

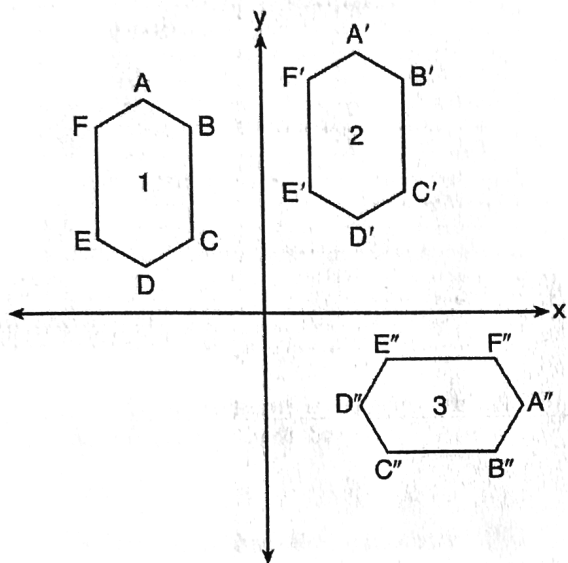
Geometry Christmas Break

Name: _____

Date: _____

Place all answers for Part. A on a Scantron.

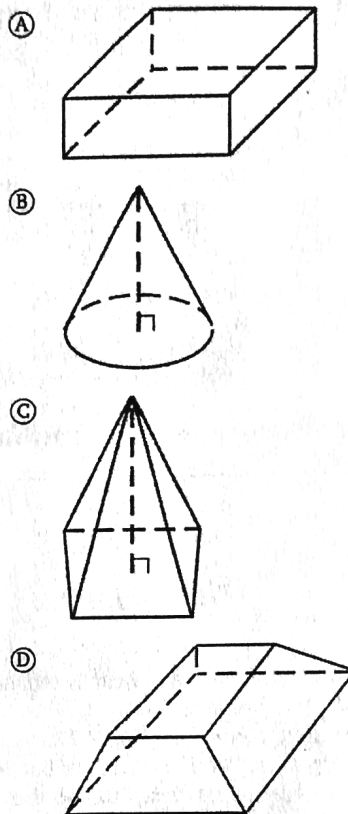
1. In the diagram below, congruent figures 1, 2, and 3 are drawn.



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

- (A) a reflection followed by a translation
 - (B) a rotation followed by a translation
 - (C) a translation followed by a reflection
 - (D) a translation followed by a rotation
2. Two right triangles must be congruent if
- (A) an acute angle in each triangle is congruent
 - (B) the lengths of the hypotenuses are equal
 - (C) the corresponding legs are congruent
 - (D) the areas are equal

3. Which figure can have the same cross section as a sphere?



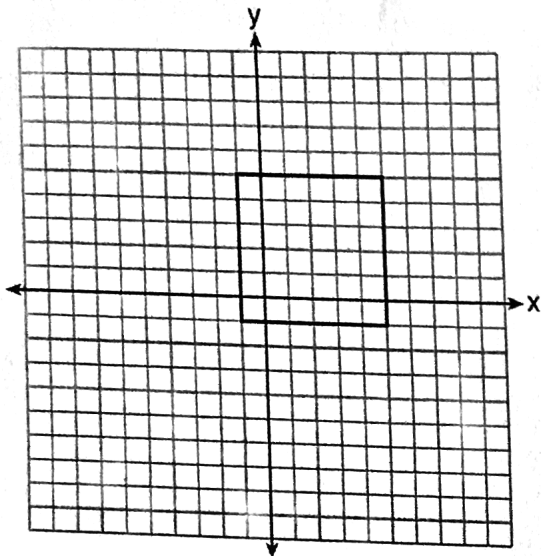
4. Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?

- (A) $y = -\frac{1}{2}x + 6$
- (B) $y = \frac{1}{2}x + 6$
- (C) $y = -2x + 6$
- (D) $y = 2x + 6$

5. A gallon of paint will cover approximately 450 square feet. An artist wants to paint all the outside surfaces of a cube measuring 12 feet on each edge. What is the *least* number of gallons of paint he must buy to paint the cube?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

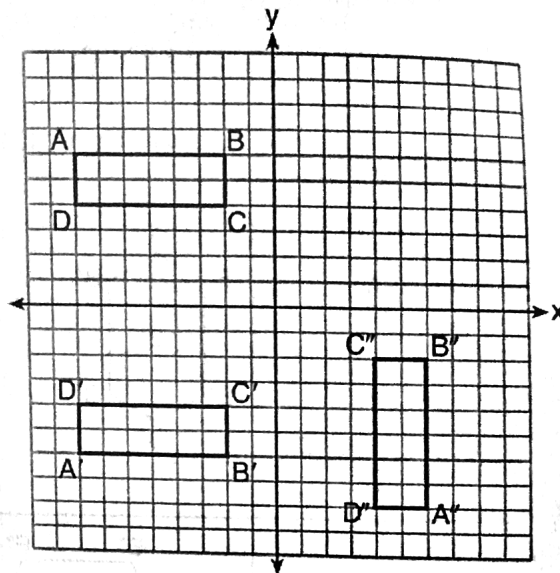
6. In the diagram below, a square is graphed in the coordinate plane.



A reflection over which line does *not* carry the square onto itself?

- (A) $x = 5$ (B) $y = 2$
 (C) $y = x$ (D) $x + y = 4$
7. The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the nearest meter?
- (A) 73 (B) 77 (C) 133 (D) 230
8. A quadrilateral has vertices with coordinates $(-3, 1)$, $(0, 3)$, $(5, 2)$, and $(-1, -2)$. Which type of quadrilateral is this?
- (A) rhombus (B) rectangle
 (C) square (D) trapezoid

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

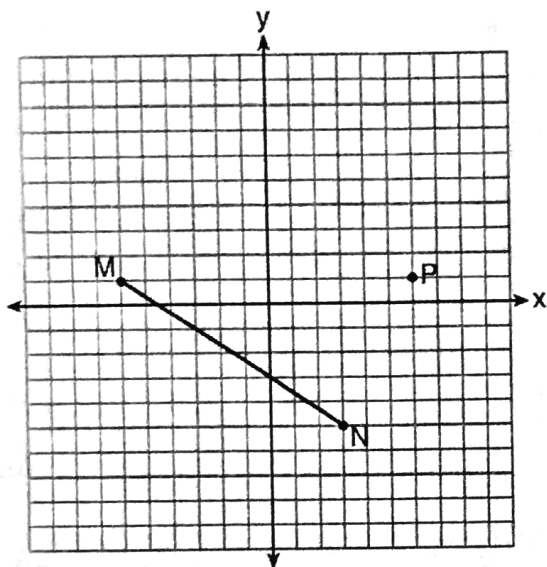


Which sequence of transformations maps $ABCD$ onto $A'B'C'D'$ and then maps $A'B'C'D'$ onto $A''B''C''D''$?

- (A) a reflection followed by a rotation
 (B) a reflection followed by a translation
 (C) a translation followed by a rotation
 (D) a translation followed by a reflection
10. The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?
- (A) 3591 (B) 65 (C) 55 (D) 4

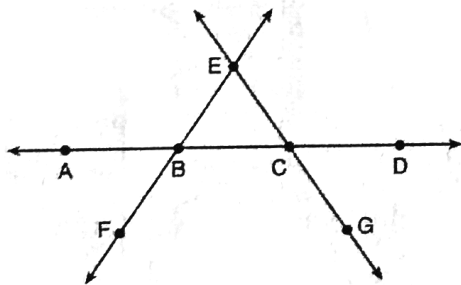
11. Given M
 $N(3$

11. Given \overline{MN} shown below, with $M(-6, 1)$ and $N(3, -5)$, what is an equation of the line that passes through point $P(6, 1)$ and is parallel to \overline{MN} ?



- (A) $y = -\frac{2}{3}x + 5$ (B) $y = -\frac{2}{3}x - 3$
 (C) $y = \frac{3}{2}x + 7$ (D) $y = \frac{3}{2}x - 8$

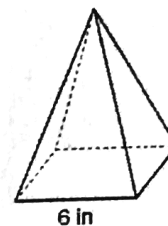
12. In the diagram below, \overrightarrow{FE} bisects \overline{AC} at B, and \overrightarrow{GE} bisects \overline{BD} at C.



Which statement is always true?

- (A) $\overline{AB} \cong \overline{DC}$ (B) $\overline{FB} \cong \overline{EB}$
 (C) \overline{BD} bisects \overline{GE} at C. (D) \overline{AC} bisects \overline{FE} at B.

13. As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



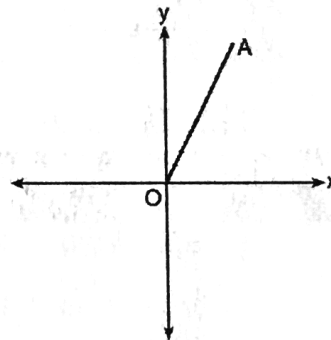
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is

- (A) 72 (B) 144 (C) 288 (D) 432

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

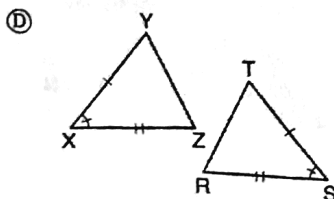
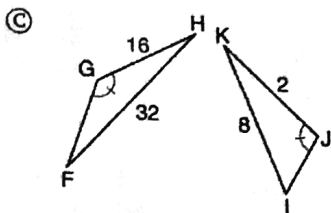
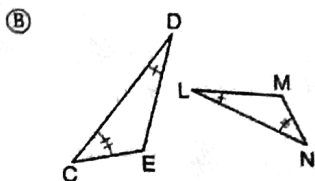
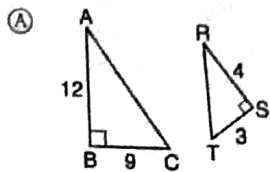
- (A) right (B) acute
 (C) obtuse (D) equiangular

15. Which transformation of \overline{OA} would result in an image parallel to \overline{OA} ?



- (A) a translation of two units down
 (B) a reflection over the x-axis
 (C) a reflection over the y-axis
 (D) a clockwise rotation of 90° about the origin

16. Using the information given below, which set of triangles can not be proven similar?



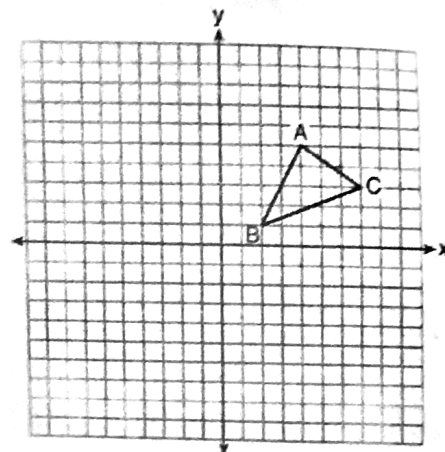
17. A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?

- (A) $(8.5)^3 - \pi(8)^2(8)$ (B) $(8.5)^3 - \pi(4)^2(8)$
 (C) $(8.5)^3 - \frac{1}{3}\pi(8)^2(8)$ (D) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$

18. What is an equation of a line that is perpendicular to the line whose equation is $2y = 3x - 10$ and passes through $(-6, 1)$?

- (A) $y = -\frac{2}{3}x - 5$ (B) $y = -\frac{2}{3}x - 3$
 (C) $y = \frac{2}{3}x + 1$ (D) $y = \frac{2}{3}x + 10$

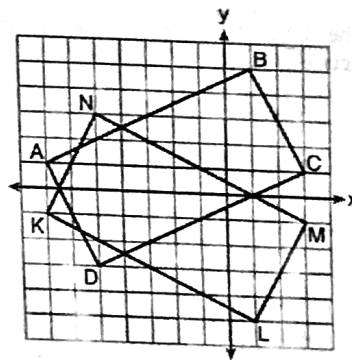
19. In the diagram below, $\triangle ABC$ has vertices $A(4, 2)$, $B(2, 1)$, and $C(7, 3)$.



What is the slope of the altitude drawn from A to \overline{BC} ?

- (A) $\frac{2}{5}$ (B) $\frac{3}{2}$ (C) $-\frac{1}{2}$ (D) $-\frac{5}{2}$

20. On the set of axes below, rectangle $ABCD$ can be proven congruent to rectangle $KLMN$ using which transformation?

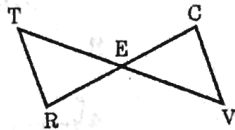


- (A) rotation
 (B) translation
 (C) reflection over the x -axis
 (D) reflection over the y -axis

21. In the figure, \overline{TV} and \overline{RC} bisect each other. Complete the statement.

$$\triangle TER \cong \triangle \underline{\hspace{2cm}}$$

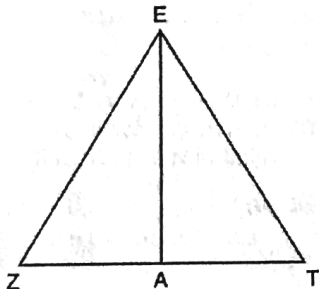
- (A) CEV (B) VEC
 (C) EVC (D) VCE



22. Segment CD is the perpendicular bisector of \overline{AB} at E . Which pair of segments does *not* have to be congruent?

- (A) $\overline{AD}, \overline{BD}$ (B) $\overline{AC}, \overline{BC}$
 (C) $\overline{AE}, \overline{BE}$ (D) $\overline{DE}, \overline{CE}$

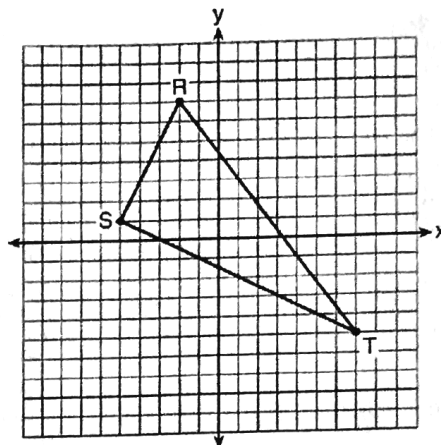
23. Line segment EA is the perpendicular bisector of \overline{ZT} , and \overline{ZE} and \overline{TE} are drawn.



Which conclusion can *not* be proven?

- (A) \overline{EA} bisects angle ZET .
 (B) Triangle EZT is equilateral.
 (C) \overline{EA} is a median of triangle EZT .
 (D) Angle Z is congruent to angle T .
24. Given $\triangle ABC \cong \triangle DEF$, which statement is *not* always true?
- (A) $\overline{BC} \cong \overline{DF}$
 (B) $m\angle A = m\angle D$
 (C) area of $\triangle ABC =$ area of $\triangle DEF$
 (D) perimeter of $\triangle ABC =$ perimeter of $\triangle DEF$

25. Triangle RST is graphed on the set of axes below.

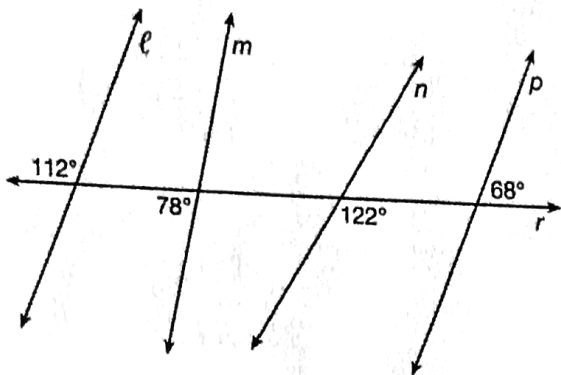


How many square units are in the area of $\triangle RST$?

- (A) $9\sqrt{3} + 15$ (B) $9\sqrt{5} + 15$
 (C) 45 (D) 90
26. The coordinates of vertices A and B of $\triangle ABC$ are $A(3, 4)$ and $B(3, 12)$. If the area of $\triangle ABC$ is 24 square units, what could be the coordinates of point C ?
- (A) $(3, 6)$ (B) $(8, -3)$
 (C) $(-3, 8)$ (D) $(6, 3)$
27. The two angles formed as a result of a bisector will always be _____.
- (A) complementary (B) supplementary
 (C) right (D) congruent
28. Which of the following can be the lengths of the sides of a triangle?

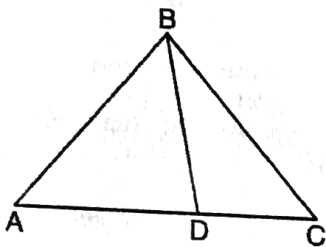
- (A) $5\frac{1}{2}, 5\frac{1}{2}, 11$ (B) 5, 6, 7
 (C) 4, 4, 8 (D) 4, 9, 13

29. In the diagram below, lines ℓ , m , n , and p intersect line r .



Which statement is true?

- (A) $\ell \parallel n$ (B) $\ell \parallel p$ (C) $m \parallel p$ (D) $m \parallel n$
30. In the diagram below, $m\angle BDC = 100^\circ$, $m\angle A = 50^\circ$, and $m\angle DBC = 30^\circ$.

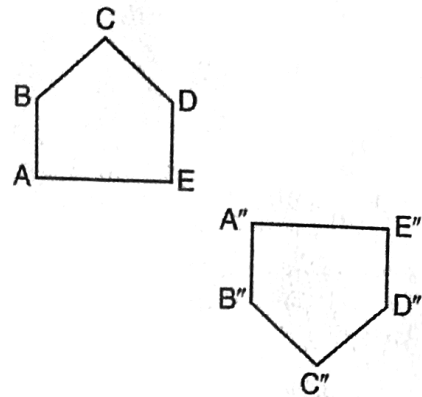


Which statement is true?

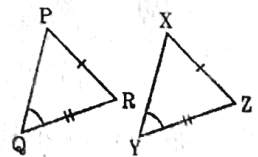
- (A) $\triangle ABD$ is obtuse. (B) $\triangle ABC$ is isosceles.
 (C) $m\angle ABD = 80^\circ$ (D) $\triangle ABD$ is scalene.
31. According to the Triangle Inequality Theorem, if 20 and 25 are the lengths of two sides of a triangle, then an inequality that represents all possible lengths for the third side is _____.

- (A) $0 < s < 45$ (B) $5 < s < 45$
 (C) $0 < s < 5$ (D) $5 \leq s \leq 45$

32. Identify which sequence of transformations could map pentagon $ABCDE$ onto pentagon $A''B''C''D''E''$, as shown below.

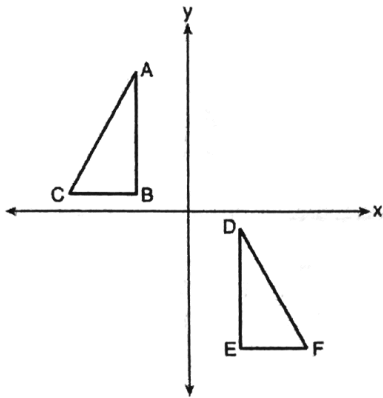


- (A) dilation followed by a rotation
 (B) translation followed by a rotation
 (C) line reflection followed by a translation
 (D) line reflection followed by a line reflection
33. What is the point halfway between $(3x, 6y)$ and $(-x, 0)$?
- (A) $(2x, -6y)$ (B) $(4x, 3y)$
 (C) $(4x, 0)$ (D) $(x, 3y)$
34. The midpoint of \overline{RS} is $(2, 2)$. If $R = (-2, -6)$, then $S =$
- (A) $(0, -4)$ (B) $(0, -2)$
 (C) $(6, 10)$ (D) $(15, 5)$
35. State the congruence relation for $\triangle XYZ$ and $\triangle PQR$.



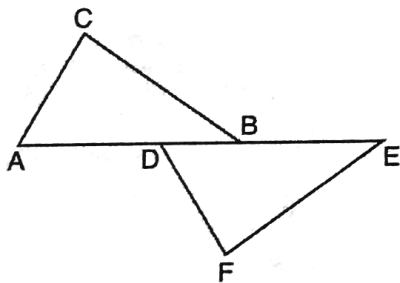
- (A) ASA
 (B) AAA
 (C) SSA
 (D) not necessarily congruent

36. In the diagram below, $\triangle ABC \cong \triangle DEF$.



Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

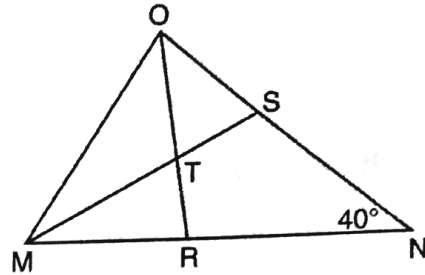
- (A) a reflection over the x -axis followed by a translation
 - (B) a reflection over the y -axis followed by a translation
 - (C) a rotation of 180° about the origin followed by a translation
 - (D) a counterclockwise rotation of 90° about the origin followed by a translation
37. Kelly is completing a proof based on the figure below.



She was given that $\angle A \cong \angle EDF$, and has already proven $\overline{AB} \cong \overline{DE}$. Which pair of corresponding parts and triangle congruency method would *not* prove $\triangle ABC \cong \triangle DEF$?

- (A) $\overline{AC} \cong \overline{DF}$ and SAS
- (B) $\overline{BC} \cong \overline{EF}$ and SAS
- (C) $\angle C \cong \angle F$ and AAS
- (D) $\angle CBA \cong \angle FED$ and ASA

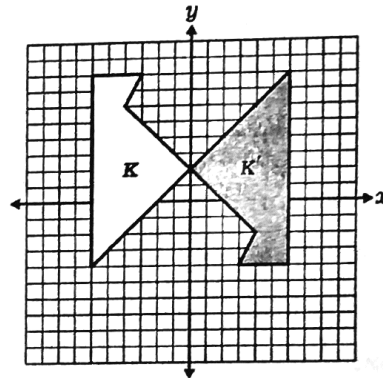
38. In the diagram below of triangle MNO , $\angle M$ and $\angle O$ are bisected by \overline{MS} and \overline{OR} , respectively. Segments \overline{MS} and \overline{OR} intersect at T , and $m\angle N = 40^\circ$.



If $m\angle TMR = 28^\circ$, the measure of angle OTS is

- (A) 40°
- (B) 50°
- (C) 60°
- (D) 70°

39. In the diagram, K and K' are congruent.

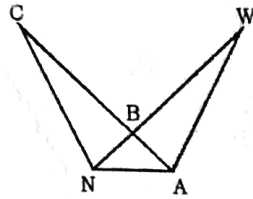


Which of the following is a way of transforming K into K' ?

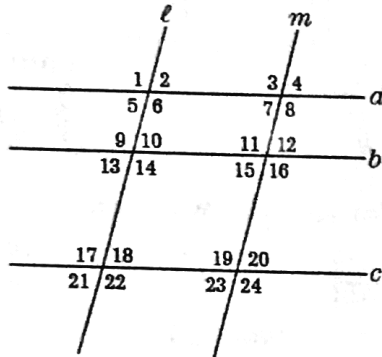
- (A) a rotation of 180° about the origin
- (B) a clockwise rotation of 90° about the point $(0, 2)$
- (C) a reflection across the x -axis, then a translation down 2 units
- (D) a reflection across the y -axis, then a reflection across the line $y = 2$

40. In the figure, $m\angle CNA = m\angle WAN$ and $CN = WA$. What congruence statement proves $\triangle CAN \cong \triangle WNA$?

- (A) SAS
 (B) ASA
 (C) SSA
 (D) not necessarily congruent



41.



Given the diagram above, if $m\angle 6 = m\angle 5$ and $m\angle 19 = m\angle 20$, which of the following is true?

- (A) line l and line a are perpendicular
 (B) line m and line b are perpendicular
 (C) line l and line c are perpendicular
 (D) line a and line c are parallel

42. The teacher sketches $\triangle JOY$ on the board with the following specifications:

$$m\angle J = 2x + 11$$

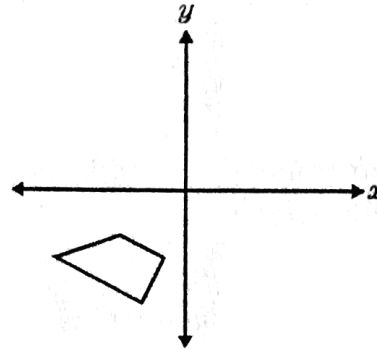
$$m\angle O = 4x + 9$$

$$m\angle Y = x + 27$$

She then asks her students which side of the triangle is the shortest. Enrique answers \overline{JO} , Jorge answers \overline{OY} , and Stella answers \overline{JY} . Which student is correct?

- (A) Jorge (B) Stella (C) Enrique
 (D) no shortest side, $\triangle JOY$ is equilateral

43. A trapezoid is in the third quadrant of an x - y coordinate system, as shown here:



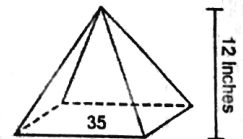
The trapezoid is reflected across the line $y = -x$, then it is reflected across the x -axis. Which of these transformations will put it back in its original position (with the same orientation it had originally)?

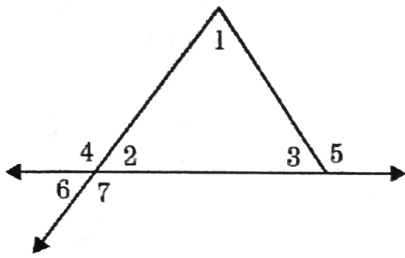
- I. a clockwise rotation of 90° about the origin
 II. a reflection across the line $y = -x$, then a reflection across the y -axis
 III. a reflection across the line $y = x$, then a reflection across the x -axis

- (A) I only (B) I and II only
 (C) II and III only (D) I, II and III

44. Steven purchased a box of chocolate shaped like the one shown in the diagram. The box is 12 inches tall and the area of the bottom of the box is 35 square inches. Which expression can be used to find how much chocolate the box holds?

- (A) 12×35
 (B) $35^2 \times 12$
 (C) $(35^2 \times 12) \div 3$
 (D) $12 \times 35 \times \frac{1}{3}$



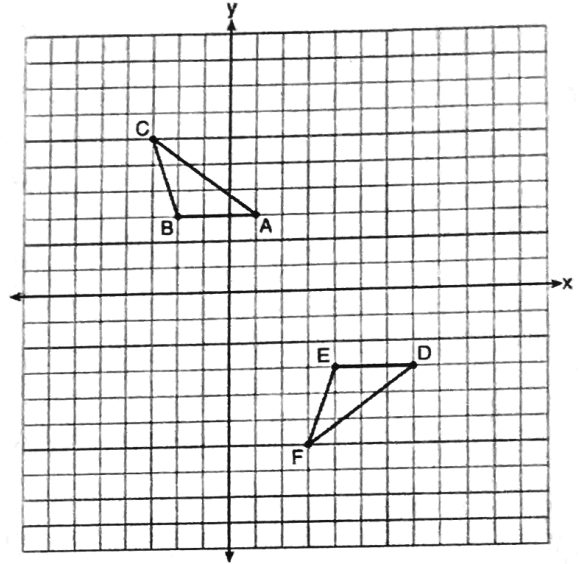


45. In the diagram shown above, $m\angle 5 = 100$ and $m\angle 1 = 30$. Find $m\angle 6$.

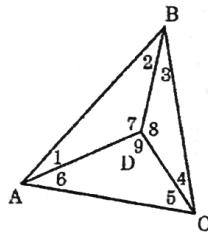
- (A) 40 (B) 60 (C) 70 (D) 80

Show all work.

46. Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.

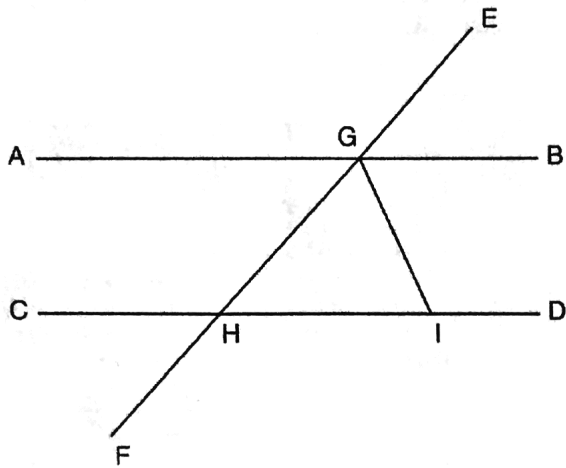


47. Given: $m\angle BAC = m\angle BCA$
 $AD = DC$
 Prove: \overline{BD} bisects $\angle ABC$



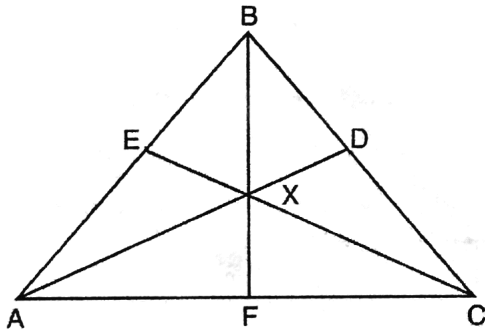
Statements	Reasons

48. In the diagram below, \overline{EF} intersects \overline{AB} and \overline{CD} at G and H , respectively, and \overline{GI} is drawn such that $\overline{GH} \cong \overline{IH}$.



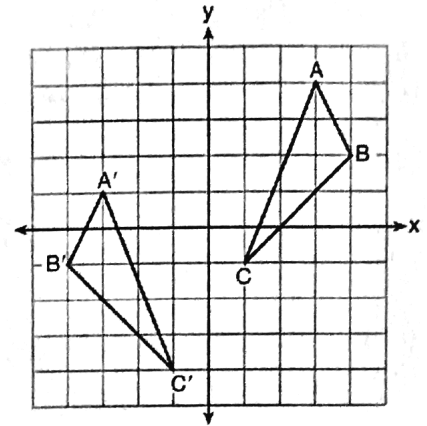
If $m\angle EGB = 50^\circ$ and $m\angle DIG = 115^\circ$, explain why $\overline{AB} \parallel \overline{CD}$.

49. In the diagram below of isosceles triangle ABC , $\overline{AB} \cong \overline{CB}$ and angle bisectors \overline{AD} , \overline{BF} , and \overline{CE} are drawn and intersect at X .



If $m\angle BAC = 50^\circ$, find $m\angle AXC$.

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



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