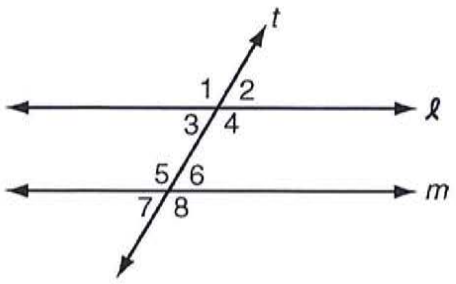
Geometry Midterm Review

Name: _____ **Date:** _____

1. In the accompanying diagram, line ℓ is parallel to line m, and line t is a transversal.

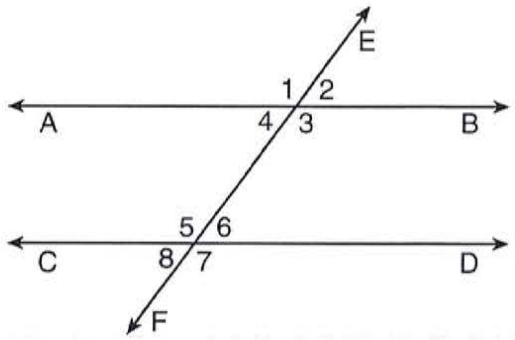


Which must be a true statement?

(1) $m\angle 1 + m\angle 4 = 180$ (2) $m\angle 1 + m\angle 8 = 180$

(3) $m\angle 3 + m\angle 6 = 180$ (4) $m\angle 2 + m\angle 5 = 180$

2. Transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, as shown in the diagram below.



Which statement could always be used to prove $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?

(1) $\angle 2 \cong \angle 4$

(2) $\angle 7 \cong \angle 8$

(3) $\angle 3$ and $\angle 6$ are supplementary

(4) $\angle 1$ and $\angle 5$ are supplementary

3. When two parallel lines are cut by a transversal, which angles are *not* always congruent?

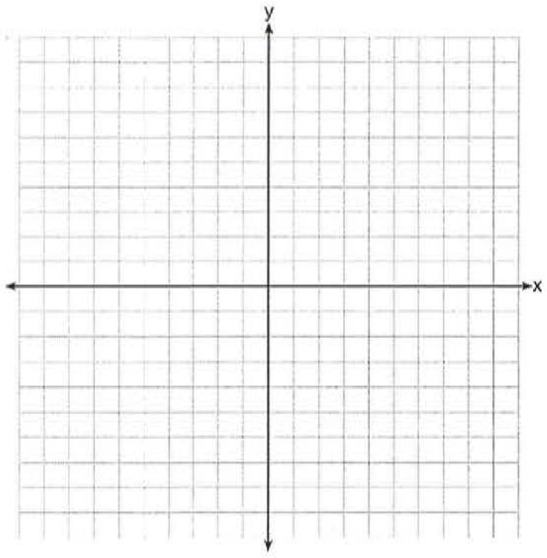
(1) a pair of alternate interior angles

(2) a pair of alternate exterior angles

(3) two interior angles on the same side of the transversal

(4) two corresponding angles

4. Quadrilateral $MATH$ has coordinates $M(-6,-3)$, $A(-1,-3)$, $T(-2,-1)$, and $H(-4,-1)$. The image of quadrilateral $MATH$ after the composition $r_{x-axis} \circ T_{7,5}$ is quadrilateral $M''A''T''H''$. State and label the coordinates of $M''A''T''H''$.

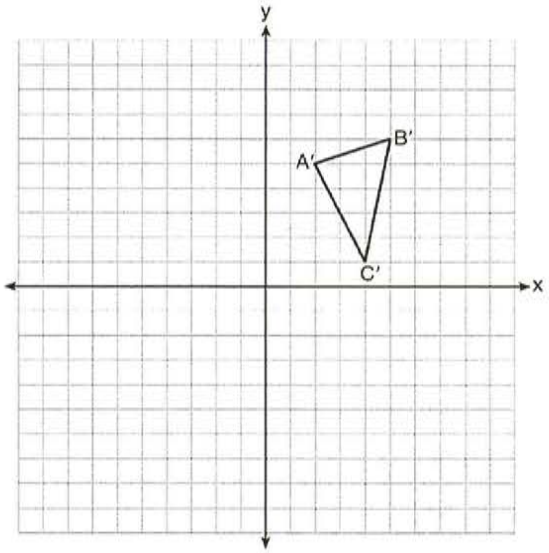


5. The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.



6. Under the transformation $(x, y) \rightarrow (2x, 2y)$, which property is *not* preserved?

(1) distance
(2) orientation
(3) parallelism
(4) angle measure

7. If $\triangle ABC$ and its image, $\triangle A'B'C'$, are graphed on a set of axes, $\triangle ABC \cong \triangle A'B'C'$ under each transformation *except*

(1) D_2
(2) $R_{90°}$
(3) $r_{y=x}$
(4) $T_{(-2,3)}$

8. Which figure has 60° rotational symmetry?

(1) square
(2) equilateral triangle
(3) regular octagon
(4) regular hexagon

9. Which figure has 120° rotational symmetry?

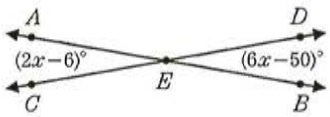
(1) rhombus
(2) regular pentagon
(3) square
(4) equilateral triangle

10. If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?

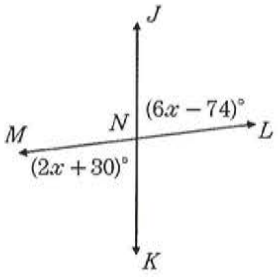
(1) reflection over the x-axis
(2) translation to the left 5 and down 4
(3) dilation centered at the origin with scale factor 2
(4) rotation of 270° counterclockwise about the origin

11. After a reflection over a line, $\triangle A'B'C$ is the image of $\triangle ABC$. Explain why triangle ABC is congruent to triangle $A'B'C'$.

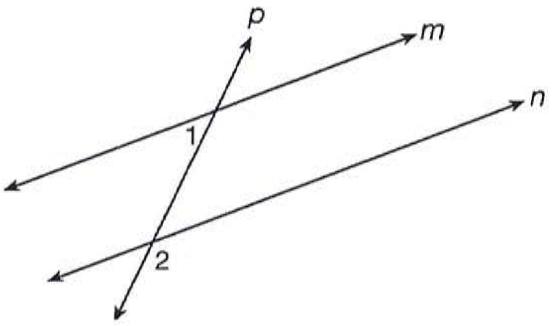
12. In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. Angles AEC and DEB measure $2x - 6$ and $6x - 50$, respectively. Find the value of x.



13. In the accompanying diagram, lines $\overleftrightarrow{JK}$ and $\overleftrightarrow{LM}$ intersect at N, $m\angle JNL = 6x - 74$, and $m\angle MNK = 2x + 30$. What is the value of x?



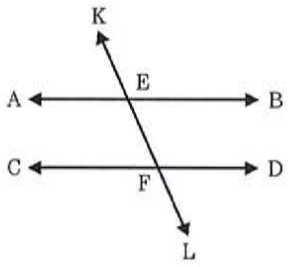
14. As shown in the diagram below, lines m and n are cut by transversal p.



If $m\angle 1 = 4x + 14$ and $m\angle 2 = 8x + 10$, lines m and n are parallel when x equals

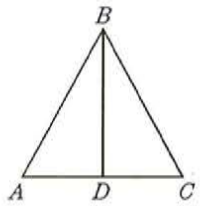
(1) 1 (2) 6 (3) 13 (4) 17

15. In the accompanying diagram, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$; transversal $\overleftrightarrow{KL}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ at E and F, respectively; $m\angle BEF = 3x + 40$; and $m\angle DFL = 8x - 10$. Find $m\angle CFL$.



16. Given: $\triangle ABC$, $\overline{BD}$ is both the median and the altitude of $\overline{AC}$.

Prove: $\overline{BA} \cong \overline{BC}$



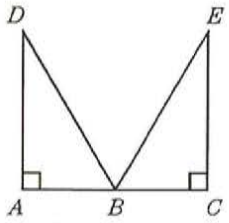
17. In the accompanying diagram, B is the midpoint of $\overline{AC}$, $\overline{DA} \perp \overline{AC}$, $\overline{EC} \perp \overline{AC}$, and $\overline{DB} \cong \overline{EB}$. Which method of proof may be used to prove $\triangle DAB \cong \triangle ECB$?

(1) $SAS \cong SAS$

(2) $ASA \cong ASA$

(3) $HL \cong HL$

(4) $AAS \cong AAS$



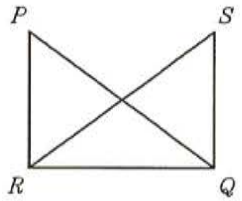
18. In the accompanying diagram, $\overline{PR} \cong \overline{SQ}$, $\overline{PR} \perp \overline{RQ}$, and $\overline{SQ} \perp \overline{RQ}$. Which statement can be used to prove that $\triangle PQR \cong \triangle SRQ$?

(1) $AAS \cong AAS$

(2) $SAS \cong SAS$

(3) $HL \cong HL$

(4) $SSS \cong SSS$



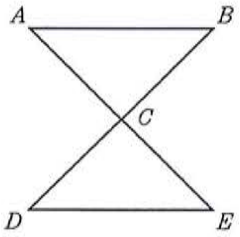
19. In the accompanying diagram, $\overleftrightarrow{ACE}$, $\overleftrightarrow{BCD}$, $\overleftrightarrow{AB}$, and $\overleftrightarrow{DE}$, $\angle A \cong \angle E$, and C is the midpoint of $\overline{AE}$. Which theorem justifies $\triangle ABC \cong \triangle EDC$?

(1) $SSS \cong SSS$

(2) $SAS \cong SAS$

(3) $ASA \cong ASA$

(4) $SSA \cong SSA$



20. In the accompanying diagram of isosceles triangle ABC, $\angle ACB$ is the vertex angle, $\overline{CM} \perp \overline{AB}$, and M is the midpoint of $\overline{AB}$.

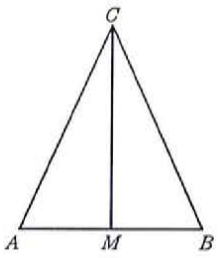
Which statement can *not* be used to justify $\triangle ACM \cong \triangle BCM$?

(1) HL $\cong$ HL

(2) AAS $\cong$ AAS

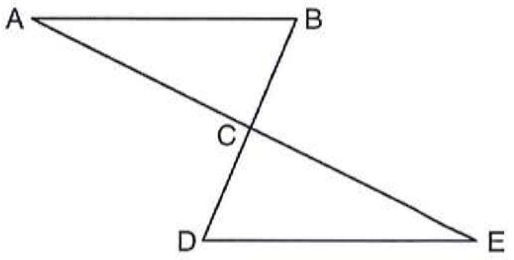
(3) SSS $\cong$ SSS

(4) AAA $\cong$ AAA

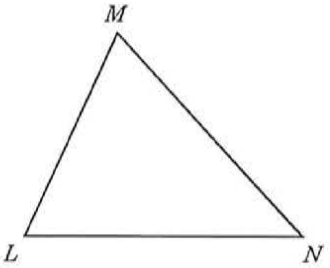


21. Given: $\triangle ABC$ and $\triangle EDC$, C is the midpoint of $\overline{BD}$ and $\overline{AE}$

Prove: AB = ED

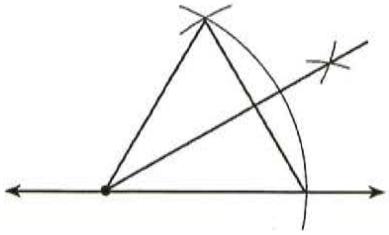


22. Construct the altitude of $\triangle LMN$ from M to $\overline{LN}$.

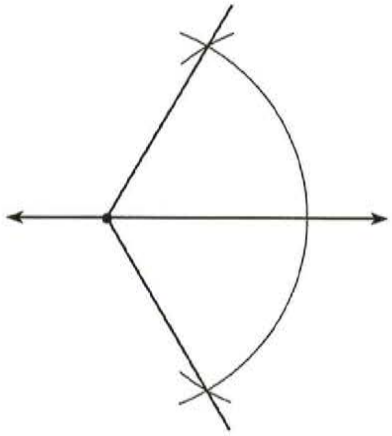


23. Which diagram shows the construction of a 45° angle?

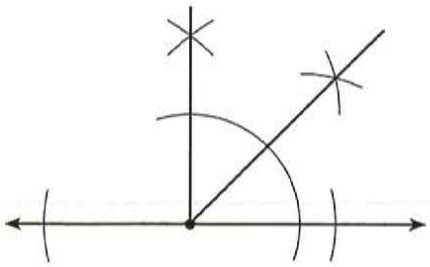
(1)



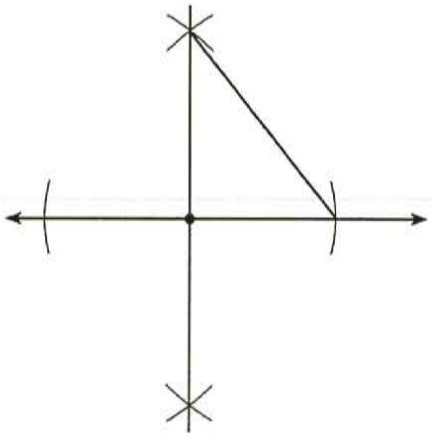
(2)



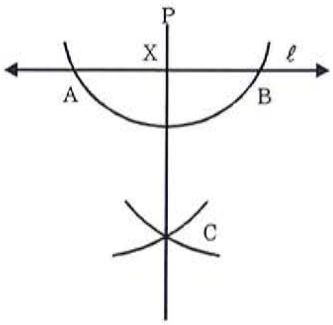
(3)



(4)



24. The diagram shows the construction of dropping perpendicular $\overline{PX}$ from point P to line ℓ. The arc drawn from point P intersects line ℓ at A and B, and the arcs drawn from points A and B intersect $\overleftrightarrow{PX}$ at C.



Which statement is *not* always true about this construction?

(1) $PA = PB$ (2) $AX = BX$

(3) $PX = CX$ (4) $AC = BC$

25. To locate a point equidistant from the vertices of a triangle, construct

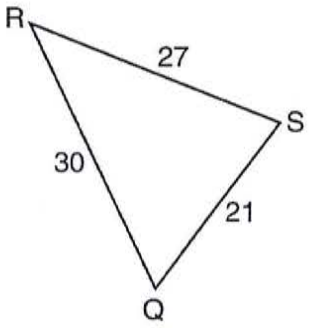
(1) the perpendicular bisectors of the sides

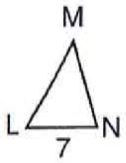
(2) the angle bisectors

(3) the altitudes

(4) the medians

26. In the accompanying diagram, $\triangle QRS$ is similar to $\triangle LMN$, $RQ = 30$, $QS = 21$, $SR = 27$, and $LN = 7$. What is the length of $\overline{ML}$?





27. If two angles of one triangle are congruent, respectively, to two angles of another triangle, then these triangles must be

(1) isosceles (2) similar

(3) congruent (4) equilateral

28. Which is *not* a property of all similar triangles?

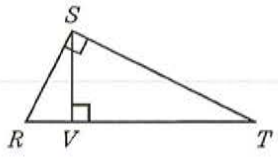
(1) The corresponding angles are congruent.

(2) The corresponding sides are congruent.

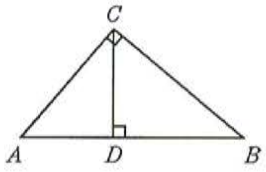
(3) The perimeters are in the same ratio as the corresponding sides.

(4) The altitudes are in the same ratio as the corresponding sides.

29. In the accompanying diagram, $\overline{SV}$ is the altitude to hypotenuse $\overline{RT}$ of right triangle RST. If $RV = 3$ and $VT = 12$, find the length of $\overline{SV}$.



30. In right triangle ABC, $m\angle C = 90°$ and altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If $AD = 4$ and $DB = 5$, find AC.

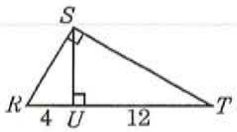


31. In the accompanying diagram, $\triangle RST$ is a right triangle, $\overline{SU}$ is the altitude to hypotenuse $\overline{RT}$, $RU = 4$, and $UT = 12$.

What is the length of $\overline{RS}$?

(1) 8 (2) $\sqrt{48}$

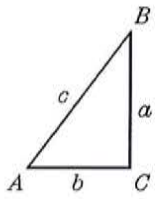
(3) $\sqrt{160}$ (4) 24



32. In the accompanying diagram of right triangle ABC, $\angle C$ is a right angle. Which equation is valid for $\triangle ABC$?

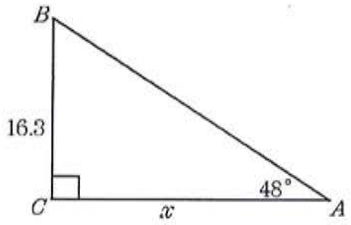
(1) $\cos A = \frac{c}{b}$ (2) $\tan A = \frac{b}{a}$

(3) $\sin A = \frac{a}{c}$ (4) $\cos B = \frac{a}{b}$



33. In the accompanying diagram of right triangle ABC, $m\angle C = 90$, $m\angle BAC = 48$, $AC = x$, and $CB = 16.3$.

Which equation could be used to find the length of $\overline{AC}$?



(1) $\sin 48 = \frac{16.3}{x}$ (2) $\cos 48 = \frac{x}{16.3}$

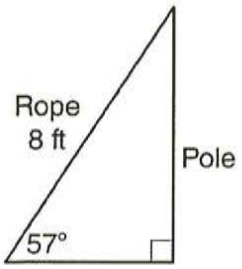
(3) $\tan 48 = \frac{16.3}{x}$ (4) $\tan 48 = \frac{x}{16.3}$

34. Which value of x satisfies the equation $\sin 40° = \cos x$?

(1) 20° (2) 40° (3) 50° (4) 80°

35. If $\cos(2x - 25)° = \sin 55°$, find the value of x.

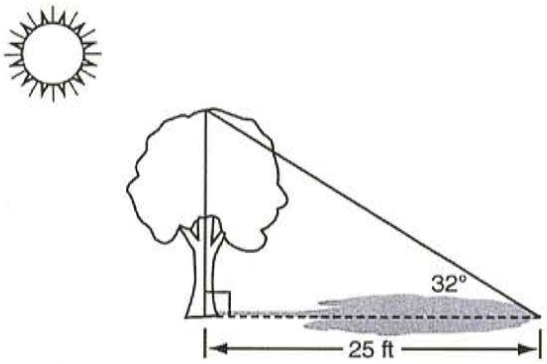
36. An 8-foot rope is tied from the top of a pole to a stake in the ground, as shown in the diagram below.



If the rope forms a 57° angle with the ground, what is the height of the pole, to the *nearest tenth of a foot*?

(1) 4.4 (2) 6.7 (3) 9.5 (4) 12.3

37. A tree casts a 25-foot shadow on a sunny day, as shown in the diagram below.



If the angle of elevation from the tip of the shadow to the top of the tree is 32°, what is the height of the tree to the *nearest tenth of a foot*?

(1) 13.2 (2) 15.6 (3) 21.2 (4) 40.0

38. The expression $\sqrt{27} + \sqrt{12}$ is equal to

(1) $13\sqrt{3}$ (2) $5\sqrt{3}$ (3) $5\sqrt{6}$ (4) $\sqrt{39}$

39. The expression $\sqrt{200}$ is equivalent to

(1) $25\sqrt{8}$ (2) $100\sqrt{2}$

(3) $2\sqrt{10}$ (4) $10\sqrt{2}$

40. Which set of numbers represents the lengths of the sides of a right triangle?

(1) $\{7, 8, 9\}$ (2) $\{7, 8, 10\}$

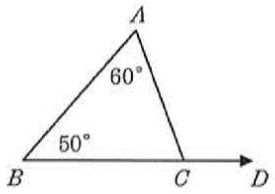
(3) $\{6, 8, 10\}$ (4) $\{6, 8, 9\}$

41. Which set of numbers could not represent the lengths of the sides of a right triangle?

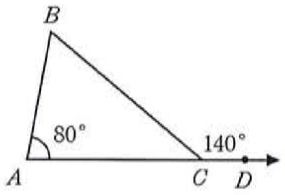
(1) $\{3, 4, 5\}$ (2) $\{6, 9, 12\}$

(3) $\{5, 12, 13\}$ (4) $\{8, 15, 17\}$

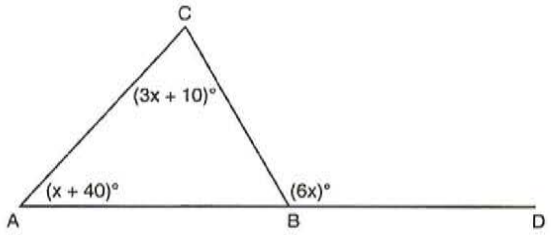
42. In the accompanying diagram, $\angle ACD$ is an exterior angle of $\triangle ABC$. If $m\angle A = 60$ and $m\angle B = 50$, find $m\angle ACD$.



43. In the diagram shown, $m\angle BCD = 140$ and $m\angle BAC = 80$. Find $m\angle ABC$.



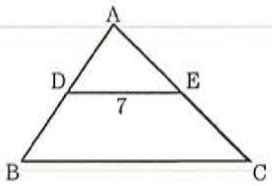
44. In the diagram of $\triangle ABC$ below, $\overline{AB}$ is extended to point D.



If $m\angle CAB = x + 40$, $m\angle ACB = 3x + 10$, and $m\angle CBD = 6x$, what is $m\angle CAB$?

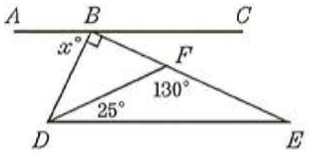
(1) 13 (2) 25 (3) 53 (4) 65

45. In the accompanying diagram of scalene triangle $\triangle ABC$, D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$, respectively, and $\overline{DE} = 7$. Find the length of $\overline{BC}$

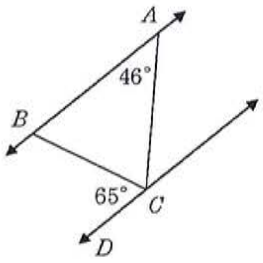


46. Points R, S, and T are the midpoints of the sides of a triangle whose sides have lengths 14, 18, and 20. Find the perimeter of $\triangle RST$.

47. In the accompanying diagram, $\overline{ABC} \parallel \overline{DE}$, $m\angle FDE = 25$, $m\angle DFE = 130$, and $m\angle ABD = x$. What is the value of x?



48. In the accompanying diagram, $\overleftrightarrow{AB}$ is a parallel to $\overleftrightarrow{CD}$, $m\angle BAC = 46$, and $m\angle BCD = 65$. Find the measure of $\angle ACB$.



49. If the measure of the angles of a triangle are represented by $2x$, $4x$, and $6x$, then the triangle is

(1) right (2) obtuse

(3) acute (4) equiangular

50. If the measures of the angles of a triangle are represented by $x + 30$, $4x + 30$, and $10x - 30$, the triangle must be

(1) isosceles (2) obtuse

(3) right (4) scalene

51. In $\triangle KID$, $m\angle K = 40$ and $m\angle D = 80$. Which side of $\triangle KID$ is the shortest?

52. In $\triangle PQR$, $m\angle P = 51$ and $m\angle Q = 57$. Which expression is true?

(1) $QR > PQ$ (2) $PR > PQ$

(3) $PQ > QR$

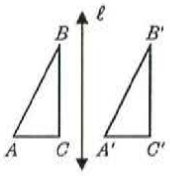
53. If M is the midpoint of $\overline{AB}$, then which statement is *false*?

(1) $\frac{AB}{2} = MB$ (2) $AM = MB$

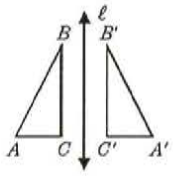
(3) $AB - MB = AM$ (4) $AM + AB = MB$

54. In which figure is $\triangle A'B'C'$ a reflection of $\triangle ABC$ in line ℓ?

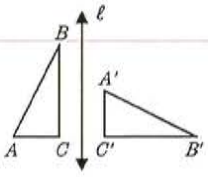
(1)



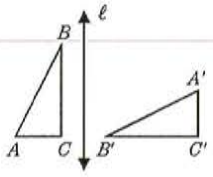
(2)



(3)



(4)



55. What is the image of point $(4, 5)$ after a reflection in the y-axis?

56. The coordinates of any point (x, y) after a reflection in the x-axis can *always* be represented by

(1) (x, y) (2) $(-x, y)$

(3) $(x, -y)$ (4) $(-x, -y)$