Name: _____ **Period:** _____ **Number:** _____

Geometry Final Review – Fall Semester

Chapter 1: Discovering Points, Lines, Planes and Angles

Important Vocabulary and Concepts:
- Undefined Terms
- Segment Addition Postulate
- Definition of a Midpoint
- Distance Formula
- Midpoint Formula
- Angle Bisector

- Adjacent Angles
- Linear Pair
- Vertical Angles
- Complementary Angles
- Supplementary Angles

1. If C is the **midpoint** of $\overline{AB}$, $AC = x^2 + 5x$, $CB = 8x + 28$, solve for x and $\overline{AB}$.

$x =$ _____

$\overline{AB} =$ _____

2. Find the coordinate of the **midpoint** of $\overline{ST}$, if the endpoints are $S(-1, 2)$ and $T(3, -5)$.

_____

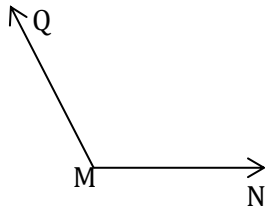3. Find the **distance** between $S(-4, -6)$ and $T(3, -1)$.

_____

4. If C is **between** A and B, $AC = 3x + 4$, $CB = 7x - 12$, and $AB = 6x + 20$ solve for x and $\overline{AB}$. Describe which property was used to solve the problem.
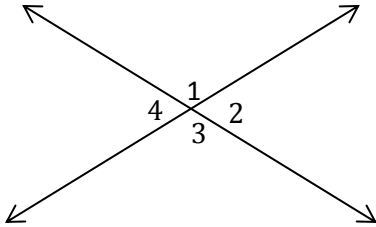
$x =$ _____

Property: _____

5. Name the angle shown below.

_____

6. Use the figure below to answer the question.
   If $m\angle 2 = x + 21$ and $m\angle 4 = 8x - 42$. Find $m\angle 4$ and $m\angle 1$.

$m\angle 4 =$ _____

$m\angle 1 =$ _____

7. If $\angle A$ and $\angle B$ are a **linear pair**, $m\angle A = (4x + 12)°$ and $m\angle B = (2x + 36)°$, solve for x.
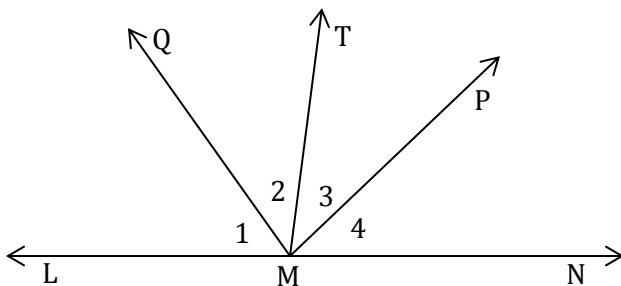
$x =$ _____

8. If $\angle C$ and $\angle D$ are **complementary** angles, $m\angle C = (8x - 12)°$ and $m\angle D = (4x)°$, solve for x and $m\angle C$.

$x =$ _____

$m\angle C =$ _____

9. Use the figure below to answer the following question.
   $\overrightarrow{ML}$ and $\overrightarrow{MN}$ are opposite rays. $\overrightarrow{MT}$ **bisects** $\angle QMP$. If $m\angle 4 = 43, m\angle 1 = 71$ and $m\angle 3 = 2x + 19$,
   solve for x and $m\angle 3$

$x =$ _____

$m\angle 3 =$ _____

Chapter 2: Reasoning and Proof

Important Vocabulary and Concepts
- Justification List for Proofs (attached)
- Converse
- Contrapositive
- Conditional Statement

- Laws of Deduction
- Inverse
- Hypothesis
- Conclusion

#10-18: Describe the property being used.

10. If $x + 8 = 12y$, then $12y = x + 8$

_____

11. If $A + C = 20$, and $C = 30$, then $A + 30 = 20$

_____

12. $AB = AB$

_____

13. If $x = y + 1$, and $y + 1 = z$, then $x = z$.

_____

14. If $3x + 8 = 20$, then $3x = 12$

_____

15. If $PQ = 16$, then $2PQ = 32$

_____

16. If R is the midpoint of $\overline{TS}$, then $\overline{TR} \cong \overline{RS}$

_____

17. If $AB = CD$, then $CD = AB$

_____

18. If B is between A and C, then $AB + BC = AC$

_____

19. If $\angle A$ is supplementary to $\angle B$ and $\angle G$ is supplementary to $\angle B$, then what must be true?

20. Given the statement: All drivers are 16 yrs old or over.

  a) Write in Conditional form_____

  b) Identify the hypothesis_____

  c) Identify the conclusion_____

  d) Write the converse _____ T or F

  e) Write the inverse _____ T or F

  f) Write the Contrapositive _____ T or F

  g) Give a counterexample to the Converse of the statement:

21. If I go to the movie, then I'll eat popcorn.
    If I eat popcorn, then I'll enjoy the movie.

Conclusion? _____

Law of Logic? _____

22. If I miss my bus, then I'll be late for school.
    I miss my bus.

Conclusion? _____

Law of Logic? _____

23. If this wind keeps up, then we will lose some trees.
    We lose some trees.

Conclusion? _____

Law of Logic? _____

Chapter 3: Parallel and Perpendicular Lines

Important Vocabulary and Concepts:
- Slope
- Parallel Lines (Slopes)
- Perpendicular Lines (Slopes)
- Parallel Lines
- Alternate Interior Angles
- Alternate Exterior Angles

- Vertical Lines
- Horizontal Lines
- Transversal
- Consecutive Interior Angles
- Corresponding Angles
- Proving Lines are Parallel with the Converse

24. Write an equation of a line that passes through $(-8, 5)$ and $(-10, 13)$.

$y = $ _____

25. Find the slope of the line **perpendicular** to the line passing through $(12, -5)$ and $(8, -3)$.

$m = $ _____

26. Find the slope of the line **parallel** to the line passing through $(-2, 5)$ and $(-7, -5)$.

$m = $ _____

27. Write an equation for a line that is **parallel** to $2x + 3y = 9$, and passes through $(3, 1)$.

$y = $ _____

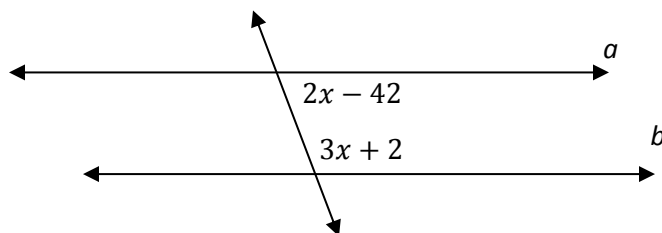28. If $d \perp e$ and $f \perp e$, then what must be true of lines d and f? (Draw a diagram)

29. Use the figure below to final all missing angle measures, given $l \parallel m$ and $a \parallel b$
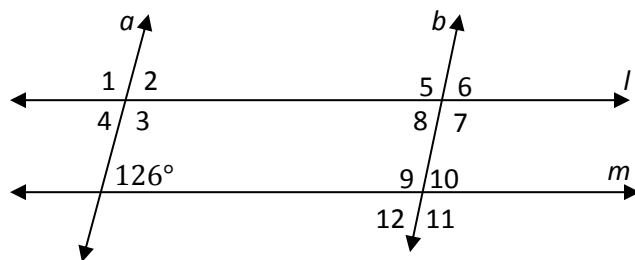
∠1 = _____   ∠2 = _____   ∠3 = _____   ∠4 = _____   ∠5 = _____   ∠6 = _____

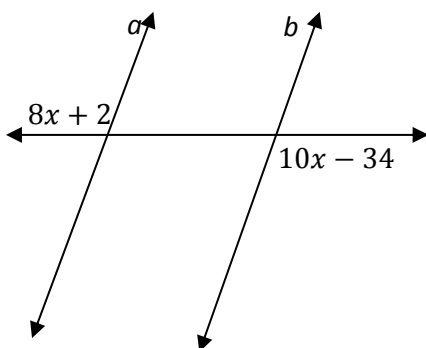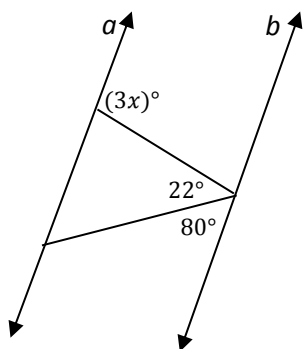∠7 = _____   ∠8 = _____   ∠9 = _____   ∠10 = _____   ∠11 = _____   ∠12 = _____

30. Use the figure below to solve for x, given $a \parallel b$. Name the special relationship, if one exists, between the shown angles.


$2x - 42$

$3x + 2$

$x =$ _____

Relationship: _____

31. Use the figure below to solve for x, given $a \parallel b$. Name the special relationship, if one exists, between the shown angles.

$8x + 2$

$10x - 34$

$x =$ _____

Relationship: _____

32. Use the figure below to solve for x, given $a \parallel b$.

$(3x)°$

$22°$

$80°$

$x =$ _____

#33-35: Use the figure below and the given information to determine which lines, if any, are parallel. State the theorem or postulate that justifies your answer. If you cannot prove any lines are parallel, write "cannot prove".

a b

1 / 2   5 / 6 l
4 / 3   8 / 7

9 / 10 m
12 / 11
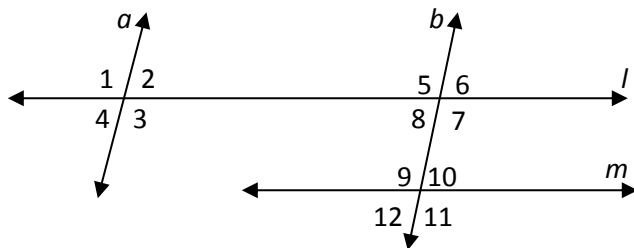
33. $\angle 1 \cong \angle 7$

Parallel Lines: _____ Justification: _____

34. $\angle 9 \cong \angle 11$

Parallel Lines: _____ Justification: _____

35. $m\angle 8 + m\angle 9 = 180°$

Parallel Lines: _____ Justification: _____

Chapter 4: Congruent Triangles

Important Vocabulary and Concepts
- Scalene
- Isosceles
- Equilateral
- Exterior Angle Theorem
- SSS, SAS, ASA, AAS, HL

- Acute
- Right
- Obtuse
- Triangle Sum Theorem
- CPCTC

36. Explain the difference between each type of triangle and draw a picture of each.
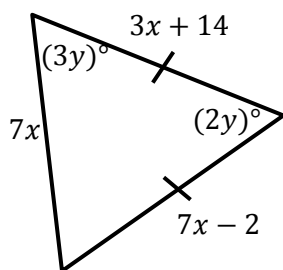
   a. Isosceles:

   b. Equilateral:

   c. Scalene:

37. What type of triangle has a hypotenuse. Draw the triangle and identify the hypotenuse.

38. What type of triangle has a vertex angle? Draw the triangle and identify the vertex angle.

39. What does CPCTC stand for? When would it be used in a proof?

40. Use the figure below to solve for x and y.

$3x + 14$

$(3y)°$

$7x$

$(2y)°$

$7x - 2$

$x =$ _____

$y =$ _____

41. Solve for x, if $m\angle AED = 2x$ and $m\angle AEG = 5x - 2$
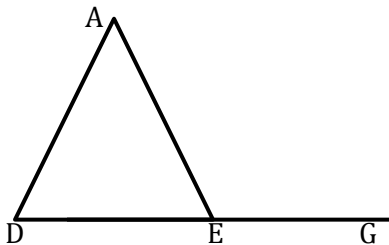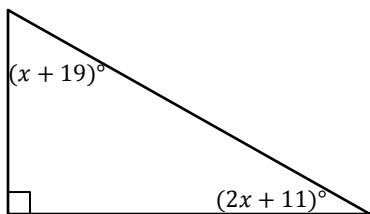

$x = $ _____

42. Use the figure below to solve for x.

$(2x)°$ $(3x - 18)°$
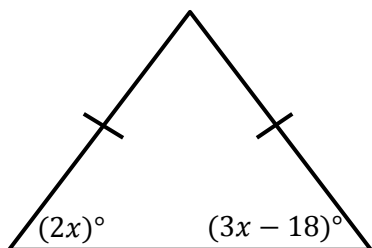
$x = $ _____

43. Use the figure below to solve for x.

$46°$
$4x + 1$ $5x - 8$
$46°$
$2x + 10$
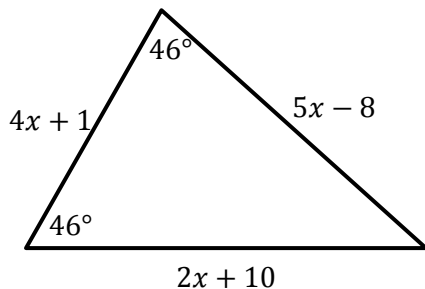
$x = $ _____

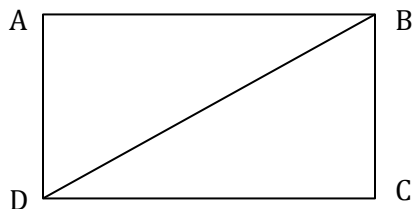44. Use the figure below to solve for x.

$(x + 19)°$
$(2x + 11)°$

$x = $ _____

45. If $\triangle ABC \cong \triangle FGH$, then $\triangle GHF \cong$ _____

<u>#46-47: If the triangles are congruent, name the congruent triangles and the postulate that proves they are congruent (if not congruent, write "not congruent").</u>

46. Given: $AB = CD$, and $AB \parallel CD$.

A ▭ B
D ◹ C

$\triangle ABD \cong \triangle$_____

Why? _____

47. $\overline{RC}$ bisects $\angle HRT$ and $\angle H \cong \angle T$.

R, T, C, H figure
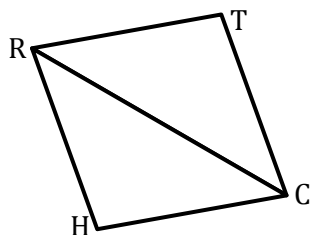
$\triangle RTC \cong \triangle$_____

Why? _____

Chapter 5: Relationships within Triangles

Important Vocabulary and Concepts
- Perpendicular Bisector
- Medium
- Ordering Angle Measurements based on Side Lengths
- Ordering Side Lengths base on Angles
- Angle Bisector
- Altitude
- Triangle Inequality Theorem
- Determining if it is a triangle

48. Describe the four segments in a triangle. Draw a picture for each segment.

    a. Median:

    b. Altitude:

    c. Angle Bisector:

    d. Perpendicular Bisector:

    e. Circumcenter

    f. Incenter

    g. Centroid

    h. Orthocenter

49. If ΔXYZ has vertices $X\ (-2, 8), Y\ (6, -2), Z\ (4, -10)$, find the slope of the perpendicular bisector of $\overline{XZ}$. Graph the triangle!

_____

50. If ΔXYZ has vertices $X\ (-2, 8), Y\ (6, -2), Z\ (4, -10)$, find coordinates of A if $\overline{ZA}$ is a median of ΔXYZ. Graph the triangle!

_____

Chapter 6: Polygons and Quadrilaterals

Important Vocabulary and Concepts
- Parallelogram
- Rectangle
- Isosceles Trapezoid
- Rhombus
- Square
- Median

51. Describe the properties of a parallelogram.

52. Describe the properties of a rectangle.

53. Describe the properties of a rhombus.

54. Describe the properties of a square.

55. Describe the properties of an isosceles trapezoid.

56. $BARK$ is a parallelogram. If $m\angle A = 99°$, solve for $m\angle R$, $m\angle K$ and $m\angle B$.
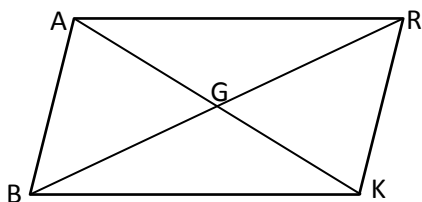
$m\angle R =$ _____

$m\angle K =$ _____

$m\angle B =$ _____
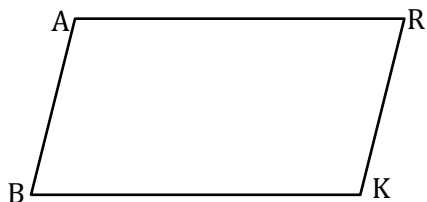
57. $BARK$ is a parallelogram. If $\overline{AB} = x + 24, \overline{AR} = 4x + 15, \overline{RK} = 3y - 11$ and $\overline{KB} = y + 40$, solve for x and y

$x =$ _____

$y =$ _____
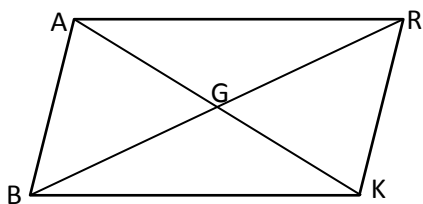
58. $BARK$ is a parallelogram. If $m\angle RKG = 49°$ and $m\angle AGR = 82°$, solve for $m\angle RGK$ and $m\angle ABG$.
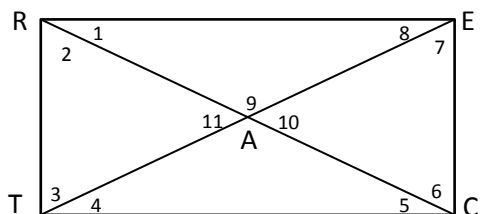
$m\angle RGK =$ _____

$m\angle ABG =$ _____

59. $RECT$ is a rectangle. If $\overline{RA} = x + 3$ and $\overline{ET} = 4x - 44$, solve for x and $\overline{RC}$.

$x =$ _____

$\overline{RC} =$ _____
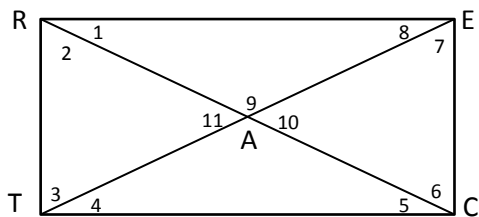
60. $RECT$ is a rectangle. If $m\angle 9 = 118°$, solve for all the missing angles.

$m\angle 1 =$ _____ $m\angle 6 =$ _____

$m\angle 2 =$ _____ $m\angle 7 =$ _____

$m\angle 3 =$ _____ $m\angle 8 =$ _____

$m\angle 4 =$ _____ $m\angle 10 =$ _____

$m\angle 5 =$ _____ $m\angle 11 =$ _____

61. $RHOM$ is a rhombus. $m\angle 4 = 56°$, solve for all the missing angles.

$m\angle 1 =$ _____ $m\angle 7 =$ _____

$m\angle 2 =$ _____ $m\angle 8 =$ _____

$m\angle 3 =$ _____ $m\angle 9 =$ _____

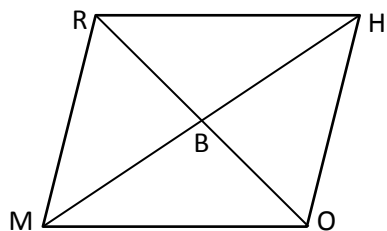$m\angle 5 =$ _____ $m\angle 10 =$ _____

$m\angle 6 =$ _____
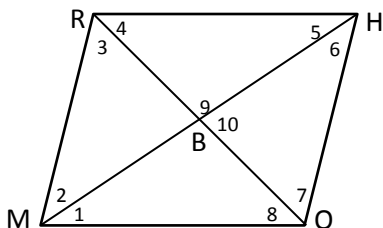
62. $RHOM$ is a rhombus. If $\overline{RM} = x^2 - 2x$ and $\overline{OH} = 5x - 12$, solve for x and find the perimeter of the rhombus. (There will be more than one answer for both parts!!)
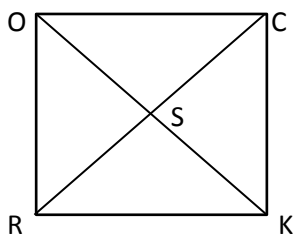

$x =$ _____
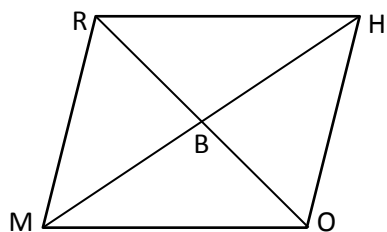
Perimeter: _____

63. $RHOM$ is a rhombus. If $\overline{RB} = 7$ and $\overline{MH} = 18$, solve for $\overline{OH}$. Round answer to two decimals.

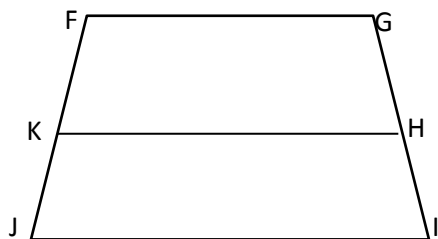$$\overline{OH} = \underline{\hspace{3cm}}$$

64. $ROCK$ is a square. If $\overline{RK} = 14x - 37$ and $\overline{OC} = 12x - 25$ solve for x and find the area of the square.

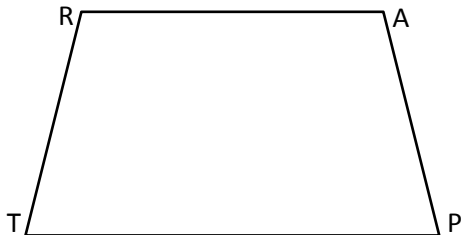$$x = \underline{\hspace{3cm}}$$

$$\text{Area} = \underline{\hspace{3cm}}$$

65. $FGIJ$ is a trapezoid and $\overline{KH}$ is the median. If $\overline{FG} = 28$ and $\overline{JI} = 36$, solve for $\overline{KH}$.

$$\overline{KH} = \underline{\hspace{3cm}}$$

66. $FGIJ$ is an isosceles trapezoid. If $m\angle T = 11x + 1$ and $m\angle P = 20x - 62$, solve for x, $m\angle R$ and $m\angle A$.
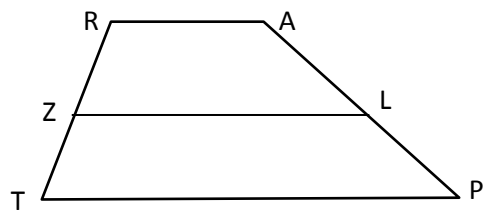

$$x = \underline{\hspace{3cm}}$$

$$m\angle R = \underline{\hspace{3cm}}$$

$$m\angle A = \underline{\hspace{3cm}}$$

67. $TRAP$ is a trapezoid and $\overline{ZL}$ is the median. If $\overline{RZ} = 2x + 18, \overline{ZT} = y + 23, \overline{AL} = x + 19, \overline{LP} = 3y - 16$
solve for x and y.

$x = $ _____

$y = $ _____