Midterm Exam Review

Name: __Key__

Date: _____ Period: _____
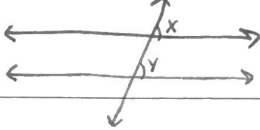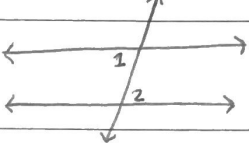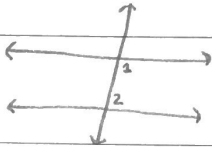
Vocabulary – Describe the following using words, pictures, formulas, etc.

Vocabulary Term	Definition	Picture, Formula or Example
1. The three undefined terms in Geometry	point, line, plane	• ↦→ ◇
2. Complementary angles	angles that add up to 90°	
3. Supplementary angles	angles that add up to 180°	
4. Linear pair	2 angles that create a straight line	
5. Vertical angles	angles directly across from each other	
6. Parallel lines	lines that never intersect	
7. Perpendicular lines	lines that intersect at a right angle	
8. Altitude of a triangle	line segment through vertex and perpendicular to opposite edge.	
9. Median of a triangle	line segment joining a vertex to the middle of opposite side.	
10. Angle bisector	line that bisects an angle.	
11. Midpoint	a point that bisects a segment	A C B
12. Isosceles triangle (label all parts)	a triangle with 2 congruent sides	
13. Right triangle	a triangle with one right angle.	

Midterm Exam Review

14. Equilateral triangle	a triangle with all congruent sides	
15. 4 triangle congruence postulates	SSS ASA SAS AAS	
16. Corresponding angles		
17. Alternate interior angles		
18. Same side interior angles		
19. Slope	measure of steepness of a line	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$
20. Converse	Switching the hypothesis & conclusion	
21. Law of syllogism	if $a=b$ and $b=c$ then $a=c$	
22. Law of detachment	if p then q	

Midterm Exam Review

Name: _____

Date: _____ Period: _____

Unit 1 – Transformations

*Perform the indicated transformation(s). Write the vertex matrix for both the given image and the transformed image. Graph each * problem.*

27. △MNO with M(-5,3), N(0, 4), and O(4, 6); $(x, y) \to (x - 5, y - 3)$

$$\begin{bmatrix} -5 & 0 & 4 \\ 3 & 4 & 6 \end{bmatrix} \to \begin{bmatrix} -10 & -5 & -1 \\ 0 & 1 & 3 \end{bmatrix}$$

28. Quadrilateral PQRS with P(-5, 2), Q(-2,6), R(1, 6), and S(4, 2); r = 5

$$\begin{bmatrix} -5 & -2 & 1 & 4 \\ 2 & 6 & 6 & 2 \end{bmatrix} \to \begin{bmatrix} -25 & -10 & 5 & 20 \\ 10 & 30 & 30 & 10 \end{bmatrix}$$

29. Pentagon PENTA with P(0, 3), E(3,6), N(8, -1), T(6, -2), and A(2, -4); reflected across the y-axis.

$$\begin{bmatrix} 0 & 3 & 8 & 6 & 2 \\ 3 & 6 & -1 & -2 & -4 \end{bmatrix} \to \begin{bmatrix} 0 & -3 & -8 & -6 & -2 \\ 3 & 6 & -1 & -2 & -4 \end{bmatrix}$$

*30. △RST with R(7,4), S(5,-3), and T(2, 6); reflected across the line y = x.

$$\begin{bmatrix} 7 & 5 & 2 \\ 4 & -3 & 6 \end{bmatrix} \to$$

31. △FGH with F(-4,6), G(-2,-1), and H(0, 3); reflected across the x-axis, then reflected across the y-axis.

$$\begin{bmatrix} -4 & -2 & 0 \\ 6 & -1 & 3 \end{bmatrix} \to \begin{bmatrix} -4 & -2 & 0 \\ -6 & 1 & -3 \end{bmatrix} \to \begin{bmatrix} 4 & 2 & 0 \\ -6 & 1 & -3 \end{bmatrix}$$

32. △XYZ with X(-2, 2), Y(4, 2), and Z(1, -5); rotate 180° clockwise.

*33. Pentagon MNOPQ with M(-4, 1), N(-2, 3), O(0, 3), P(4, 3), and Q(2, -7); rotate 90° counterclockwise, then dilate by r = 4.

34. Perform this series of transformations in order on quad ABCD.
    A(-1, 1) B(0, 5) C(1, 2) D(1, -1)
    - $(x, y) \to (3x, 3y)$
    - $(x, y) \to (y, x)$
    - $(x, y) \to (-x, -y)$

    What are the final coordinates?

$$\begin{bmatrix} -1 & 0 & 1 & 1 \\ 1 & 5 & 2 & -1 \end{bmatrix} \to \begin{bmatrix} -3 & 0 & 3 & 3 \\ 3 & 15 & 6 & -3 \end{bmatrix} \to \begin{bmatrix} 3 & 15 & 6 & -3 \\ -3 & 0 & 3 & 3 \end{bmatrix}$$

$$\downarrow$$

$$\begin{bmatrix} -3 & -15 & -6 & 3 \\ 3 & 0 & -3 & -3 \end{bmatrix}$$

Unit 2 – Intro To Geometry

35. Using Figure 1, points B, E, D and F are ____.

    A. collinear

    B. coplanar

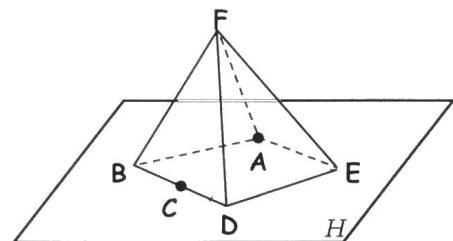   C. both collinear and coplanar

    D. none of the above

Figure 1

Midterm Exam Review

36. If C is the midpoint of $\overline{AB}$, AC = 2x + 1, and BC = 3x – 4, find x and AB.

$2x + 1 = 3x - 4$
$5 = x$

$= 2(5) + 1 + 3(5) - 4$
$= 22$

37. Find SW if W is between S and T, SW = 3x – 2, WT = 2x, and ST = 48.

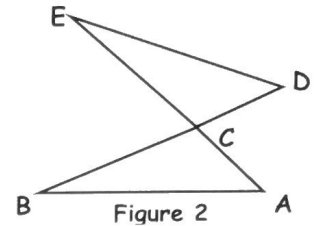$3x-2 \quad 2x$
S   W   T

$3x - 2 + 2x = 48$
$5x = 50 \qquad x = 10$

$SW = 3(10) - 2$
$= 28$

38. Write an equation to describe the relation of points B, C & D in Figure 2.

$$BC + CD = \underline{BD}$$

If BC = 12 and BD = 20, what is CD? $12 + x = 20$

$= 90$

$x = 8$

39. Name the <u>complement</u> of an angle whose measure is 50°.

$x + 50 = 90$
$x = 40°$

40. Find m∠2 in Figure 3.

$4x - 6 = 3x + 10$
$x = 16$
$= 4(16) - 6 = 58°$

$180 \quad 58 = 122°$

58° (4x – 6)°   1 / 2   (3x + 10)° 58°

Figure 3
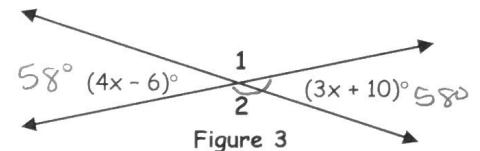
41. M lies in the interior of ∠GHI. m∠GHM = 50° and m∠GHI = 85°. Find m∠IHM.

$50°$ 85 $x = 35°$

H   M
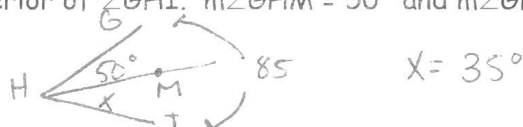
42. If the measure of an angle is 9 times more than the measure of its ⟨supplement,⟩ what is the measure of both angles?

$= 180°$

$x = \boxed{18}$
$9x = 18(9) = \boxed{162}$
$x + 9x = 180$
$10x = 180$
$x = 18$

43. If the measure of an angle is 4 times more than the measure of its complement, what is the measure of each angle?

$x = \boxed{18}$
$4x = 18(4) = \boxed{72}$
$x + 4x = 90$
$5x = 90$
$x = 18$

44. Using Figure 4, which of these is an accurate statement?

A. AG + GE = AE   B. HG + GF = HF

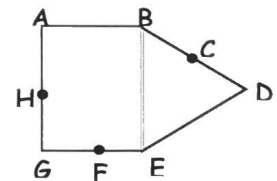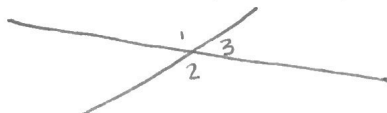C. EF + FG = EG   D. BD + DE = BE

Figure 4

45. If two angles form a linear pair, then they are

    A. vertical angles.   (B.) supplementary angles.

    C. complementary angles.   D. congruent angles.

46. Angles 1 and 2 are vertical angles. Angles 2 and 3 are a linear pair. If $m\angle 1 = 3x + 8$, $m\angle 2 = 5x - 20$, and $m\angle 3 = 5x + 4y$, draw a picture and find x and y. (Hint: Draw a picture!!!)

$$3x + 8 = 5x - 20$$
$$28 = 2x$$
$$14 = x$$

For Questions 47 – 49, $\overline{AD} \perp \overline{HC}$, $\overline{HF} \perp \overline{BE}$ and $m\angle BHC = 43°$.

47. Find $m\angle AHB$. $47°$ $180 - 90 - 43 = 47$

48. Find $m\angle CHE$. $90 + 47 = 137°$

49. Find $m\angle AHE$. $180 - 47 = 133°$
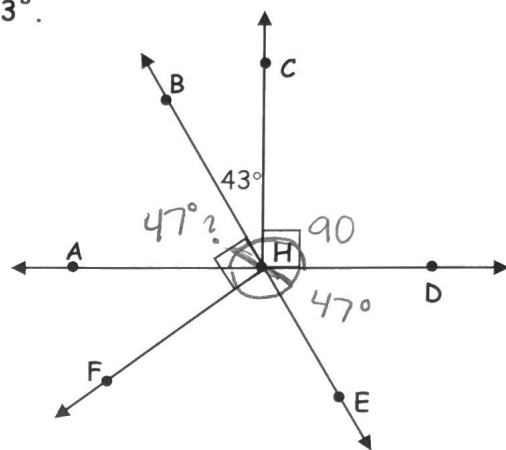
50. Write the following statement in if … then form. Then write the converse. If the converse is false, give a counterexample.

       "All right angles are congruent."

If ~~an~~ angles ~~is a~~ are right angles, then they are congruent.

51. Determine if the following statements use the Law of Detachment, Law of Syllogism, or neither. If a conclusion can be made, write the conclusion.

    a) If a figure is an octagon, then it is a polygon.
        Figure A is an octagon.
        Conclusion: Figure A is a polygon
        Law of Logic: Law of Detachment

    b) If it rains, then the field will be muddy.
        If the field is muddy, then the game will be cancelled.
        Conclusion: If it rains, then the game will be cancelled.
        Law of Logic: Law of Syllogism

___

c) Two complementary angles are acute angles.

∠1 and ∠2 are acute.

Conclusion: _____ None _____

Law of Logic: _____

d) If you like chocolate, then you like Snickers bars.

If you like chocolate, then you like Milky Ways.

Conclusion: _____ None _____

Law of Logic: _____

Unit 3 – Parallel Lines

52. In Figure 5, if m∠2 = 60° , what is m∠5?

$120°$
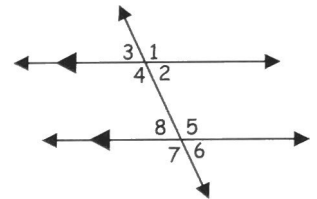
53. In Figure 5, if m∠3 = 73°, find all the other angle measures.

m∠2, m∠8, m∠6 = 73°

m∠1, m∠4, m∠5, m∠7 = 107°

Figure 5

54. In Figure 6a, what kind of angles are 9 and 5?

alt. interior
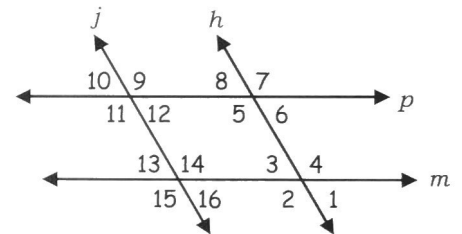
55. In Figure 6a, if ∠9 ≅ ∠5, which 2 lines are parallel?

j and h

56. In Figure 6a, h ∥ j and m∠15 = 110° . What is m∠4?

$110°$

Figure 6a

57. In Figure 6b, what kind of angles are 4 and 7?
What line is their transversal?

corresponding
h
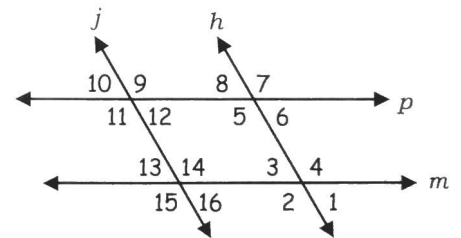
58. If Figure 6b, h ∥ j and m ∥ p. m∠1 = 80° . Find m∠ 10.

$80°$

Figure 6b

6

59. Find the slopes of a line parallel to and perpendicular to the line passing through R(2, -3) and S(5, 1). original slope : $\frac{1-(-3)}{5-2} = \frac{4}{3}$ parallel: $\frac{4}{3}$ perpendicular: $-\frac{3}{4}$

60. If a line has a slope of zero, than that line is __horizuntal__.

61. If a line has an undefined slope, then that line is ___vertical___.

Unit 5 - Triangles

62.

63. In Figure 7, what is the value of x?

$60 + 45 + 5x + 20 = 180$ $5x = 55$

$125 + 5x = 180$ $\boxed{x = 11}$
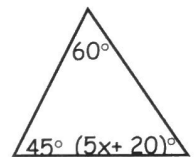
64. Using Figure 8, find m∠3.

$= 180 - 40 - 40$

$= 100°$
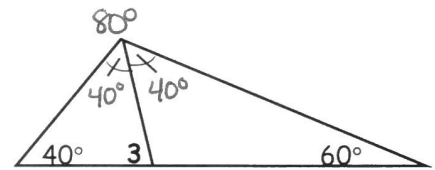
65. In Figure 9, m∠1 = 91°. Find m∠5. $91 + 40 = 131°$

66. Find the values of the variables in each figure.

a)

e $90°$
d $23°$ $32°$ b
c $125°$ $58°$
$55°$
a $\rightarrow 67°$

b)

z
w $30°$ x
y $2y - 6$

omit

Figure 7: triangle with 60°, 45°, (5x+ 20)°

Figure 8: 80°, 40°, 40°, 40°, 3, 60°
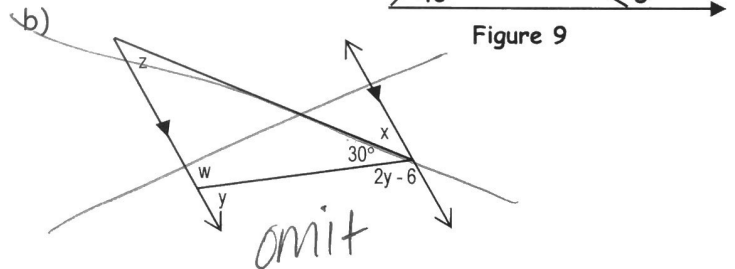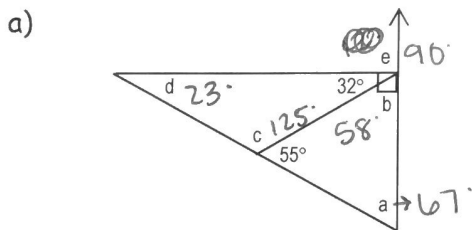
Figure 9: 91°, 1, 3, 2, 4, 91°, 40°, 5
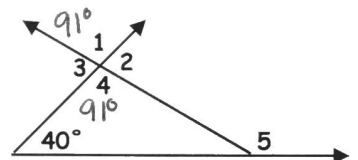
67. Which could be the angle measures of two angles of a right triangle?

   A. 70°, 30°   B. 45°, 135°   C. 50°, 40°   D. 60°, 60°

68. The measure of a base angle of an isosceles triangle is 40°. What is the measure of the vertex angle?

$100°$ $= 180 - 40 - 40$

7

Midterm Exam Review

69. Find the measure of the sides of an equilateral $\triangle PQR$ if $PQ = 5x - 7$ and $PR = 2x + 5$.
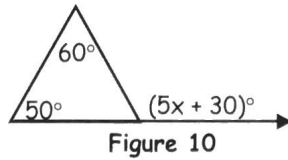
$5(4) - 7 = 20 - 7 = \boxed{13}$

$5x - 7 = 2x + 5$

$3x = 12$
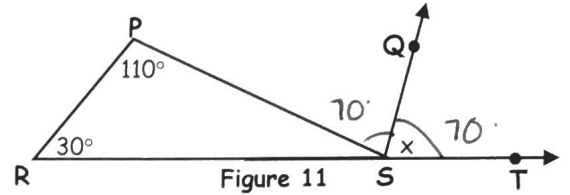
$x = 4$

70. In Figure 10, x = ___.

$60 + 50 = 5x + 30$

$110 = 5x + 30$

$80 = 5x$

$\boxed{16 = x}$

(Figure 10: triangle with angles 60°, 50°, and exterior (5x + 30)°)

Figure 10

71. In Figure 11, if $\overrightarrow{SQ}$ bisects $\angle PST$ what is the value of x?

(Figure 11: P at 110°, R at 30°, Q with 10°, angles 10° and 70° at S, x at S, T)

Figure 11

72. Find x.

$3x + 12x = 3x + 120$

$15x = 3x + 120$

$12x = 120$

$\boxed{x = 10}$

(Figure: triangle with 3x, 12x, and 3x + 120)
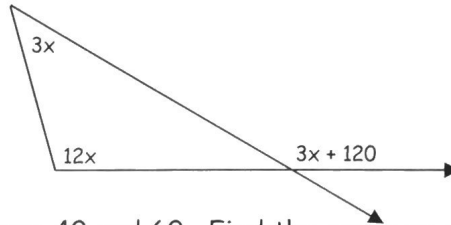
73. The measures of two angles of a triangle are 40 and 60. Find the measure of the largest **exterior** angle of the triangle.

omit

74. In $\triangle RST$, RS = 5, ST = 9, and RT = 8. Name the angle measures in order from greatest to least.

$\angle R, \angle S, \angle T$
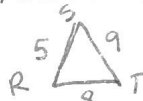
(triangle with 5, 9, 8; R, T)

75. If 12 and 22 are each side lengths of a triangle, what are the two lengths that the third side must be between?

$12 + 22 = 34$

$22 - 12 = 10$

$10 < x < 34$

76. If 12 and 22 are each side lengths of a triangle, find a number that could NOT be the length of the third side. (Hint: refer to number 75.)

A. 14   B. 20   C. 10   D. 26   E. 30

77. In $\triangle ABC$, $m\angle A = x + 6$, $m\angle B = 2x + 4$, and $m\angle C = x - 6$. Which list of sides for $\triangle ABC$ are ordered correctly from longest to shortest?

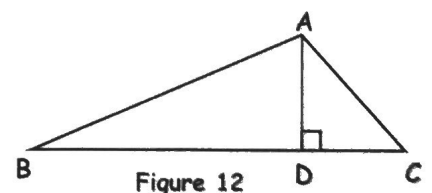OMIT A. $\overline{CA}, \overline{AB}, \overline{BC}$ B. $\overline{BC}, \overline{AB}, \overline{CA}$ C. $\overline{AB}, \overline{BC}, \overline{CA}$ D. $\overline{CA}, \overline{BC}, \overline{AB}$

78. In figure 12, what is the name for $\overline{AD}$ in $\triangle ABC$?
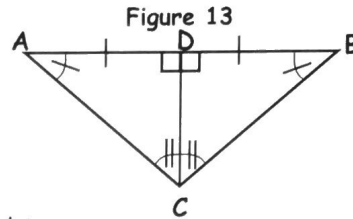
altitude

(Figure 12: triangle ABC with altitude AD to base, right angle at D)

B   Figure 12   D   C

8

79. If $\triangle PQR \cong \triangle XYZ$, then what side corresponds to $\overline{XZ}$?

PR

80. In Figure 13, $\triangle$____ $\cong \triangle$____.

$\triangle BDC \cong \triangle ADC$

Figure 13

81. In Figure 14 what theorem or postulate can be used to prove $\triangle ADB \cong \triangle CDB$?
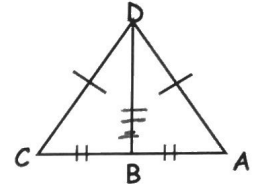
SSS

Figure 14

82. If $\angle JEF \cong \angle HFE$ in Figure 15, what theorem or postulate can be used to prove $\triangle EFH \cong \triangle FEJ$?
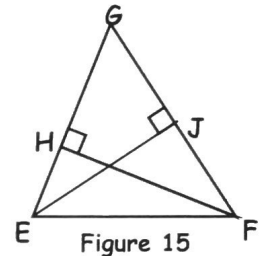
omit

Figure 15

83. If $\overline{AE}$ and $\overline{BD}$ bisect each other in Figure 16, what theorem or postulate can be used to prove $\triangle DCA \cong \triangle BCE$?
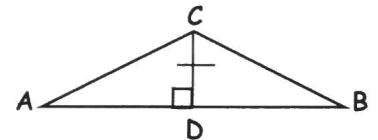
SAS
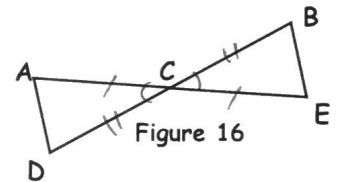
Figure 16

84. Name one additional pair of corresponding parts that must be congruent in order to prove $\triangle ABC \cong \triangle XYZ$ by SAS.   omit
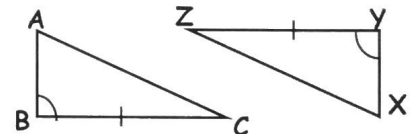
85. To show $\triangle ADC \cong \triangle BDC$ by ASA, we would need ____ $\cong$ ____.

   A. $\angle CAD, \angle CBD$ B. $\overline{AD}, \overline{BD}$

   C. $\angle ACD, \angle BCD$ D. $\overline{AC}, \overline{BC}$

86. **Given:** $\triangle PQR \cong \triangle JKL$. Which statement is not necessarily true?
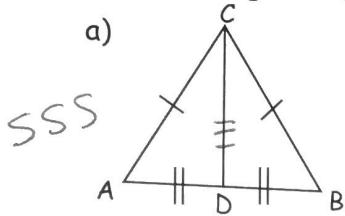
   A. $\overline{QR} \cong \overline{KL}$ B. $\angle P \cong \angle J$ C. $\overline{KJ} \cong \overline{QP}$ D. $\angle Q \cong \angle L$
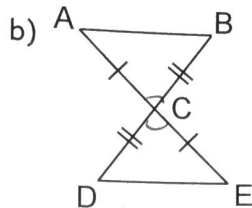
GEOMETRY

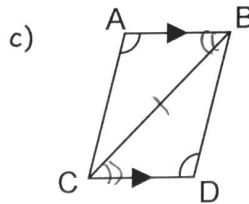# Midterm Exam Review

Name: _____

Date: _____ Period: _____

87. Are the following pairs of triangles congruent? If they are, name the postulate/theorem, and write the congruence statement.
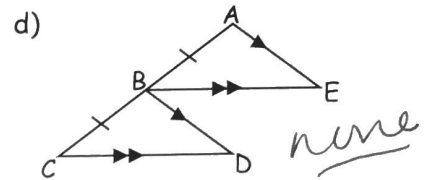
a)
SSS

b)
SAS

c)
ASA

d)
none

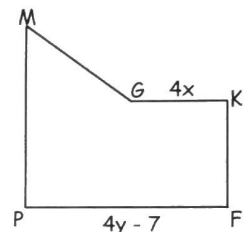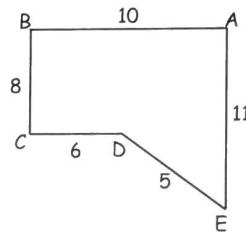**88.** In the figures at the right, ABCDE ≅ PFKGM.

a) What is the value of x? $4x = 6$ $x = \dfrac{6}{4} = \boxed{\dfrac{3}{2}}$
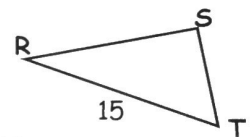
b) What is the value of y? $4y - 7 = 10$ $\dfrac{4y}{4} = \boxed{\dfrac{17}{4}}$

c) What is the perimeter of PFKGM? 40

89. If △MNP ≅ △RST, what is the value of NM?

$3x = 15$ $= 4(5) - 9$
$x = 5$ $= \boxed{11}$
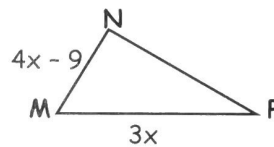
TRUE/FALSE. For each of the following, mark "T" for true and "F" for false.

90. If m∠R = 110°, then ∠R has no complement. T

91. Vertical angles are never supplementary. T

92. Slopes of parallel lines must be equal. T

93. If two angles are congruent, then they are vertical angles. F

94. In △KLM, if KL ≅ ML, then ∠K ≅ ∠L. F

95. A counterexample proves a statement false.

96. Given two distinct points A and B, there is exactly one line that contains both points. T

97. A triangle can be both isosceles and right. T

98. A triangle can contain no acute angles. F

99. A triangle can be both scalene and isosceles. F

10