GEOMETRY 21 MID-TERM EXAM REVIEW

Name: _____   Period: _____

Note to student: This packet should be used as practice for the Geometry 21 midterm exam. This should not be the only tool that you use to prepare yourself for the exam. You must go through your notes, re-do homework problems, class work problems, formative assessment problems, and questions from your tests and quizzes throughout the year thus far. The sections from the book that are covered on the midterm exam are:

Chapter 1	
1-2	Points, Lines, and Planes
1-3	Measuring Segments
1-4	Measuring Angles
1-5	Angle pairs
1-6	Basic Constructions
Chapter 9	
9-1	Translations
9-2	Reflections
9-3	Rotations
9-6	Dilations
Chapter 2	
2-2	Conditional Statements
2-3	Biconditionals and Definitions
2.5	Reflexive, symmetric, etc
2-6	Proving Angles Congruent
Chapter 3	
3-1	Lines and Angles
3-2	Properties of Parallel Lines
3-3	Proving Lines Parallel
3-4	Parallel and Perpendicular Lines
3-5	Parallel Lines and Triangles
3-6	Constructing Parallel and Perpendicular Lines
Chapter 4	
4-1	Define congruent figures
4-2	Triangle Congruence by SSS and SAS
4-3	Triangle Congruence by ASA and AAS
4-4	Using Corresponding Parts of Congruent Triangles
4-5	Isosceles and Equilateral Triangles
4-6	Congruence in Right Triangles
4-7	Congruence in Overlapping Triangles
Chapter 5	
5-1	Midsegments of Triangles
5-2	Perpendicular and Angle Bisectors
5-3	Bisectors in Triangles
5-4	Medians and Altitudes
5-6	Inequalities in one triangle
Chapter 6	
6-1	The Polygon-Angle Sum Theorems
GOOD LUCK!	

Suppose J is between H and K. Use the segment Addition Postulate to solve for the given variable and find the length of each segment.

1. $HJ = 3(x + 2)$

   $JK = 3x - 4$

   $KH = 44$

2. $HJ = 8x - 3$

   $JK = 12x - 5$

   $KH = 112$

Let Q be in the interior of ⊀POR. Use the Angle Addition Postulate to solve for x. Find the measure of each angle.

3. $m\angle POQ = (x + 4)°$

   $m\angle QOR = (2x - 2)°$

   $m\angle POR = 26°$

4. $m\angle POQ = (3x + 7)°$

   $m\angle QOR = (5x - 2)°$

   $m\angle POR = 61°$

5. $\overleftrightarrow{MO}$ bisects ∠LMN. If m∠LMO = $(x^2 + 4x - 5)°$ and m∠LMN = $(9x + 5)°$, solve for x and find m∠NMO.

6. If two planes intersect, then their intersection is always a _____.

7. Through any three noncollinear points there is exactly one_____.

8. Through any two points there is exactly one _____.

9. Draw a pair of angles that are adjacent but not a linear pair.

For # 10 & 11, refer to the figure at the right.

10. $\overline{EB}$ is a _____ of ΔABC

11. _____ is an altitude of ΔABC.
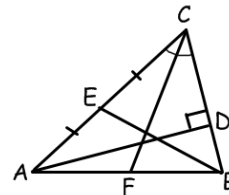
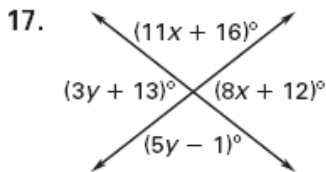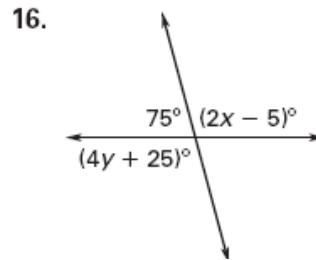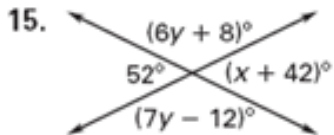12. Find the value of x if $\overline{AD}$ is an altitude of ΔABC.
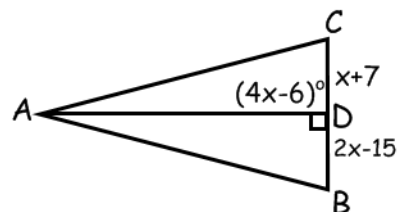
13. Draw a Venn Diagram to represent the statement: "A triangle is a polygon."

14. Write a conditional statement that is represented by the Venn Diagram at right.

_____
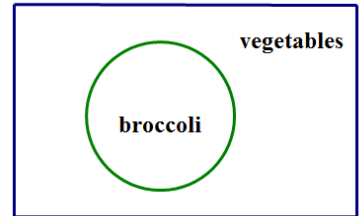
For #15-18, find the value(s) of the variable(s).

vegetables

broccoli

15.
$(6y + 8)°$
$52°$ $(x + 42)°$
$(7y - 12)°$

16.
$75°$ $(2x - 5)°$
$(4y + 25)°$

17.
$(11x + 16)°$
$(3y + 13)°$ $(8x + 12)°$
$(5y - 1)°$

18.
$(3x + 17)°$
$(2y + 9)°$ $(3y - 20)°$
$(5x - 47)°$
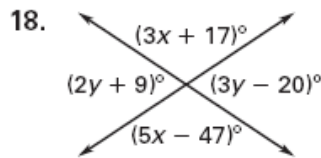
20. In triangle ABC, m∠B is 3 times the m∠A. m∠C is 20 less than 4 times m∠A. Find the measure of each angle.

19. Assume that $\angle A$ is supplementary to $\angle B$ and complementary to $\angle C$. Determine $m\angle A$, $m\angle B$, and $m\angle C$ if $m\angle A = (x + 10)°$, $m\angle B = (12x + 1)°$, $m\angle C = (5x + 2)°$

Find the values of the variables.

22.

21.
$x°$ $(3x + 8)°$
$(2y - 17)°$

$(2y - 17)°$
$70°$
$(4x)°$
$40°$
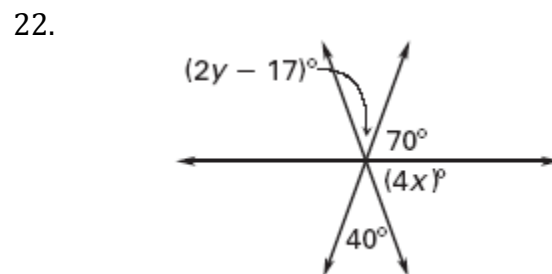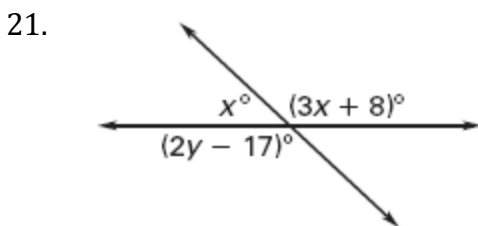
Write the conditional and converse of the statement, and determine if the converse is true. If both statements are true, write a biconditional, if not, give a counterexample.

23. If an angle measure is 32 degrees, then it is an acute angle.

24. An equilateral triangle is a triangle with 3 congruent angles.

25. When $x = 3$, $x^2 = 9$
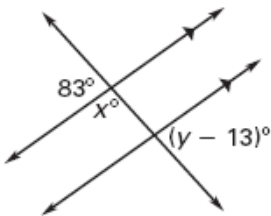
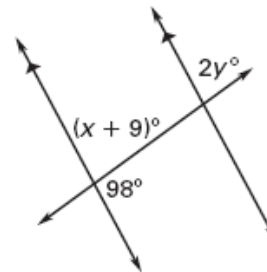**Find the measure of all labeled angles in the diagram.**
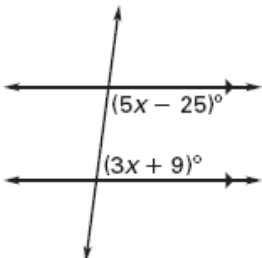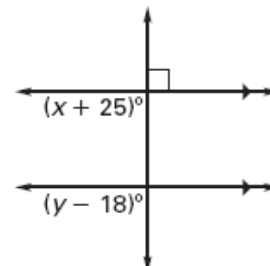
26.
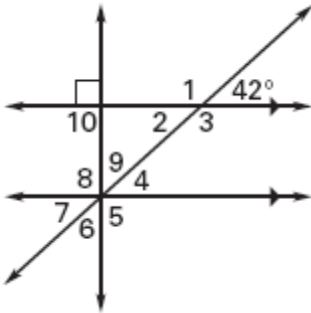
27.
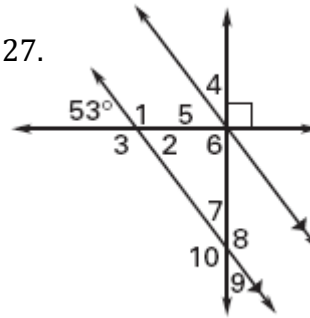
Find the value of x and y.

28.

29.

30.

31.

Solve for the given variable and find the angle measures.

32.

$(4x + 8)°$ $(2x + 3)°$

$51°$

33.

$2x°$

$(103 - x)°$ $(6x - 7)°$

34.

$80°$ $x°$

$(3x - 22)°$

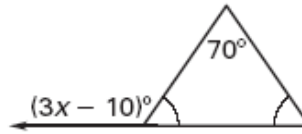35.

$3x°$

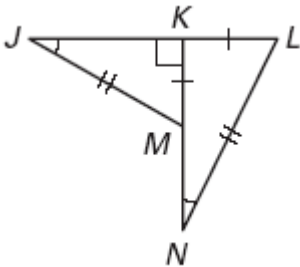$(5x - 14)°$

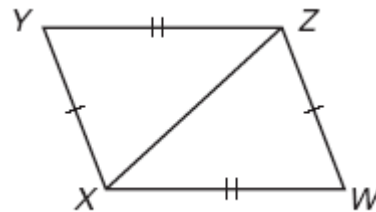36.

$51°$

$x°$

37.

$70°$

$(3x - 10)°$
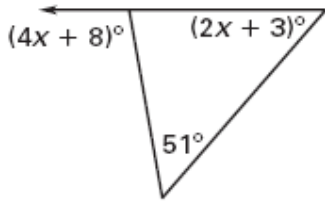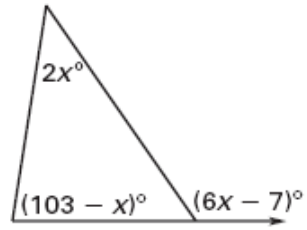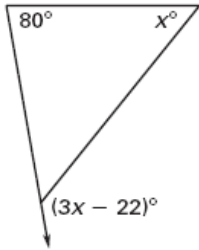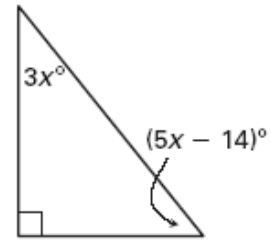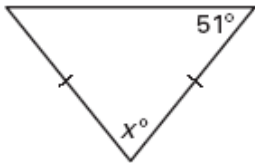
Name which triangle congruence theorem or postulate you would use to prove the triangles congruent.

38.

J   K   L

M

N

39.

Y   Z

X   W

40.

J

I   U

L

41.

J   O

P

K   L   M   N

42.

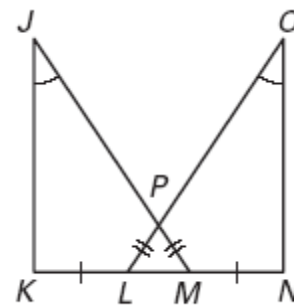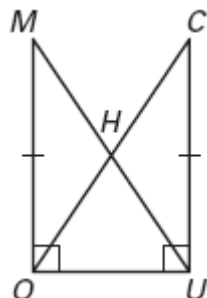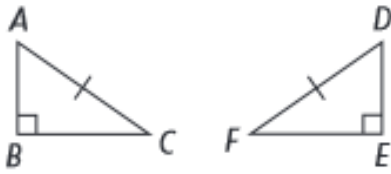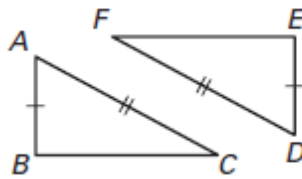M   C

H

O   U
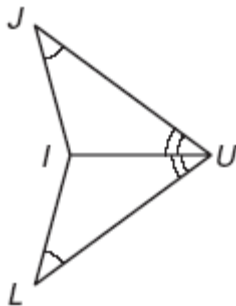
LABEL AND STATE the third congruence that is needed to prove the two triangles congruent using the given theorem.
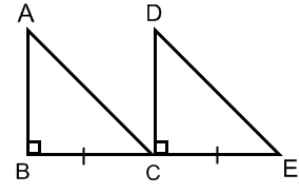
43. **HL≅**   44. **SAS ≅**   45. **ASA ≅**

_____ ≅ _____   _____ ≅ _____   _____ ≅ _____

46. What is being constructed in the figure to the right?

   a. Perpendicular bisector
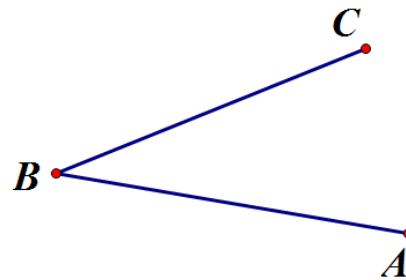   b. Parallel lines
   c. Circle
   d. Copy of an angle
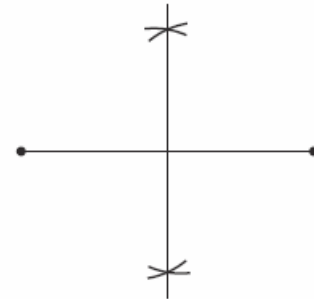
47. Perform the following constructions with a compass and straightedge;
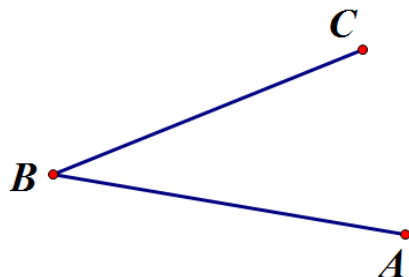
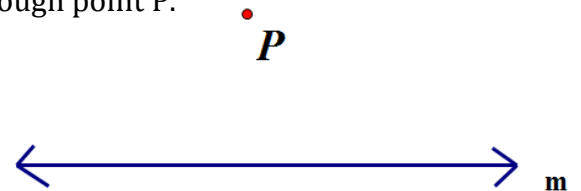   a. Construct the perpendicular bisector of the segment LK. Mark it accordingly.

   L ——————————————— K

   b. Construct the angle bisector of <ABC. Mark it accordingly.

   C

   B

   A

   c. Construct an angle congruent to <ABC and call it <DEF.
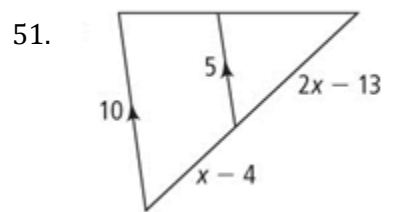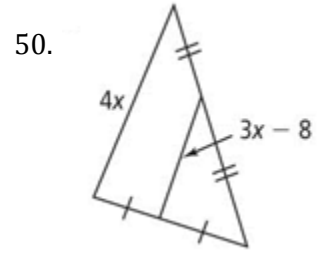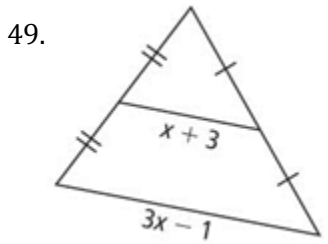
   C

   B

   A

d. Construct the line perpendicular to line m that goes through point P.

P
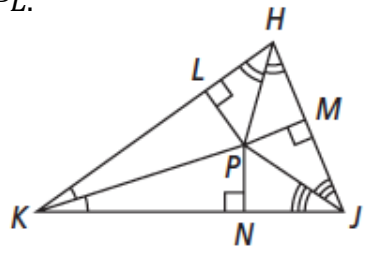
m

48. $\overline{YV}$ is an angle bisector of ΔXYZ. Determine m∡ZYV and m∡XYZ if m∡XYZ = 8x − 6 and m∡XYV = 2x + 7.

For #49-51, solve for x.

49.

$x + 3$

$3x - 1$

50.

$4x$

$3x - 8$

51.

5

$2x - 13$

10

$x - 4$

52. *PM* = 4x + 7 and *PN* = 12x – 5
Find *PL*.

H
L
M
P
K
N
J

53. Solve for x.

$6x + 4$

$8x - 6$
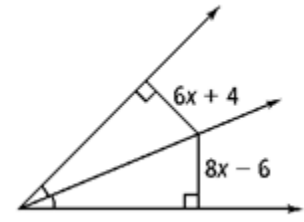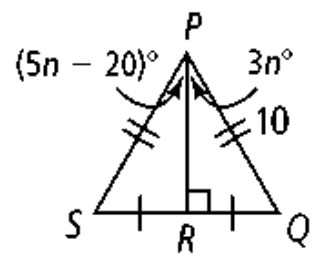
54. a. According to the diagram, what are the lengths of $\overline{PQ}$ and $\overline{PS}$?
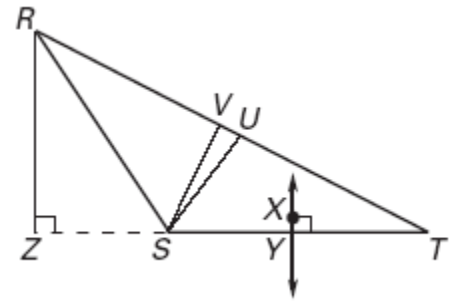
b. How is $\overline{PR}$ related to ∠SPQ?

c. Find the value of n.

d. Find m∠SPR and m∠QPR.

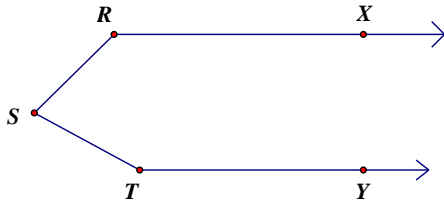P
$(5n - 20)°$ $3n°$
10
S   R   Q

55. Use the diagram shown and the given information to name each line or segment as the altitude, median, angle bisector, or perpendicular bisector of a triangle.
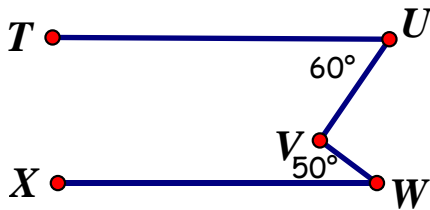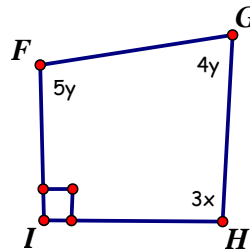
$$m \angle RSV = m \angle TSV, RU = UT \text{ and } SY = TY$$

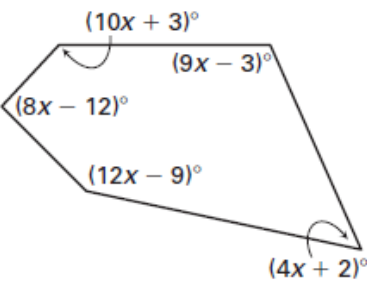56. Find the measure of ∡RST given $\overline{RX} \parallel \overline{TY}$, m∡SRX = 120°, m∡STY = 160°

57. Find m∡UVW given $\overline{TU} \parallel \overline{XW}$.

58. Solve for x and y. $\overline{FI} \parallel \overline{GH}$.

59. Solve for x.

$(10x + 3)°$
$(9x - 3)°$
$(8x - 12)°$
$(12x - 9)°$
$(4x + 2)°$

60. One exterior angle of a regular polygon is 15°, what is the measure of one interior angle? _____

61. One exterior angle of a regular polygon is 36°, how many sides does the polygon have? _____

62. One interior angle of a regular polygon is 160°, how many sides does the polygon have? _____

Use the figure below for #63-70. $\overleftrightarrow{BC} \parallel \overleftrightarrow{JH}$, $\overleftrightarrow{CJ} \parallel \overleftrightarrow{EH}$.

Decide whether the following pairs of angles are congruent. If yes, state the postulate or theorem to support your answer. If no, explain why not.

63. ∠2 *and* ∠12   _____

_____

64. ∠7 *and* ∠3   _____

_____

65. ∠12 *and* ∠16   _____

_____

66. ∠9 *and* ∠15   _____

_____
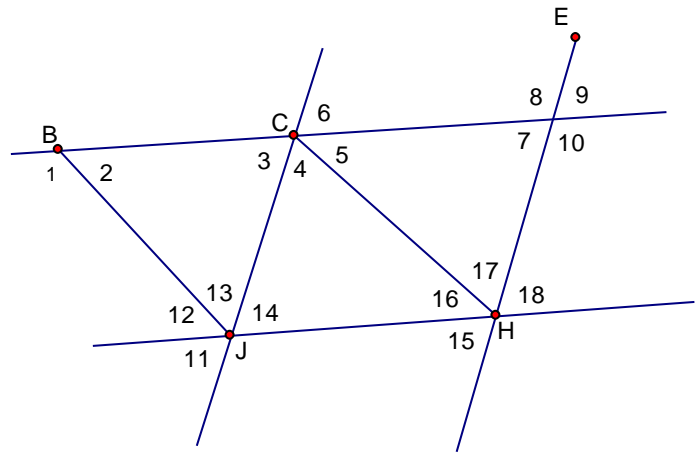
Given the following relationships and using the figure above, which lines (if any) can be proven parallel? Give the postulate or theorem to support your answer.

67. ∠14 ≅ ∠18

__◻__ ; _____

68. ∠13 ≅ ∠4

__◻__ ; _____

69. ∠10 *and* ∠18 are supplementary

__◻__ ; _____

70. ∠11 ≅ ∠18

__◻__ ; _____

71. Find the measures of each of the numbered angles in the figure below.
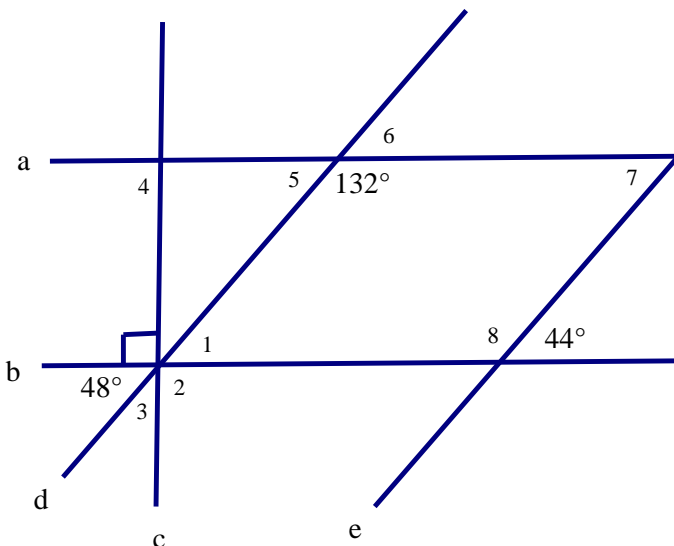
1 = _____   2 = _____

3 = _____   4 = _____

5 = _____   6 = _____
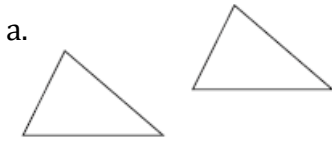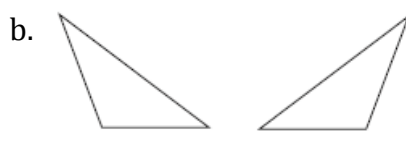
7 = _____   8 = _____

Is $a \parallel b$? _____ Why?_____
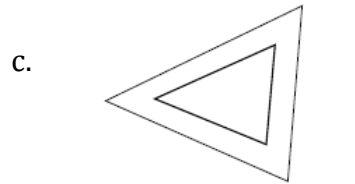
Is $d \parallel e$? _____ Why?_____

72. Tell what type of TRANSFORMATION is shown in each diagram.

a.

b.

c.

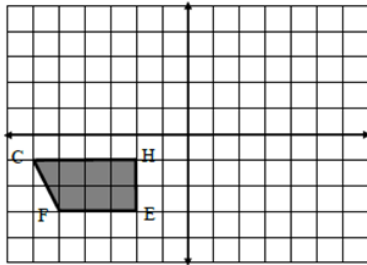_____   _____   _____

For #73 & 74, list the coordinates of the vertices. Perform each transformation. Then list the coordinates of the new vertices. Finally, write the transformation rule.
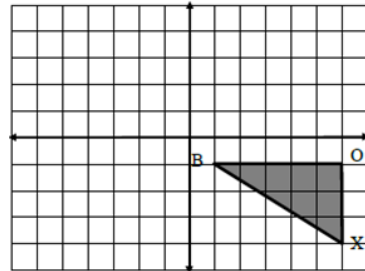
73. Rotate about the origin 90 degrees clockwise

74. Translate left 5 and up 3

Original coordinates _____   Original coordinates _____

New coordinates_____   New coordinates_____

Rule_____   Rule_____

75. Given the point and its image, determine the scale factor.

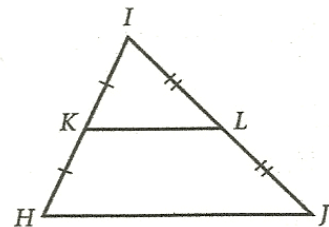a. $A(3,6)$ $A'(4.5, 9)$ b. $G'(3,6)$ $G(1.5,3)$ c. $B(2,5)$ $B'(1,2.5)$

76. The sides of one right triangle are 6, 8, and 10. The sides of another right triangle are 10, 24, and 26. Determine if the triangles the second one is a dilation of the first. If so, what is the scale factor?
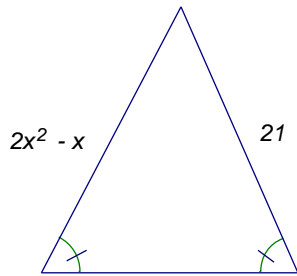
Use the diagram to the right for #77 & 78.
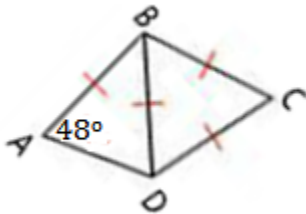
77. If $HJ = 26$ cm, then $KL =$ _____
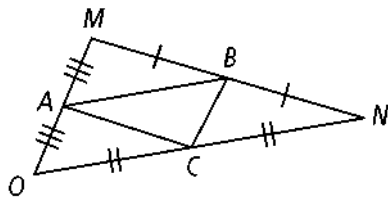
78. If $HJ = 3x - 1$ and $KL = x + 1$, then $HJ =$ _____

79. Solve for x.

2x² - x   21

80. Find the measure of ∠ABC.

81. Solve for x if $AB = 4x + 1, BC = 2x,$ and $AC = 3x + 2.$ The perimeter of $\triangle ABC = 96$ units.

For #82-84, find the possible measures for $\overline{XY}$ in △XYZ. Write as an inequality or "between __ and __"

82. XZ = 6 and YZ = 6   83.   XZ = 9 and YZ = 5   84.   XZ = 11 and YZ = 6

85. Can the following be the side lengths of a triangle?
      a. 32, 50, $\sqrt{350}$ b. 20, 12, 8   c. 122, 106, 100

86. Explain the difference between parallel, intersecting, and skew lines.

87. If line p is parallel to line q, and line p is perpendicular to line m, then must line p intersect line q? Explain.

88. In a plane, if 2 lines are both perpendicular to the same line then _____.

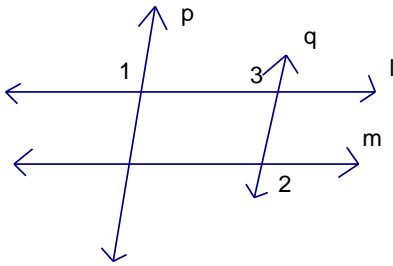89. In a plane, if line p is perpendicular to line m, and line t is also perpendicular to line m, then_____.
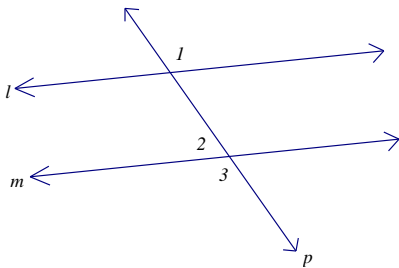
Write a proof for each of the following.

90. **Given:** $\overline{AD} \cong \overline{BC}$; $\overline{AB} \cong \overline{DC}$
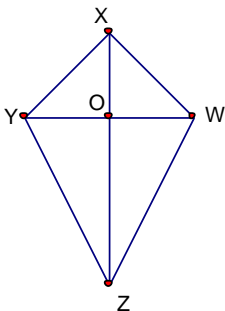   **Prove:** $\overline{AD} \parallel \overline{BC}$
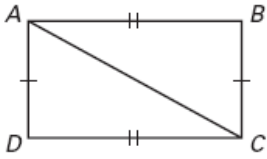
91. **Given:** p || q; ∠1 ≅ ∠2
    Prove: $l \parallel m$
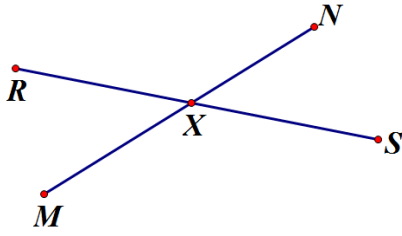

92. **Given:** $l \parallel m$
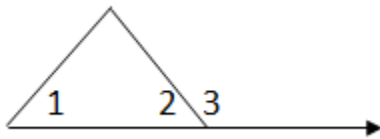   **Prove:** ∠1 and ∠2 are supplementary

93. **Given:** $\overline{XY} \cong \overline{XW}$, $\overrightarrow{XZ}$ bisects ∠YXW
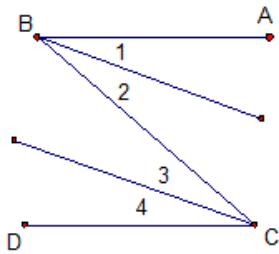   **Prove:** $\triangle ZYX \cong \triangle ZWX$

94. **Given:** X is the midpoint of $\overline{MN}$; $MX = RX$
    Prove: $XN = RX$

95. **Given:** m∠1 + m∠3 = 180
    Prove: ∠1 ≅ ∠2

96. **Given:** ∠1 ≅ ∠3 ; ∠2 ≅ ∠4
    Prove: ∠ABC ≅ ∠BCD

97. **Given:** $\overline{AE} \perp \overline{BE}$; $\overline{CD} \perp \overline{BD}$; $\overline{AC} \parallel \overline{ED}$; ∠BED ≅ ∠BDE
    Prove: B is the midpoint of $\overline{AC}$
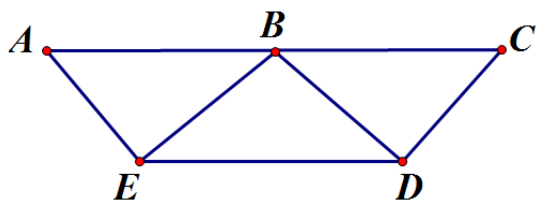
Algebra Skills Practice

Solve each system by substitution.

1) $4x + 3y = -8$
   $-8x + y = -12$

2) $4x - 2y = 8$
   $y = -2$

3) $14x - 2y = 46$
   $-7x + y = -23$

4) $5x + y = 8$
   $-3x + 2y = -10$

Solve each system by elimination.

5) $10x - 8y = 4$
   $-5x + 3y = -9$

6) $-15x + 9y = 27$
   $-5x - y = 17$

7) $-7x - 8y = -23$
   $4x + 4y = 12$

8) $-3x - 10y = -4$
   $x - 5y = 18$

Find all possible values of the given variable by factoring.

1. $6x^2 - 13x = 5$

2. $10x = 25 - 3x^2$

3. $10x^2 + 17x + 3 = 0$

4. $6x^2 - 3 = 7x$

5. $12x^2 - 28x - 5 = 0$

6. $14x^2 + 1 = 9x$

MORE FACTORING PRACTICE

8 $x^2 + 6x + 9 = 0$

9 $c^2 + 7c + 10 = 0$

10 $e^2 + 10e + 9 = 0$

18 $3a^2 + 20a - 7 = 0$

19 $2x^2 - 21x - 11 = 0$

20 $4a^2 + 4a - 35 = 0$