

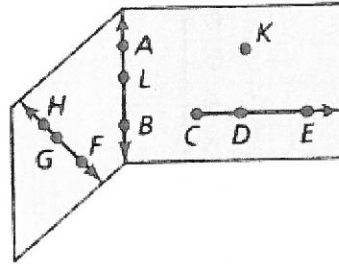
Name: Answer Key

Period: _____

Geometry Midterm Exam Review

For questions #1-5, use the figure to complete each statement.

1. Name 3 collinear points HGF, ALB
2. Name 2 lines HF, AB
3. Name 2 line segments HG, GF, AL, LB, CD, DE
4. Name 2 rays CE, LA, LB, GH, GF
5. Name a plane KCD, HFL



6. Given segment \overline{AB} . If the coordinate of one endpoint of a segment is $A(-2, 6)$ and the coordinate of the midpoint is $M(4, 1)$. Find the coordinate B of the other endpoint of the segment.
 **Use the midpoint formula.

$$4 = \frac{-2 + x}{2}$$

$$8 = -2 + x$$

$$10 = x$$

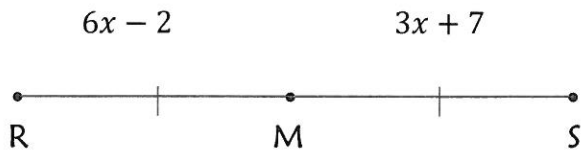
$$1 = \frac{6 + y}{2}$$

$$2 = 6 + y$$

$$-4 = y$$

$(10, -4)$

7. Find RS. 324



$$6x - 2 = 3x + 7$$

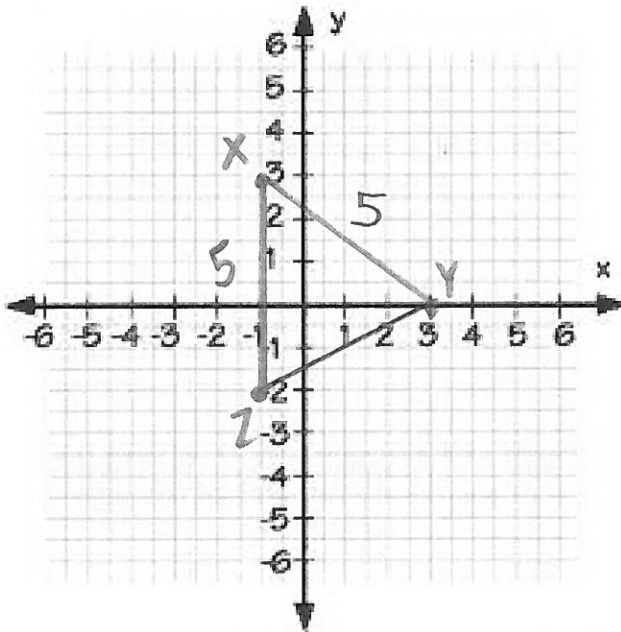
$$3x = 9$$

$$x = 3$$

8. Find the Perimeter and Area of polygon XYZ with vertices X(-1,3), Y(3,0), Z(-1, -2).

Perimeter $10 + 2\sqrt{5}$ u

Area 10 u²



$$A = \frac{b \times h}{2}$$

$$A = \frac{4 \times 5}{2} = 10$$

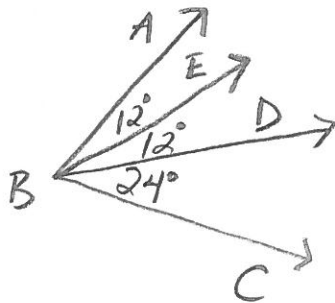
$$XY = \sqrt{(-1-3)^2 + (3-0)^2}$$

$$XY = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$$

$$ZY = \sqrt{(-1-3)^2 + (-2-0)^2}$$

$$ZY = \sqrt{(-4)^2 + (-2)^2} = \sqrt{20} = 2\sqrt{5}$$

9. If \overline{BD} is the angle bisector of $\angle ABC$, \overline{BE} is the angle bisector of $\angle ABD$, and the $m\angle DBC = 24^\circ$, What is the measure of $\angle EBC$? 36° .



10. If the measure of an angle is three times the measure of its **supplement**. Find the measure of each angle.

$$x + 3x = 180$$

$$4x = 180$$

$$x = 45$$

$$45^\circ, 135^\circ$$

11. Rewrite the following statement as a **conditional statement** (if-then form). Then write the **converse** of the conditional statement, and the **inverse** of the conditional statement. State the **truth value** of each. If the statement is false, give a **counterexample**. (8 points)

An angle measure of 91° is an obtuse angle.

Cond. If an angle measures 91° , then it is an obtuse angle.
 Conv. If an angle is obtuse, then it measures 91° . F $> 90^\circ$
 Inv. If an angle does not measure 91° , then it is not obtuse.
 F $> 90^\circ$

12. Given: B is the midpoint of \overline{AC}
 C is the midpoint of \overline{BD}



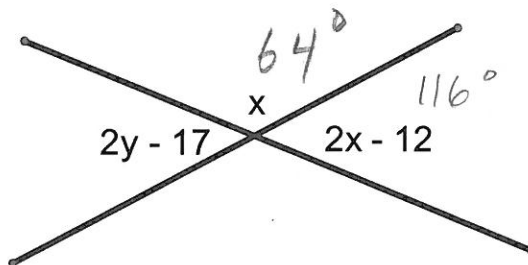
Prove: $AB = CD$

Statements	Reasons
1. B is the midpoint of \overline{AC} C is the midpoint of \overline{BD}	1. Given
2. $\overline{AB} \cong \overline{BC}$	2. Definition of Midpoint
3. $\overline{BC} \cong \overline{CD}$	3. Definition of Midpoint
4. $AB = BC$	4. Definition of Congruent Segments
5. $BC = CD$	5. Definition of Congruent Segments
6. $BC = BC$	6. Reflexive Property
7. $AB = CD$	7. Transitive Property

13. Find the values for x and y .

$$\begin{aligned} x + (2x - 12) &= 180 \\ 3x - 12 &= 180 \\ 3x &= 192 \\ x &= 64 \end{aligned}$$

$$\begin{aligned} 2y - 17 &= 116 \\ 2y &= 133 \\ y &= 66.5 \end{aligned}$$



14. Find each lettered angle measure.

$a = 102^\circ$

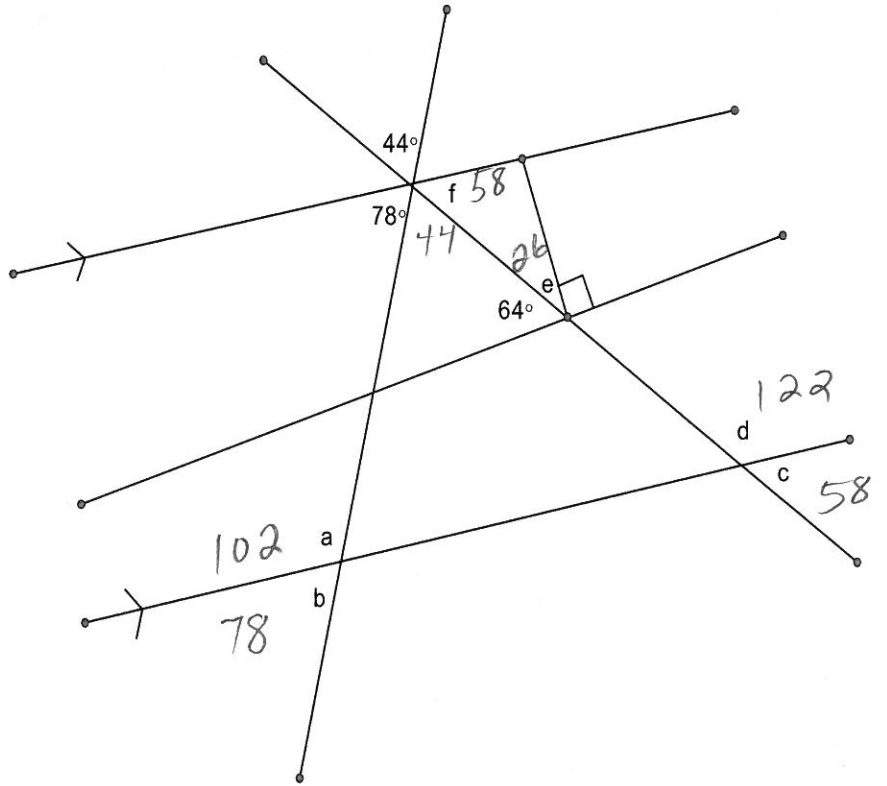
$b = 78^\circ$

$c = 58^\circ$

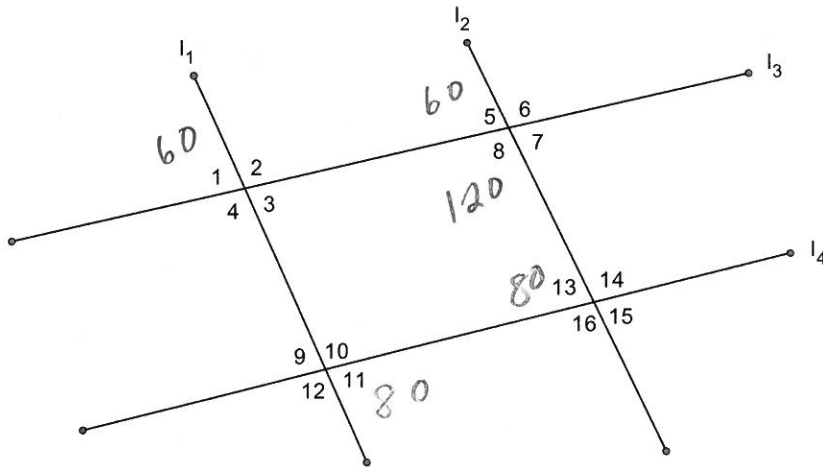
$d = 122^\circ$

$e = 26^\circ$

$f = 58^\circ$



15.



If l_1 and l_2 are parallel, use the following information to solve for x and y .

$m\angle 1 = 60^\circ$

$m\angle 8 = 3x + 2y$

$m\angle 11 = 80^\circ$

$m\angle 13 = 2x - y$

$$3x + 2y = 120$$

$$2(2x - y = 80)$$

$$3(40) + 2y = 120$$

$$120 + 2y = 120$$

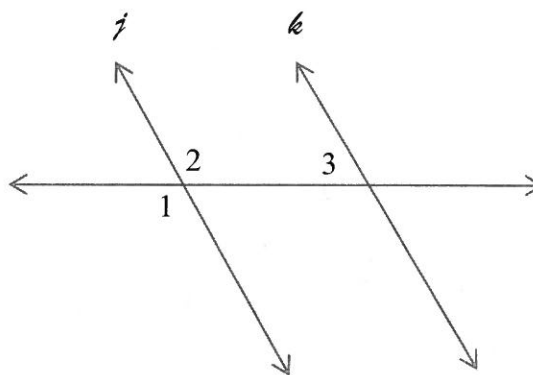
$$2y = 0$$

$$y = 0$$

$$\begin{array}{r} 3x + 2y = 120 \\ 4x - 2y = 160 \\ \hline 7x = 280 \\ x = 40 \end{array}$$

16. Given: $\angle 1$ and $\angle 3$ are supplementary

Prove: $j \parallel k$

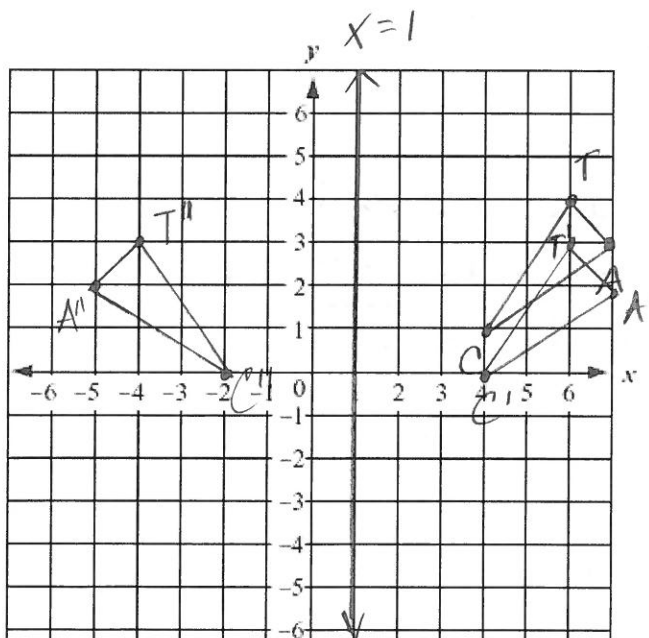


STATEMENTS	REASONS
1. $\angle 1$ and $\angle 3$ are supplementary	1. Given
2. $\angle 1$ and $\angle 2$ are vertical angles	2. Definition of Vertical Angles
3. $\angle 1 \cong \angle 2$	3. Vertical Angles Postulate
4. $\angle 2$ and $\angle 3$ are supplementary	4. Congruent Supplements Theorem
5. $j \parallel k$	5. Converse of Consecutive Angles Theorem

17. Graph $\triangle CAT$ with vertices $C(4, 1)$, $A(7, 3)$, and $T(6, 4)$ and its image after the glide reflection.

Translation: $(x, y) \rightarrow (x, y - 1)$

Reflection: over $x = 1$



18. The vector $\langle 3, -1 \rangle$ describes the translation of $K(2x-1, 8)$ onto $K'(10, 4y-5)$. Find the values of x and y .

$$2x-1+3=10$$

$$2x+2=10$$

$$2x=8$$

$$x=4$$

$$8+(-1)=4y-5$$

$$7=4y-5$$

$$12=4y$$

$$3=y$$

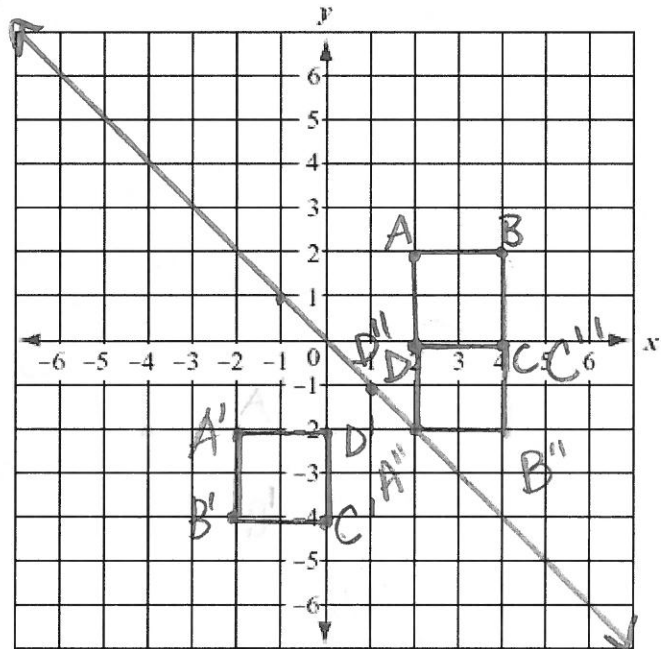
19. Graph quadrilateral ABCD with endpoints A(2, 2), B(4,2), C(4, 0) and D(2, 0), the line of reflection, and its image after the composition.

$$y = -x$$

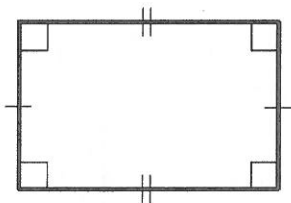
Reflection: over the line $y = -x$

Rotation: 90° about the origin

(x, y)	$(-y, -x)$	$(-y, x)$
A(2, 2)	$\rightarrow A'(-2, -2)$	$\rightarrow A''(2, -2)$
B(4, 2)	$\rightarrow B'(-2, -4)$	$\rightarrow B''(4, -2)$
C(4, 0)	$\rightarrow C'(0, -4)$	$\rightarrow C''(4, 0)$
D(2, 0)	$\rightarrow D'(0, -2)$	$\rightarrow D''(2, 0)$



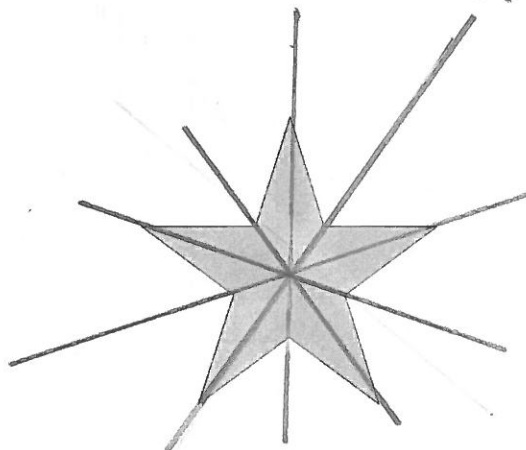
20. Does the following figure have rotational symmetry? If yes, what degree(s)?



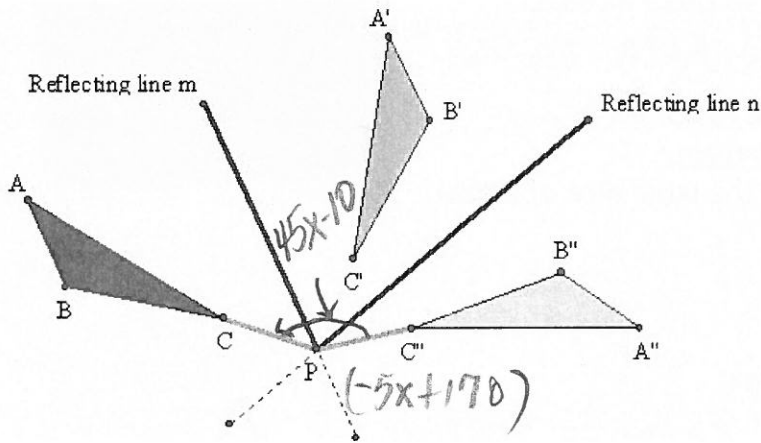
Yes, 180° the figure is rotated and mapped onto itself.

21. Draw the lines of symmetry.

5



22. The acute angle of the intersecting lines is represented by $45x - 10$ and the angle of rotation about P that maps $\triangle ABC$ to $\triangle A''B''C''$ is represented by $(-5x + 170)$. Solve for x . Find the measures of each angle.



$$2(45x - 10) = -5x + 170$$

$$90x - 20 = -5x + 170$$

$$85x = 190$$

$$x = 2$$

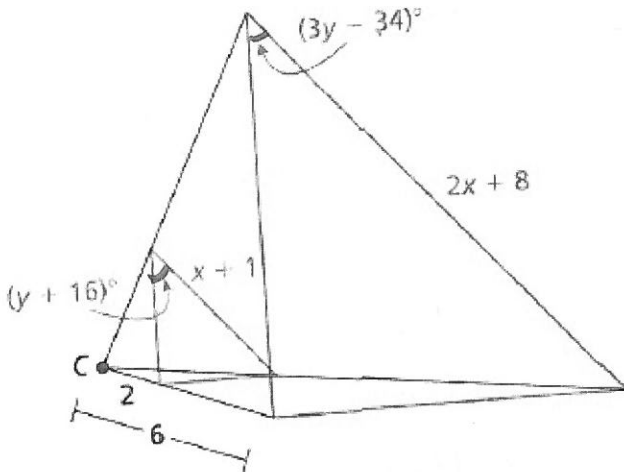
$$80^\circ \text{ and } 160^\circ$$

23. What is the pre-image of $D'(4, -3)$ using the translation $(-8, 4)$?

$$4 - (-8) = 12 \quad D(12, -7)$$

$$-3 - 4 = -7$$

24. The larger triangle is a dilation of the smaller triangle. Solve for x and y .



$$y + 16 = 3y - 34$$

$$50 = 2y$$

$$25 = y$$

$$\frac{2}{6} = \frac{x+1}{2x+8}$$

OR

Scale factor = 3

$$3(x+1) = 2x+8$$

$$3x+3 = 2x+8$$

$$x = 5$$

$$6x+6 = 4x+16$$

$$2x = 10$$

$$x = 5$$

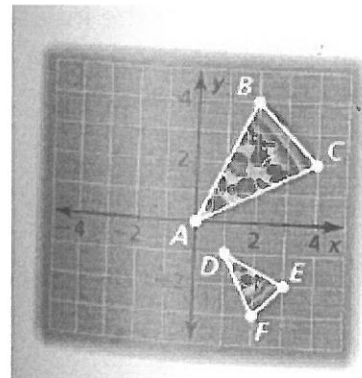
25. There is one slice of large pizza and one slice of small pizza in the box.

- a) Describe a similarity transformation that maps pizza slice ABC to pizza slice DEF.

Dilation $\frac{1}{2}$ and Rotation 270°

- b) What is one possible scale factor for a medium slice of pizza? Explain.

(Hint: Use a dilation on the large slice of pizza)



$$\frac{1}{2} < k < 1$$

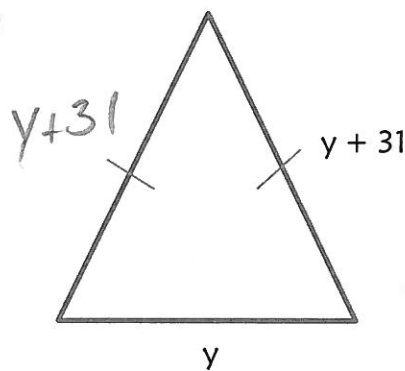
26. The perimeter of the triangle is 344.

$$y + (y + 31) + (y + 31) = 344$$

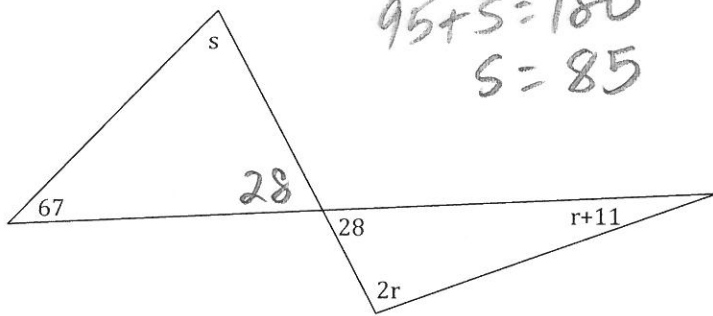
$$3y + 62 = 344$$

$$3y = 282$$

$$y = 94$$



- 27.



$$95 + s = 180$$

$$s = 85$$

$$2r + (r + 11) + 28 = 180$$

$$3r + 39 = 180$$

$$3r = 141$$

$$r = 47$$

28. What are the possible values for the range of x given triangle with side lengths x , 4, 15. Select all that apply.

$$15 - 4 < x < 15 + 4$$

$$11 < x < 19$$

a) 11

b) 19

c) 12

d) 18.5

e) 10.5

29. Classify the triangles by angle with the given side lengths.

a) 12 m, 16 m, 20 m

$$20^2 \stackrel{?}{=} 12^2 + 16^2$$

$$400 = 400$$

Right triangle

b) 7 mm, 7 mm, 9 mm

$$9^2 \stackrel{?}{=} 7^2 + 7^2$$

$$81 < 98$$

Acute triangle

30. Given the vertices R (0, 4), H (-2, -1) and S (4, -4). Classify the triangle by its sides. Is the triangle also a right triangle? $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

$$RH = \sqrt{(0 - (-2))^2 + (4 - (-1))^2}$$

$$RH = \sqrt{4 + 25} = \sqrt{29}$$

$$HS = \sqrt{(-2 - 4)^2 + (-1 - (-4))^2}$$

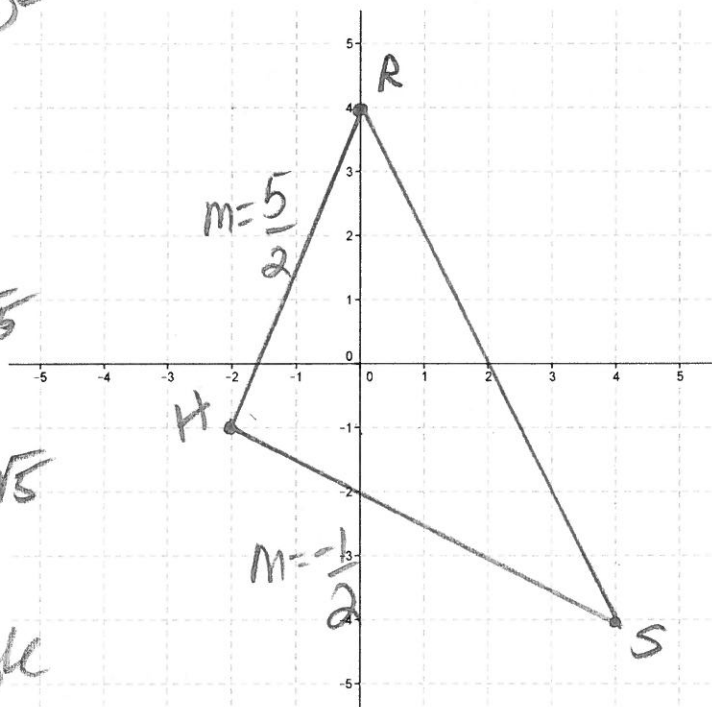
$$HS = \sqrt{36 + 9} = \sqrt{45} = 3\sqrt{5}$$

$$RS = \sqrt{(0 - 4)^2 + (4 - (-4))^2}$$

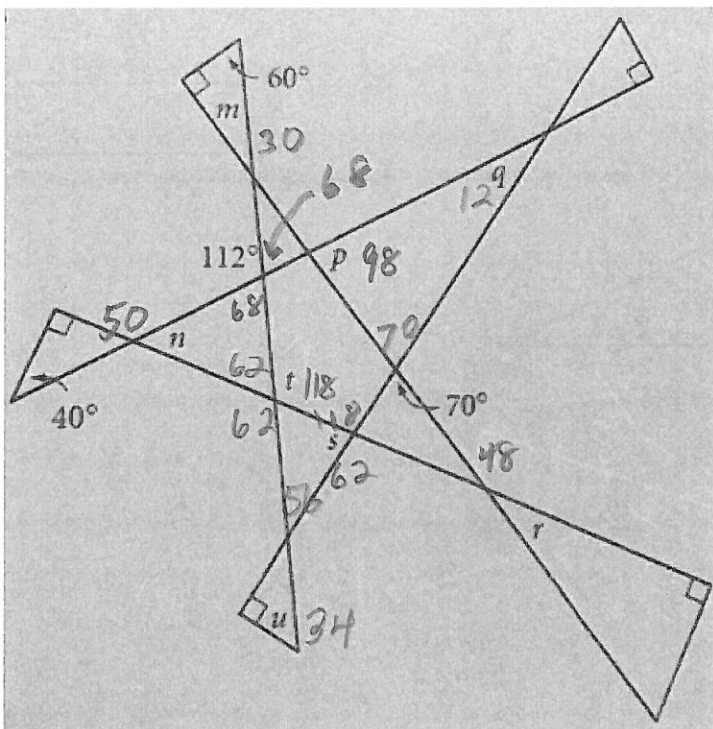
$$RS = \sqrt{16 + 64} = \sqrt{80} = 4\sqrt{5}$$

The triangle is scalene.

It is not a right triangle because the slopes are not opposite reciprocal.

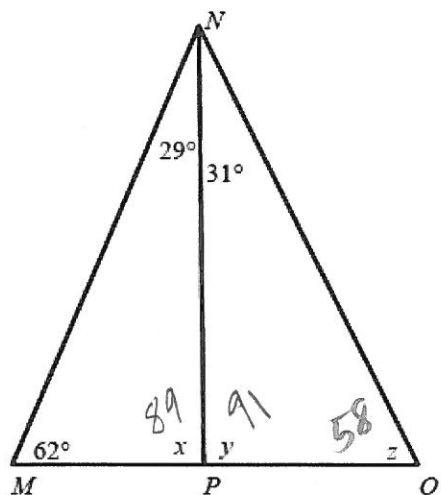


31. Find the values of the missing variables.



- $m = 30^\circ$
- $n = 50^\circ$
- $p = 98^\circ$
- $q = 12^\circ$
- $r = 48^\circ$
- $s = 62^\circ$
- $t = 118^\circ$
- $u = 34^\circ$

32.

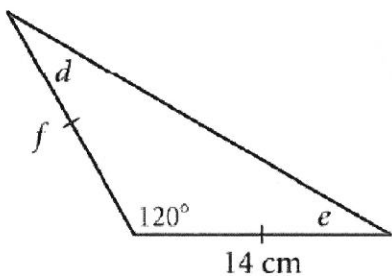


$$x = \underline{89^\circ}$$

$$y = \underline{91^\circ}$$

$$z = \underline{58^\circ}$$

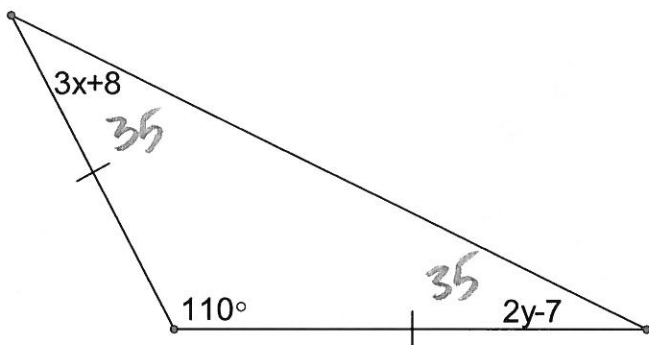
33.



$$180 - 120 = 60$$

$$d = \underline{30^\circ} \quad e = \underline{30^\circ} \quad f = \underline{14 \text{ cm}}$$

34.



$$x = \underline{9}$$

$$y = \underline{21}$$

$$3x + 8 = 35$$

$$3x = 27$$

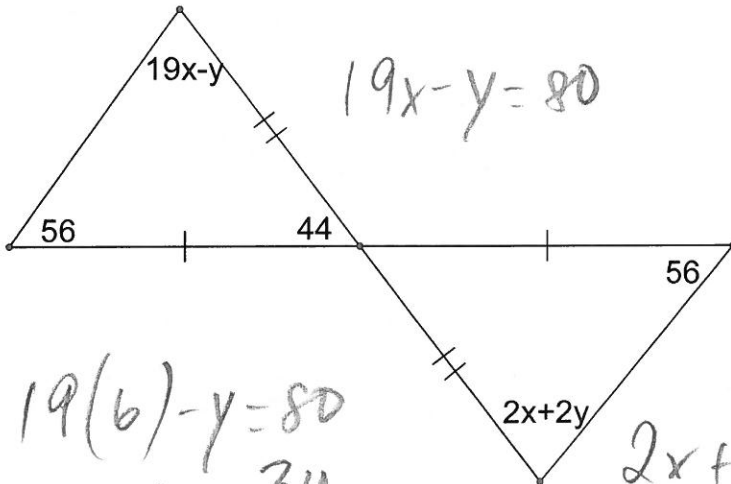
$$x = 9$$

$$2y - 7 = 35$$

$$2y = 42$$

$$y = 21$$

35.



$$x = \underline{6}$$

$$y = \underline{34}$$

$$2(19x - y = 80)$$

$$2x + 2y = 80$$

$$19(6) - y = 80$$

$$y = 34$$

$$2x + 2y = 80$$

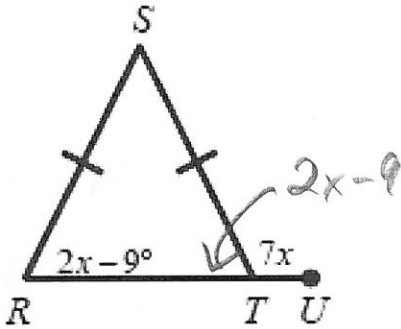
$$38x - 2y = 160$$

$$2x + 2y = 80$$

$$40x = 240$$

$$x = 6$$

36.



$$x = \underline{21}$$

$$(2x - 9) + 7x = 180$$

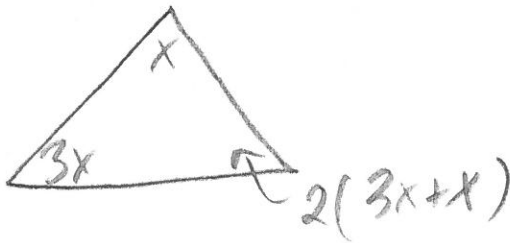
$$9x - 9 = 180$$

$$9x = 189$$

$$x = 21$$

37.

The measure of one angle in a triangle is 3 times the measure of the third angle. The second angle is 2 times the sum of the other two angles. Find the measure of each angle of the triangle.



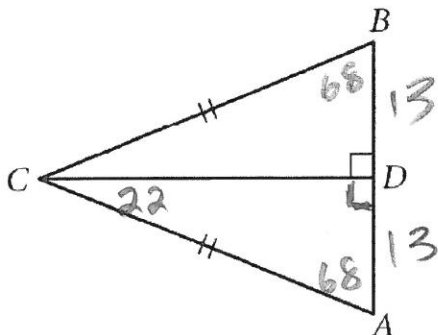
$$x + 3x + 8x = 180$$

$$12x = 180$$

$$x = 15$$

$$15^\circ, 45^\circ, 120^\circ$$

38.



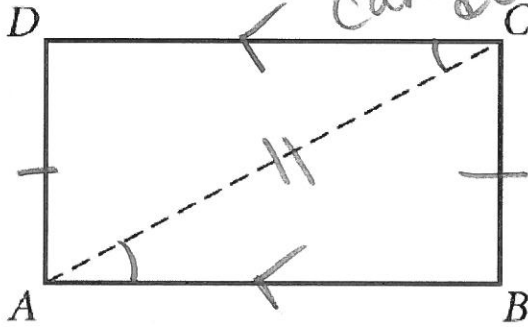
$$m\angle A = 68^\circ, AD = 13 \text{ cm}$$

$$m\angle ACD = \underline{22^\circ}$$

$$AB = \underline{26 \text{ cm}}$$

Use the given information to mark the triangles and complete the congruence statement by telling which congruence theorem supports the congruence statement. If the triangles cannot be proven as congruent from the information given, write "cannot be determined."

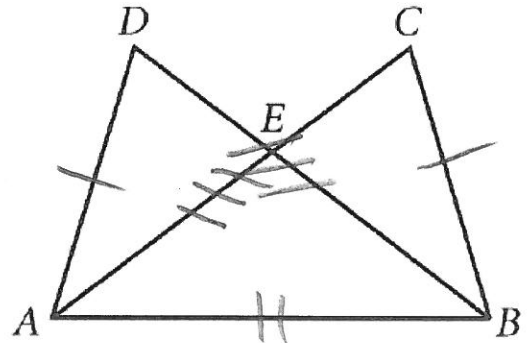
39. $\overline{AB} \parallel \overline{CD}$, $\overline{AD} \cong \overline{BC}$
 $\triangle ABC \cong \triangle$ _____



Theorem _____

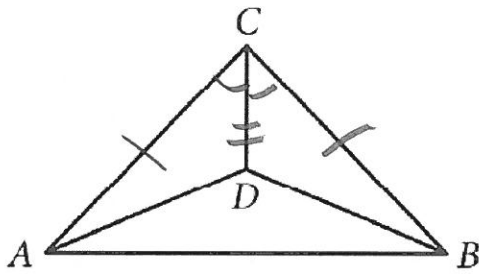
SSA cannot be determined.

40. $\overline{AC} \cong \overline{BD}$, $\overline{AD} \cong \overline{BC}$
 $\triangle ADB \cong \triangle$ BCA



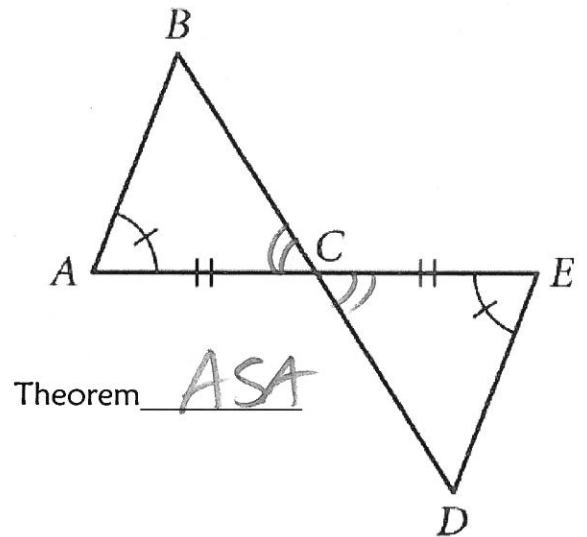
Theorem SSS

41. \overline{CD} bisects $\angle C$, $\overline{AC} \cong \overline{BC}$
 $\triangle ACD \cong \triangle$ BCD



Theorem SAS

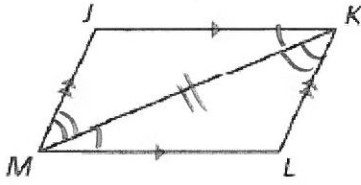
42. $\triangle ABC \cong \triangle$ EDC



Theorem ASA

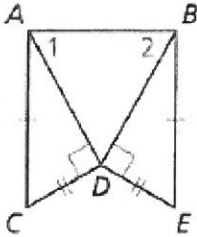
AIA = Alternate Interior Angles

43. Given $\overline{JK} \parallel \overline{ML}$, $\overline{MJ} \parallel \overline{KL}$
 Prove $\triangle MJK \cong \triangle KLM$



Statements	Reasons
1. $\overline{JK} \parallel \overline{ML}$ $\overline{MJ} \parallel \overline{KL}$	1. Given
2. $\angle JKM \cong \angle LMK$	2. AIA Theorem
3. $\angle JMK \cong \angle LKM$	3. AIA Theorem
4. $\overline{KM} \cong \overline{KM}$	4. Reflexive Property
5. $\triangle MJK \cong \triangle KLM$	5. ASA

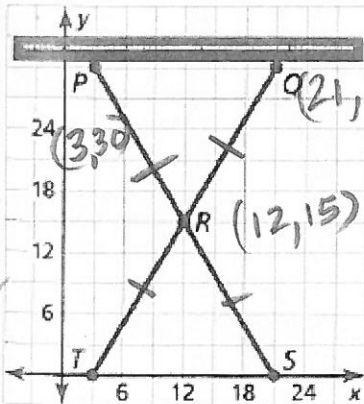
44. Given: $\triangle ADC \cong \triangle BDE$
 Prove: $\angle 1 \cong \angle 2$



Statements	Reasons
1. $\triangle ADC \cong \triangle BDE$	1. Given
2. $\overline{AD} \cong \overline{BD}$	2. CPCTC
3. $\triangle ADB$ is an isosceles triangle.	3. Definition of isosceles triangle
4. $\angle 1 \cong \angle 2$	4. Base Angle Theorem

45. Prove that the triangles formed by the legs of the keyboard are congruent.

Can also use SAS if show $\angle PRQ$ and $\angle SPT$ are vertical angles



$\overline{QR} \cong \overline{TR}$
 \therefore SSS

$PQ = |22 - 3| = 19$

$ST = |22 - 3| = 19$

$\overline{PQ} \cong \overline{ST}$

$PR = \sqrt{(3-12)^2 + (30-15)^2} = \sqrt{81+225} = 3\sqrt{34}$

$SR = \sqrt{(21-12)^2 + (0-15)^2} = 3\sqrt{34}$

$\overline{PR} \cong \overline{SR}$

$QR = \sqrt{(21-12)^2 + (30-15)^2} = 3\sqrt{34}$

$TR = \sqrt{(3-12)^2 + (0-15)^2} = 3\sqrt{34}$

