axis followed by a reflection over the y-axis

(2) a 180° rotation about the origin followed by a reflection over the line $y = x$

(3) a 90° clockwise rotation about the origin followed by a reflection over the y-axis

(4) a translation 8 units to the right and 1 units up followed by a 90° counterclockwise rotation about the origin

12. Quadrilateral $ABCD$ is graphed on the set of axes to the right. When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

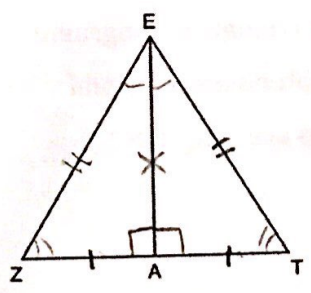


- (1) no and $C'(1, 2)$
- (2) no and $D'(2, 4)$
- (3) yes and $A'(6, 2)$
- (4) yes and $B'(-3, 4)$

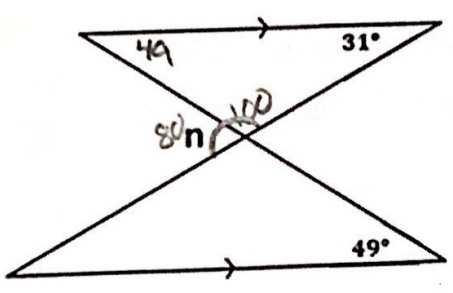
13. Line segment \overline{EA} is the perpendicular bisector of \overline{ZT} , and \overline{ZE} and \overline{TE} are drawn.

Which conclusion can *not* be proven?

- (1) \overline{EA} bisects angle ZET
- (2) Triangle EZT is equilateral
- (3) \overline{EA} is a median of triangle EZT
- (4) Angle Z is congruent to angle T



14. Find the value of $\angle n$.

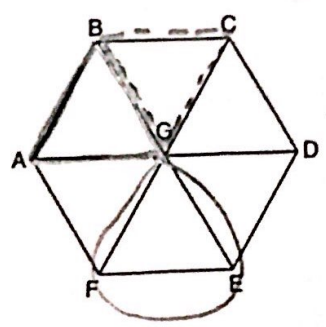


$$\begin{array}{r} 41 \\ + 31 \\ \hline 80 \end{array} \qquad \begin{array}{r} 180 \\ - 80 \\ \hline 100 \end{array}$$

$\angle n = 80$

$$\begin{array}{r} 180 \\ - 100 \\ \hline 80 \end{array}$$

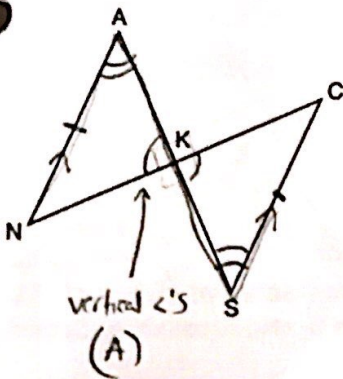
15. In regular hexagon $ABCDEF$ shown below, \overline{AD} , \overline{BE} , and \overline{CF} all intersect at G .



When $\triangle ABG$ is reflected over \overline{BG} and then rotated 180° about point G , $\triangle ABG$ is mapped onto

- (1) $\triangle FEG$
- (2) $\triangle AFG$
- (3) $\triangle CBG$
- (4) $\triangle DEG$

16. In the diagram below, \overline{AKS} , \overline{NKC} , \overline{AN} , and \overline{SC} are drawn such that $\overline{AN} \cong \overline{SC}$.
(S)



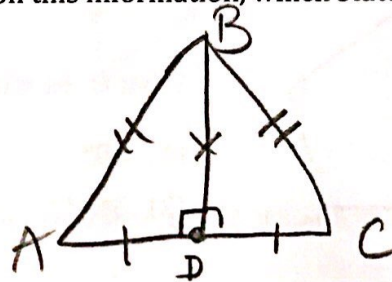
Which statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?

- (1) \overline{AS} and \overline{NC} bisect each other (S)
- (2) K is the midpoint of \overline{NC} . (S)
- (3) $\overline{AS} \perp \overline{NC}$ (A but same angle as vertex \angle 's)
- (4) $\overline{AN} \parallel \overline{SC}$ (A alternate interior)

need another pair of \angle 's

17. In $\triangle ABC$, \overline{BD} is the perpendicular bisector of \overline{AC} . Based upon this information, which statements below can be proven?

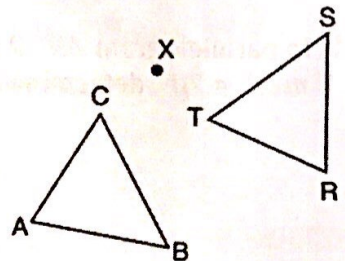
- I. \overline{BD} is a median T
- II. \overline{BD} bisects $\angle ABC$ †
- III. $\triangle ABC$ is isosceles



- (1) I and II, only
- (2) I and III, only
- (3) II and III, only
- (4) I, II, and III

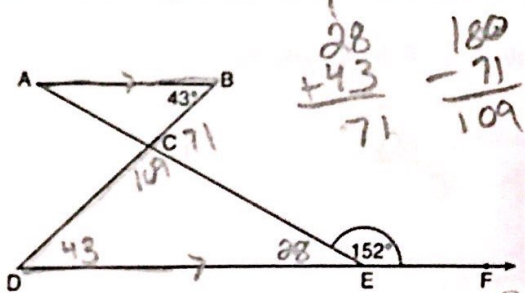
18. After a counterclockwise rotation about point X, scalene triangle ABC maps onto $\triangle RST$, as shown in the diagram below.

Which statement must be true?



- (1) $\angle A \cong \angle R$
- (2) $\angle A \cong \angle S$
- (3) $\overline{CB} \cong \overline{TR}$
- (4) $\overline{CA} \cong \overline{TS}$

19. In the diagram below, $\overline{AB} \parallel \overline{DEF}$, \overline{AE} and \overline{BD} intersect at C, $m\angle B = 43^\circ$, and $m\angle CEF = 152^\circ$.



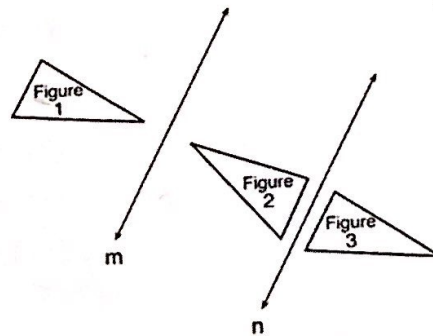
Which statement is true?

- (1) $m\angle D = 28^\circ$
- (2) $m\angle A = 43^\circ$
- (3) $m\angle ACD = 71^\circ$
- (4) $m\angle BCE = 109^\circ$

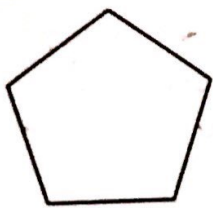
20. In the diagram below, line m is parallel to line n . Figure 2 is the image of Figure 1 after a reflection over line m . Figure 3 is the image of Figure 2 after a reflection over line n .

Which single transformation would carry Figure 1 onto Figure 3?

- (1) a dilation
- (2) a rotation
- (3) a reflection
- (4) a translation



21. The regular polygon is rotated about its center.



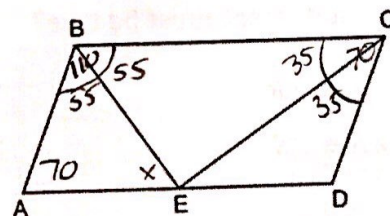
What is the minimum angle of rotation that will carry the figure onto itself?

- (1) 60°
- (2) 360°
- (3) 72°
- (4) 180°

$$5 \quad \frac{360}{5} = 72$$

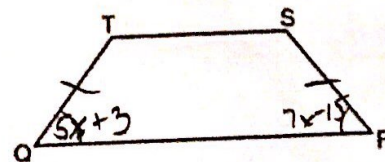
22. In parallelogram $ABCD$ shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at E , a point of \overline{AD} . If $m\angle A = 70^\circ$, determine and state $m\angle BEA$.

$$\begin{array}{r} 70 \\ + 55 \\ \hline 125 \\ - 180 \\ \hline -55 \\ \hline \angle BEA = 55^\circ \end{array}$$



23. In isosceles trapezoid $QRST$ shown below, \overline{QR} and \overline{TS} are bases. If $m\angle Q = 5x + 3$ and $m\angle R = 7x - 15$, find x .

$$\begin{array}{r} 5x + 3 = 7x - 15 \\ -5x \quad -5x \\ \hline 3 = 2x - 15 \\ +15 \quad +15 \\ \hline 18 = 2x \\ \frac{18}{2} = \frac{2x}{2} \\ 9 = x \end{array}$$



24. In the diagram of PQRS below, the diagonals \overline{PR} and \overline{QS} intersect at point T, $PR = 10$, and $QS = 24$. Determine and state the perimeter of PQRS.

$$5^2 + 12^2 = c^2$$

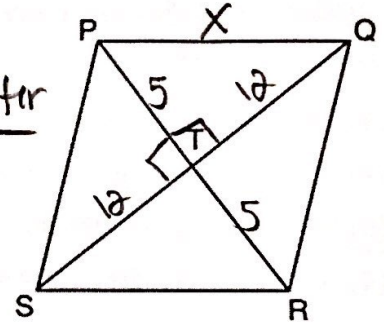
$$25 + 144 = c^2$$

$$\sqrt{169} = \sqrt{c^2}$$

$$13 = c$$

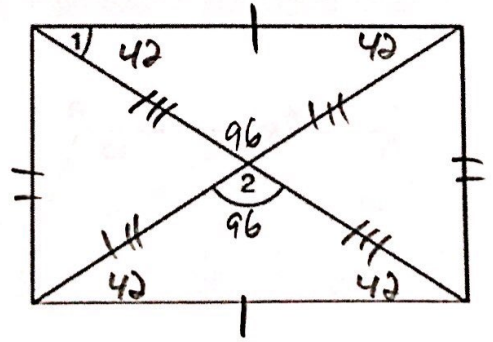
↪ 1 side

$$13(4) = \frac{\text{Perimeter}}{4} = 52$$

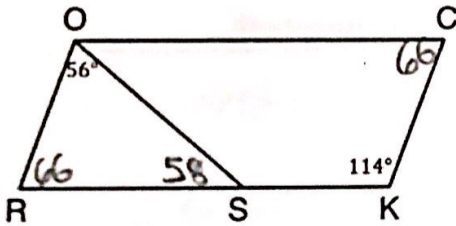


25. As shown in the accompanying diagram, a rectangular gate has two diagonal supports. If $m\angle 1 = 42^\circ$, what is $m\angle 2$?

$$\angle 2 = 96^\circ$$



26. In the diagram below of parallelogram ROCK, $m\angle K = 114^\circ$ and $m\angle ROS = 56^\circ$. What is $m\angle RSO$?



- (1) 56°
- (2) 48°

$$\frac{180}{-114} = 66$$

$$\frac{56}{+66} = 122$$

$$\frac{180}{-122} = 58$$

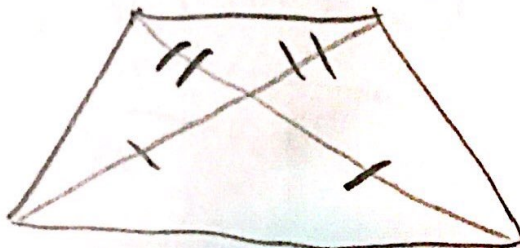
(3) 58°

27. A parallelogram must be a rectangle when its

- (1) diagonals are perpendicular
- (2) diagonals are congruent
- (3) opposite sides are parallel
- (4) opposite sides are congruent

28. If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral could be a

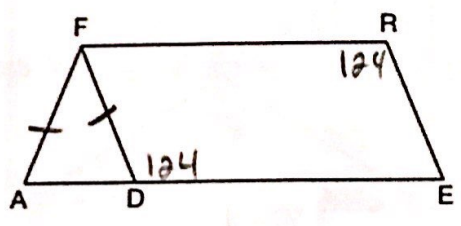
- (1) rectangle
- (2) rhombus
- (3) square
- (4) trapezoid



29. Given three distinct quadrilaterals, a square, a rectangle, and a rhombus, which quadrilaterals must have perpendicular diagonals?

- (1) the rhombus, only
- (2) the rectangle and the square
- (3) the rhombus and the square**
- (4) the rectangle, the rhombus, and the square

30. In the diagram of parallelogram $FRED$ shown below, \overline{ED} is extended to A , and \overline{AF} is drawn such that $\overline{AF} \cong \overline{DF}$



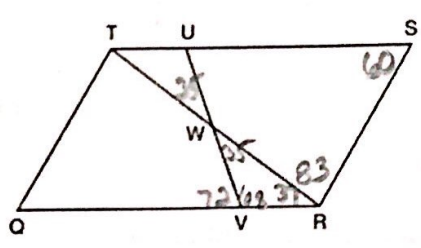
If $m\angle R = 124^\circ$, what is $m\angle FDE$?

- (1) 124°**
- (2) 68°
- (3) 56°
- (4) 112°

31. A parallelogram must be a rhombus if its diagonals

- (1) are congruent
- (2) bisect each other
- (3) do not bisect its angles
- (4) are perpendicular to each other**

32. In parallelogram $QRST$ shown below, diagonal TR is drawn, U and V are points on \overline{TS} and \overline{QR} , respectively, and \overline{UV} intersects \overline{TR} at W .



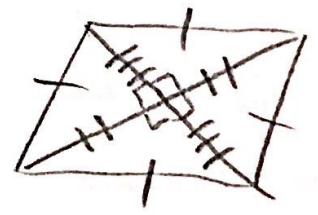
If $m\angle S = 60^\circ$, $m\angle SRT = 83^\circ$, and $m\angle TWU = 35^\circ$, what is $m\angle WVQ$?

- (1) 37°
- (2) 60°
- (3) 72°**
- (4) 83°

$$\begin{array}{r} 60 \\ + 83 \\ \hline 143 \end{array} \quad \begin{array}{r} 180 \\ - 143 \\ \hline 37 \end{array} \quad \begin{array}{r} 35 \\ + 37 \\ \hline 72 \end{array} \quad \begin{array}{r} 180 \\ - 72 \\ \hline 108 \end{array}$$

33. Which set of statements would describe a parallelogram that can always be classified as a rhombus?

- I. Diagonals are perpendicular bisectors of each other
- II. Diagonals bisect the angles from which they are drawn.
- III. Diagonals form four congruent isosceles right triangles

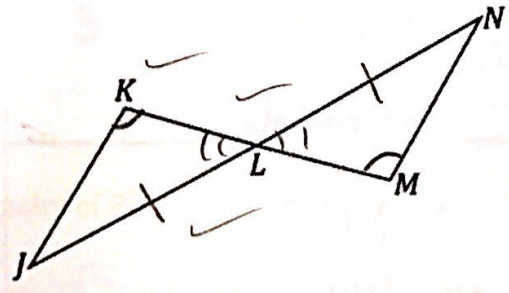


- (1) I and II
- (2) I and III
- (3) II and III
- (4) I, II, and III

34. Complete a formal proof, proving the triangles congruent, and then proving corresponding parts congruent. Be sure to mark your diagram to support your answer.

Given: \overline{KM} bisects \overline{JN}
 $\angle JKL \cong \angle NML$

Prove: $\overline{KL} \cong \overline{ML}$

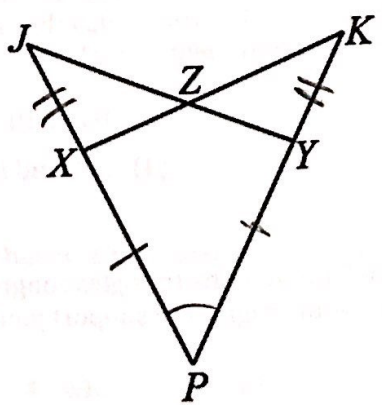


Statements	Reasons
① \overline{KM} bisects \overline{JN} $\angle JKL \cong \angle NML$	① given
② $\overline{JL} \cong \overline{LN}$	② A bisector cuts a line into 2 \cong parts
③ $\angle KLS \cong \angle NLM$	③ vertical \angle 's are \cong
④ $\triangle JKL \cong \triangle NLM$	④ A.A.S
⑤ $\overline{KL} \cong \overline{ML}$	⑤ C.P.C.T.C

35. Complete a formal proof, proving triangles are congruent. Be sure to mark your diagram to support your answer.

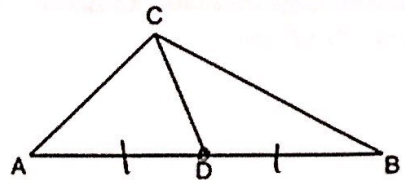
Given: $XJ = YK$
 $PX = PY$

Prove: $\Delta JPY \cong \Delta KPX$



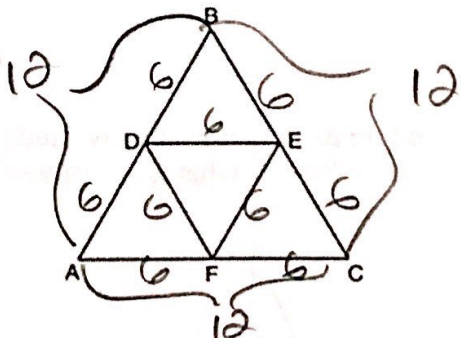
Statements	Reasons
① $XJ = YK$ $PX = PY$	① given
② $\angle P \cong \angle P$	② reflexive property
③ $JX + XP = JP$ $KY + YP = KP$ $JP = KP$	③ Addition property
④ $\Delta JPY \cong \Delta KPX$	④ SAS.

36. As shown in the diagram below, \overline{CD} is a median of $\triangle ABC$. Which statement is *always* true?



- (1) $\overline{AD} \cong \overline{DB}$
- (2) $\overline{AC} = \overline{AD}$
- (3) $\angle ACD \cong \angle CDB$
- (4) $\angle BCD \cong \angle ACD$

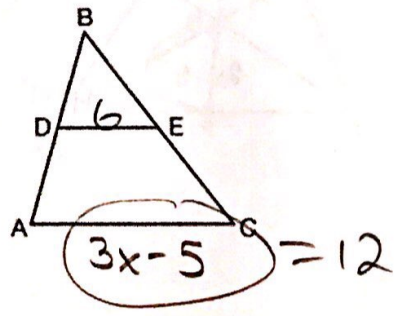
37. In the diagram below, the vertices of $\triangle DEF$ are the midpoints of the sides of equilateral triangle ABC , and the perimeter of $\triangle ABC$ is 36 cm. What is the length, in centimeters, of \overline{EF} ?



- (1) 6
- (2) 12
- (3) 18
- (4) 4

$\frac{36}{3} = 12$

38. In $\triangle ABC$, D is the midpoint of \overline{AB} and E is the midpoint of \overline{BC} . If $AC = 3x - 15$ and $DE = 6$, what is the value of x ?



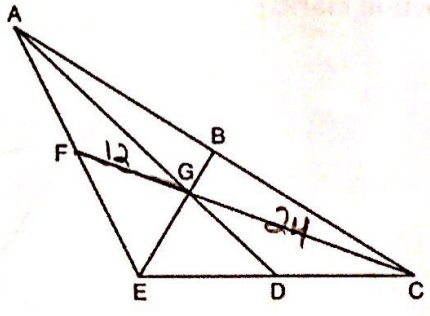
- (1) 6
- (2) 7
- (3) 9
- (4) 12

$3x - 15 = 12$

$\frac{3x}{3} = \frac{27}{3}$

$x = 9$

39. In the diagram below of $\triangle ACE$, medians \overline{AD} , \overline{EB} , and \overline{CF} intersect at G . The length of \overline{FG} is 12 cm. What is the length, in centimeters, of \overline{GC} ?

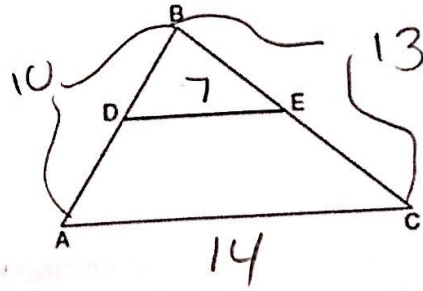


- (1) 24
- (2) 12
- (3) 6
- (4) 4

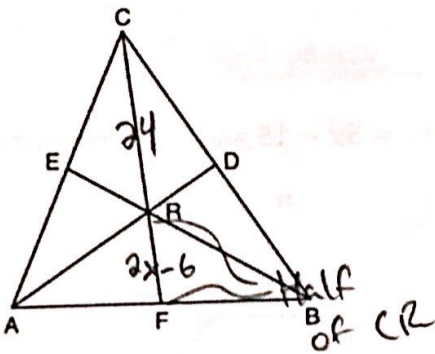
40 In the diagram below of $\triangle ABC$, \overline{DE} is a mid-segment of $\triangle ABC$, $DE = 7$, $AB = 10$, and $BC = 13$. Find the perimeter of $\triangle ABC$.

$$P = 10 + 13 + 14$$

$$P = 37$$



41. In $\triangle ABC$ shown below, medians \overline{AD} , \overline{BE} , and \overline{CF} intersect at point R . If $CR = 24$ and $RF = 2x - 6$, what is the value of x ?



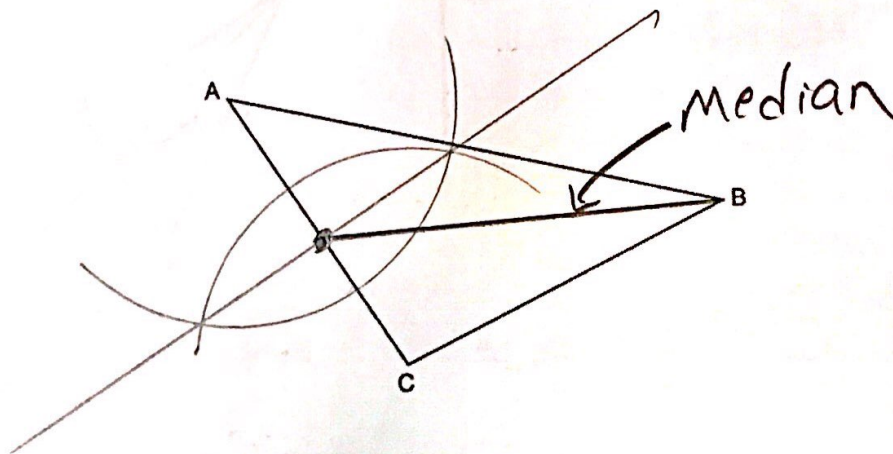
$$2x - 6 = 12$$

$$\underline{+6} \quad \underline{+6}$$

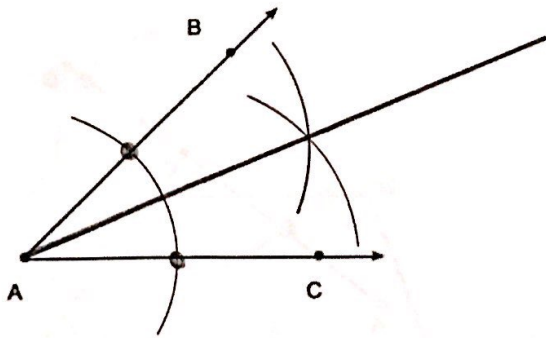
$$\frac{2x}{2} = \frac{18}{2}$$

$$x = 9$$

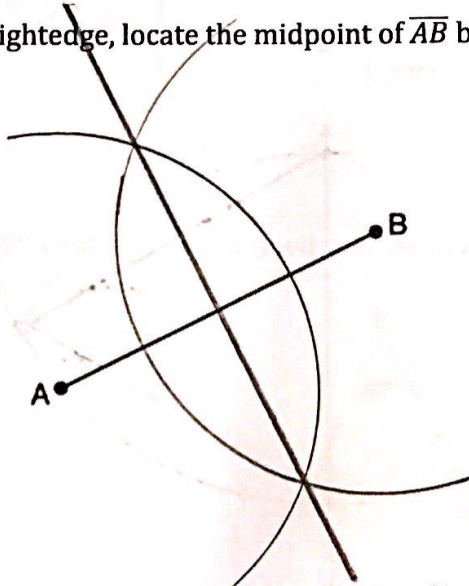
42. Using a compass and a straightedge, construct the median to side \overline{AC} in $\triangle ABC$ below. [Leave all construction marks]



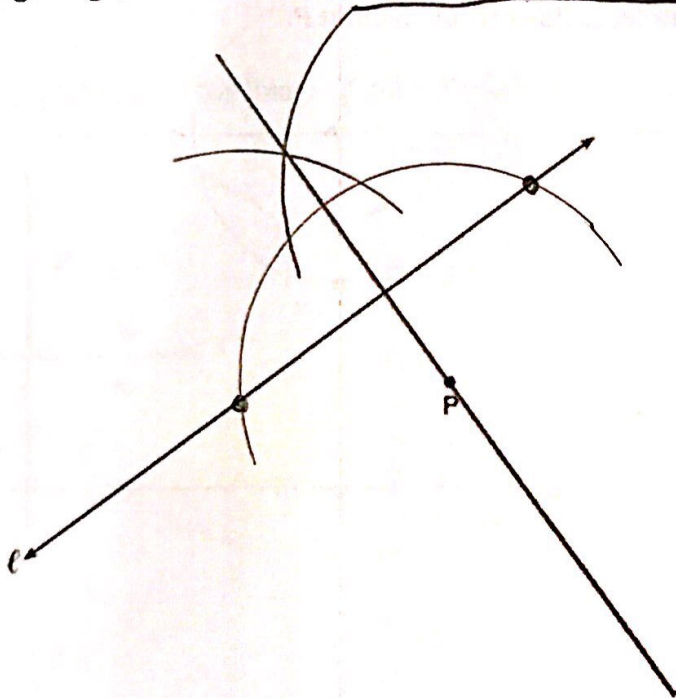
43. Using only a ruler and a compass, construct the bisector of angle BAC in the accompanying diagram.



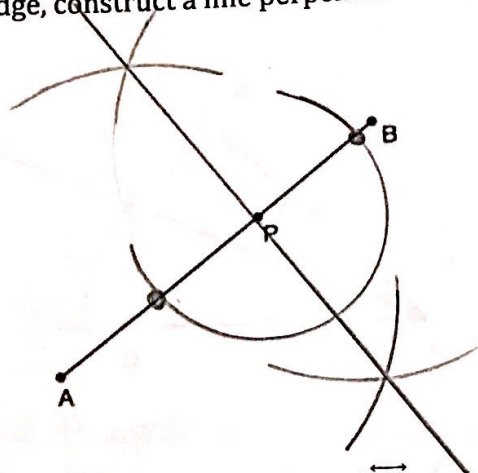
44. Using a compass and a straightedge, locate the midpoint of \overline{AB} by construction. [Leave all construction marks]



45. Using a compass and a straightedge, construct a line perpendicular to line l through point P . [Leave all construction marks]

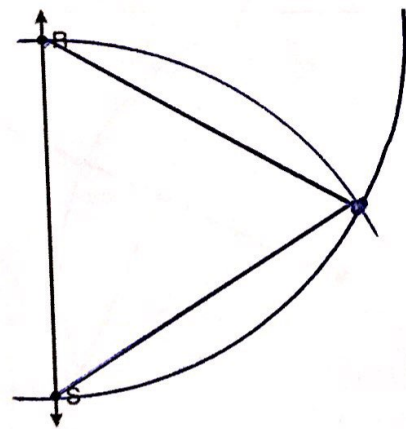


46. Using a compass and a straightedge, construct a line perpendicular to \overline{AB} through point P . [Leave all construction marks]

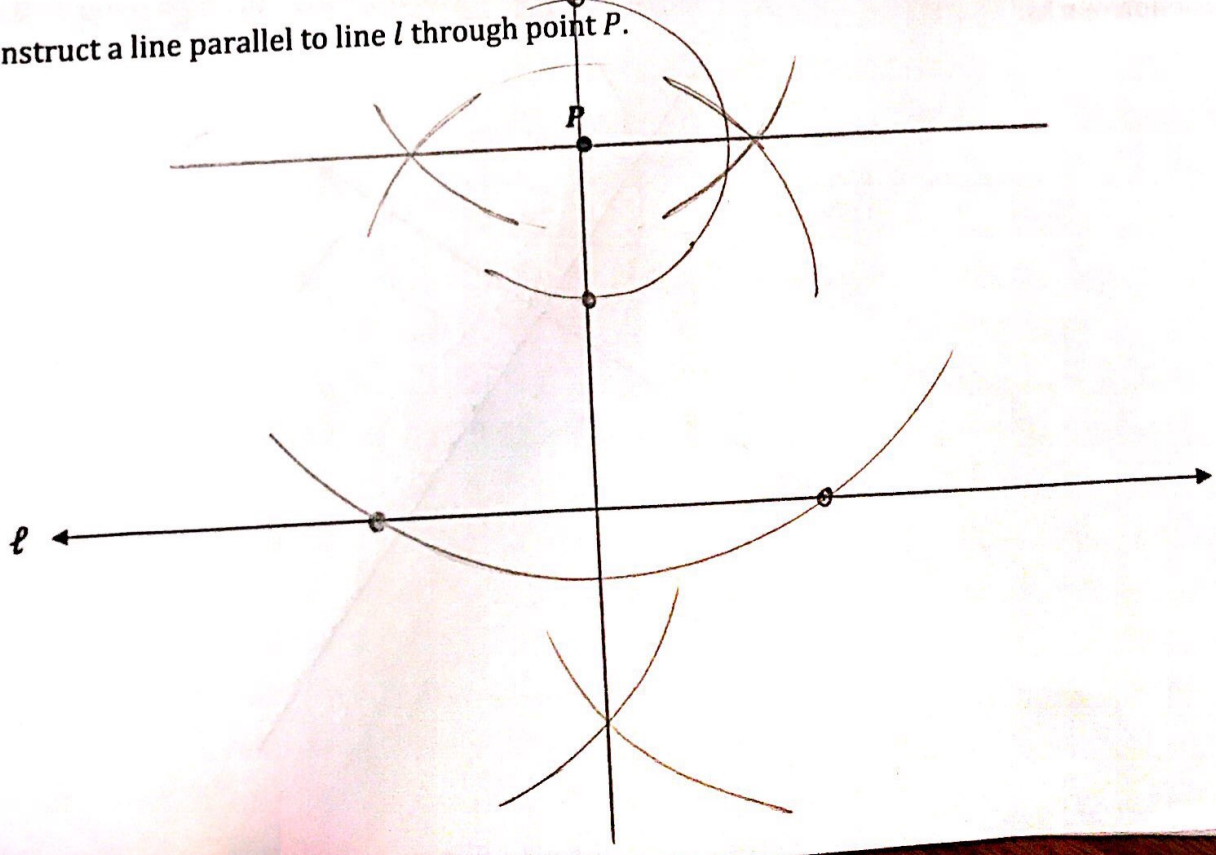


47. Using a compass and straightedge, on the diagram below of \overrightarrow{RS} , construct an equilateral triangle with \overline{RS} as one side. [Leave all construction marks]

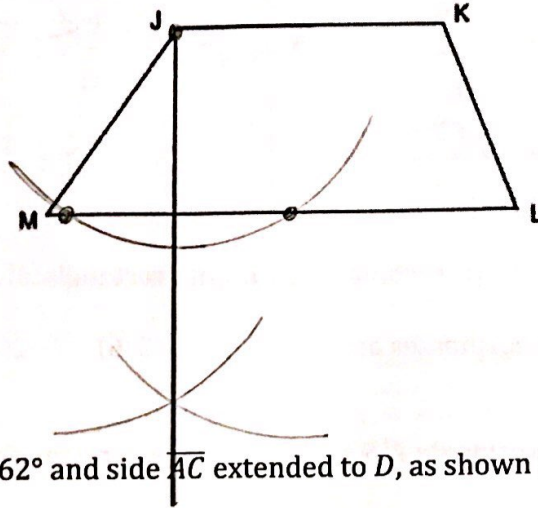
Equal length



48. Construct a line parallel to line l through point P .



49. Given trapezoid $JKLM$ with $JK \parallel ML$ using a compass and a straightedge, construct the altitude from vertex J to \overline{ML} . Leave all construction marks.

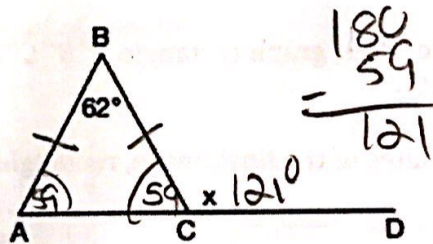


50. Given $\triangle ABC$ with $m\angle B = 62^\circ$ and side \overline{AC} extended to D , as shown below.

Which value of x makes $\overline{AB} \cong \overline{CB}$?

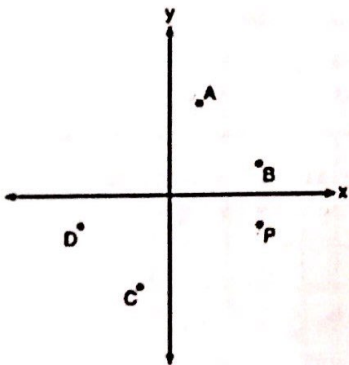
- (1) 59°
- (2) 62°
- (3) 118°
- (4) 121°

$$\begin{array}{r} 180 \\ - 62 \\ \hline 118 \\ \div 2 \\ \hline 59 \end{array}$$



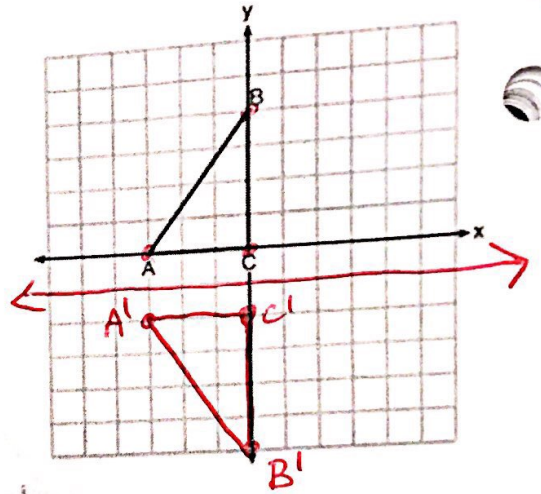
Left turn

51. Which point shown in the graph below is the image of point P after a counterclockwise rotation of 90° about the origin?



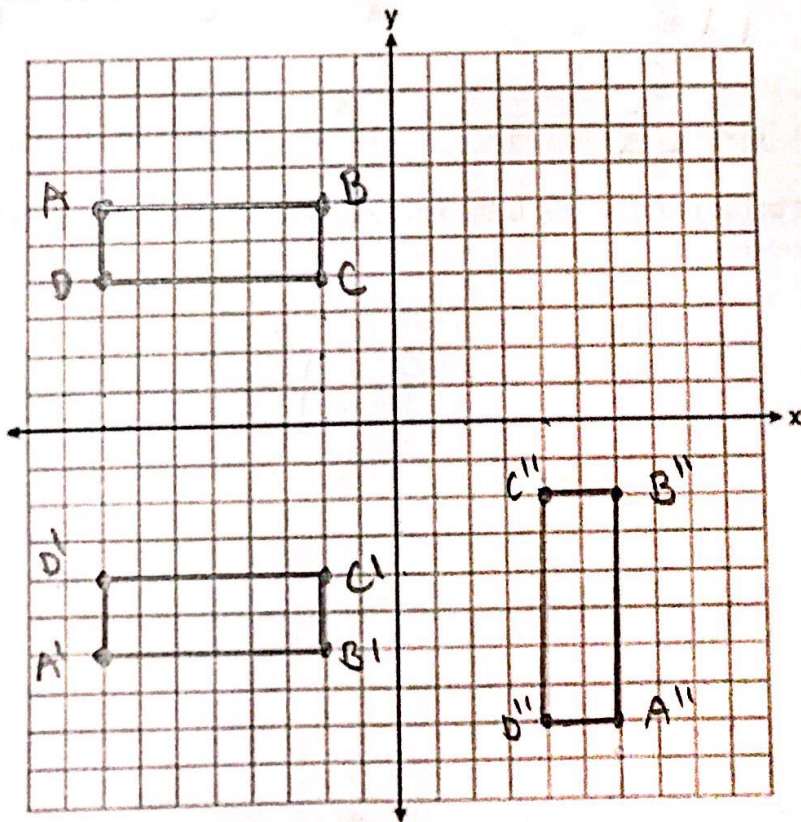
Point A

52. Triangle ABC is graphed on the set of axes. Graph and label $\Delta A'B'C'$ the image of ΔABC after a reflection over the line $y = -1$.



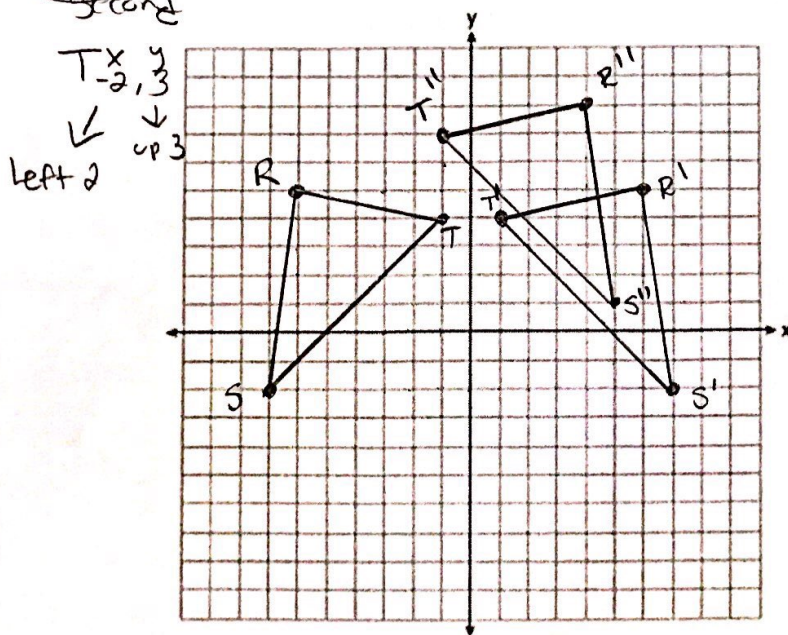
53. A sequence of transformations maps rectangle $ABCD$ onto rectangle $A''B''C''D''$.

- Graph rectangle $ABCD$ whose coordinates are $A(-8, 6)$, $B(-2, 6)$, $C(-2, 4)$, and $D(-8, 4)$ on the coordinate plane below.
- On the same set of axes, graph rectangle $A'B'C'D'$, the image of rectangle $ABCD$ reflected over the x -axis.
- On the same set of axes, graph rectangle $A''B''C''D''$, the image of rectangle $A'B'C'D'$ rotated about the origin 90° .
- State the coordinates of the final image, rectangle $A''B''C''D''$.

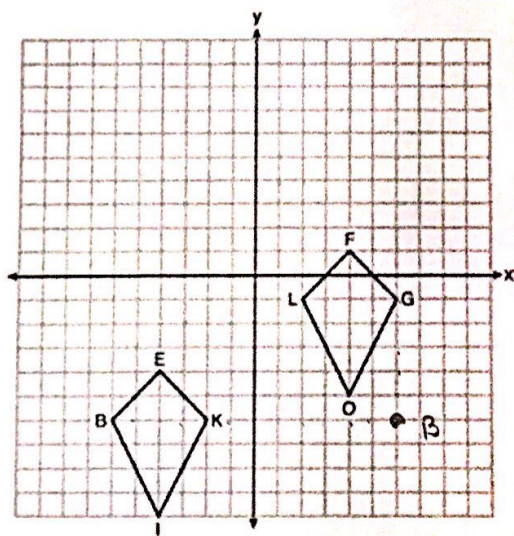


$A''(-4, -6)$
 $B''(-4, -2)$
 $C''(-2, -2)$
 $D''(-2, -6)$

54. The vertices of $\triangle RST$ are $R(-6, 5)$, $S(-7, -2)$, and $T(-1, 4)$. The image of $\triangle RST$ after a reflection about the y -axis followed by $T_{-2,3}$ is $\triangle R''S''T''$. Graph and label the coordinates of $\triangle R''S''T''$.



55. Quadrilaterals *BIKE* and *GOLF* are graphed on the set of axes below.



Describe a sequence of transformations that maps quadrilateral BIKE onto quadrilateral GOLF.

reflect over the y -axis
 then
 Translate up 5 units