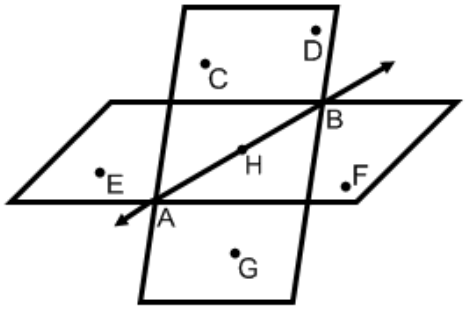
**GEOMETRY 22 MID-TERM EXAM REVIEW**

**Note to student: This packet should be used as practice for the Geometry 22 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:**

| | |
|---|---|
| **UNIT 1** | |
| **Chapter 1** | |
| 1-2 | Points, Lines, and Planes |
| 1-3 | Measuring Segments |
| 1-4 | Measuring Angles |
| 1-5 | Angle Pairs |
| 1-6 | Basic Constructions |
| **UNIT 2** | |
| **Chapter 9** | |
| 9-1 | Translations |
| 9-2 | Reflections |
| 9-3 | Rotations |
| 9-6 | Dilations |
| Concept Byte 9-3 | Symmetry |
| **UNIT 3** | |
| **Chapter 2** | |
| 2-2 | Conditional Statements |
| 2-3 | Biconditionals & Definitions |
| 2-5 | Proof Intro (Properties of =/≅ & Algebraic Proofs) |
| 2-6 | Proving Angles Congruent |
| **Chapter 3** | |
| 3-1 | Lines & Angles |
| 3-2 | Properties of Parallel Lines |
| 3-3 | Proving Lines Parallel |
| 3-5 | Parallel Lines & Triangles |
| 3-6 | Constructing Parallel & Perpendicular Lines |
| **Chapter 4** | |
| 4-1 | Define Congruent Figures |
| 4-2 | Triangle Congruence by SSS & SAS |
| 4-3 | Triangle Congruence by ASA & AAS |
| 4-6 | Congruence in Right Triangles |
| 4-4 | Using Corresponding Parts of Congruent Triangles (with proofs) |
| 4-5 | Isosceles & Equilateral Triangles |
| **Chapter 5** | |
| 5-1 | Midsegments of Triangles |
| 5-2 | Perpendicular & Angle Bisectors |
| 5-3 | Bisectors in Triangles |
| 5-4 | Medians & Altitudes |
| 5-6 | Inequalities in One Triangle |
| **Chapter 6** | |
| 6-1 | The Polygon-Angle Sum Theorems |

Using the diagram to the right, give an example of each of the following:




1. A line: _____
2. A ray: _____
3. A plane: _____
4. A segment: _____

Using the diagram above, answer questions 5-8.

5. Name a point that is coplanar with points *C*, *D*, and *H*. _____
6. Name the intersection of plane *CDG* and plane *EHF*. _____
7. Name a point that is collinear with $\overrightarrow{HA}$. _____
8. Name the intersection of $\overline{CH}$ and $\overleftrightarrow{AB}$. _____
9. Through any two points there is exactly one _____.

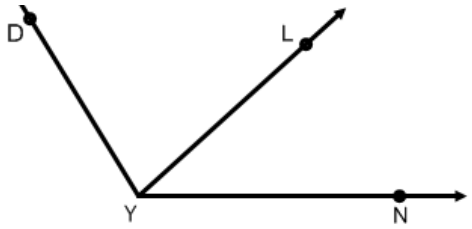
10. Assume that *B* is between *A* and *C*. If *AB = 6 units* and *BC = 13 units*, what is *AC*? _____

11. Using the diagram below, if *JR = 4x -12*, *RT = 6x +4* and *JT = 8x + 10*, find *x*. _____


12. In the diagram below, if $m\angle DYL = (5x+11)^\circ, m\angle LYN = 27^\circ,$ and $m\angle DYN = (2x+65)^\circ$, solve for *x* and find $m\angle DYN$.

*x* = _____

$m\angle DYN.$ =_____




13. If $\angle A$ and $\angle B$ are complementary, and $m\angle A = (2x+15)^\circ$ and $m\angle B = 25^\circ$, find *x*.

14. If $\angle 1$ and $\angle 2$ form a linear pair, and $m\angle 1 = (3x-9)^\circ$ and $m\angle 2 = (2x+24)^\circ,$ find *x*.

15. $\overleftrightarrow{AB}$ is the perpendicular bisector of $\overline{PQ}$. If the intersection of $\overleftrightarrow{AB}$ and $\overline{PQ}$ is $R$ and $PR = 16$, find $PQ$.

$PQ$ = _____

16. $\overleftrightarrow{AB}$ bisects $\overline{CD}$ at point $E$. If $CE = 4x + 11$ and $DE = 7x - 25$, find the following:

$x$ = _____

$DE$ = _____

$CD$ = _____

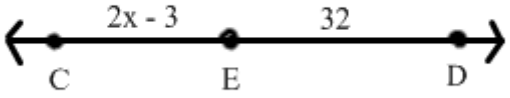
17. $\overleftrightarrow{AK}$ bisects $\angle TAN$. If $m\angle TAN = (8x - 20)^\circ$ and $m\angle KAN = (x + 11)^\circ$, find each of the following:

$x$ = _____

$m\angle NAK$ = _____

$m\angle TAN$ = _____

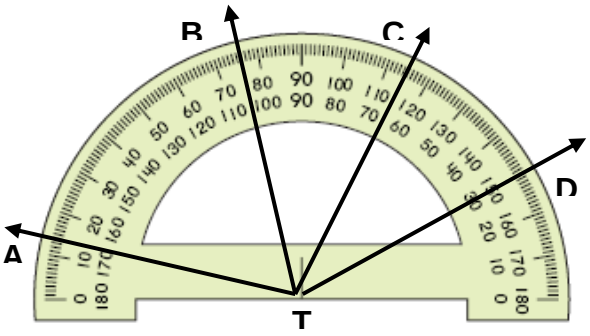
18. If CD = 5x – 7, find the indicated values.




a) x = _____ b) CE = _____ c) CD= _____

19. a) What is $m\angle DTB$? _____

b) What is $m\angle BTC$? _____

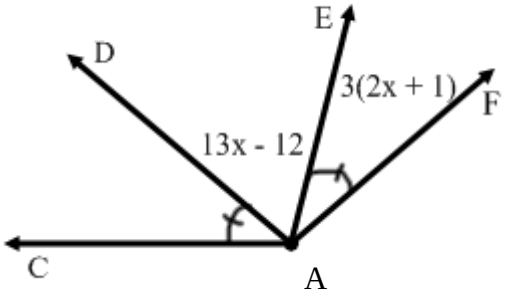



20. If $m\angle EFG = 43^o$, what is the measure of its supplement? _____

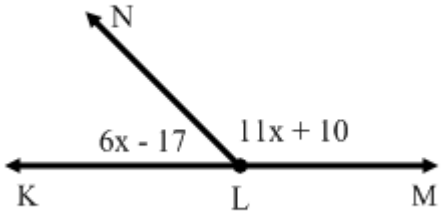
21. In the figure below, $m\angle DAF = 18x - 3$. Find the indicated measures.

a) x = _____

b) $m\angle FAE$ = _____




22. In the figure below, find the indicated measures.

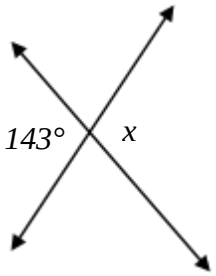



a) x = _____

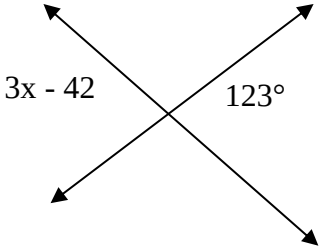
b) $m\angle KLN$ = _____

23. **Solve for *x* in the following problems.**

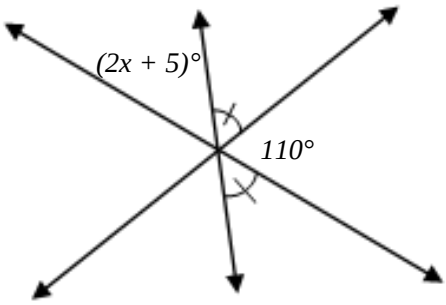
a.




b.




c.




24. Refer to the statement: "*All altitudes form right angles*."

a) Rewrite the statement as a conditional.

b) Identify the hypothesis and conclusion of the conditional.
Hypothesis:
Conclusion:

c) Draw a Venn to illustrate the statement.

d) Write the converse of the conditional. e) If the converse is false, give a counterexample:

25. Refer to the statement: "*A polygon with exactly three sides is called a triangle*."

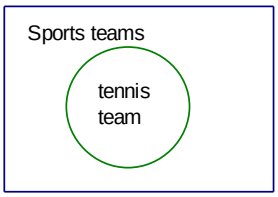
a) Rewrite the statement as a conditional.

b) Write the converse.

c) Write the biconditional.

d) Decide whether the statement is a definition. Explain your reasoning.

*26.* Given the following Venn diagram, state a conditional using the information.




_____

_____

27. Explain the similarities and differences between supplementary angles and a linear pair.

28. Explain the similarities and differences between skew lines and parallel lines.

*29.* Determine whether the following is a translation, reflection, or rotation.

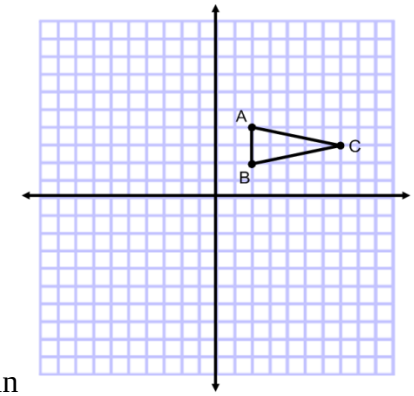
a) _____

b) _____

30. Reflect $\Delta ABC$ over the x-axis.

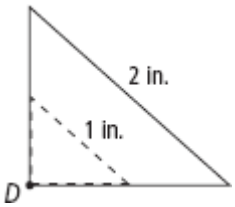
31. On the same graph, reflect $\Delta ABC$ over the y-axis.

32. On the same graph, rotate $\Delta ABC$ 180° about the origin

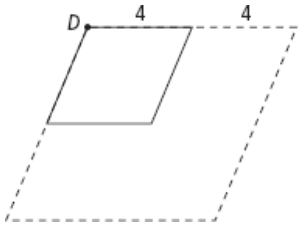



33. The dashed-line figure is a dilation image of the solid-line figure. The labeled point is the center of dilation. Tell whether the dilation is an enlargement or a reduction. Then find the scale factor of the dilation.

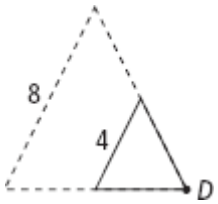
a.




b.




c.




34. Determine if the following scale factor would create an enlargement, reduction, or isometric figure.

a. 3.5 b. 2/5 c. 0.6 d. 1 e. 4/3 f. -5/8

35. In the figure at right, lines *r* and *s* are parallel, m∠2 = 40°, and m∠4 = 60°; find:

a) m∠1 _____ b) m∠3 _____

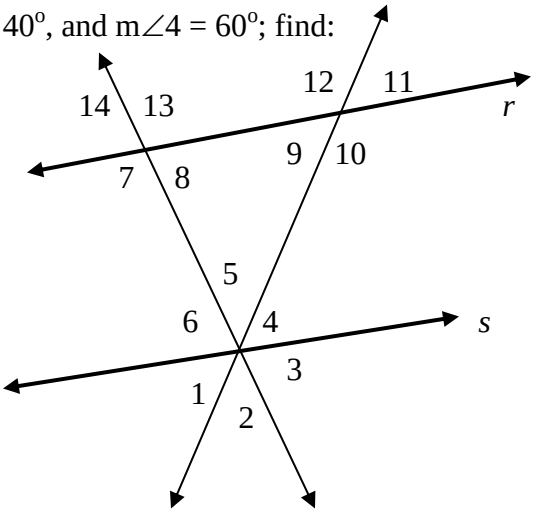
c) m∠5 _____ d) m∠6 _____

e) m∠7 _____ f) m∠8 _____

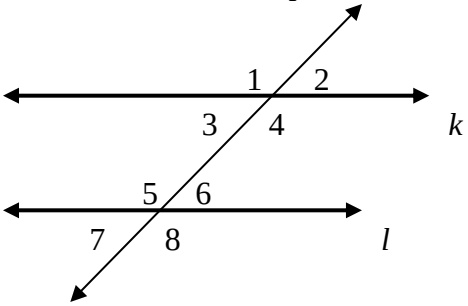
g) m∠9 _____ h) m∠10 _____

i) m∠11 _____ j) m∠12 _____

k) m∠13 _____ l) m∠14 _____



36. If lines *k* and *l* are parallel, m∠4 = (3x -10)° and m∠5 = (x + 70)°; find:



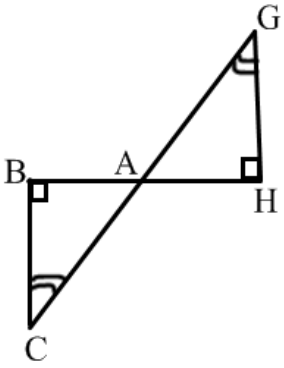

a) m∠8 _____

b) m∠6 _____

c) m∠3 _____

d) m∠7 _____

37. If m∡HAG = (7x + 4)°, and m∡CAB = (9x – 10)°, find the following:



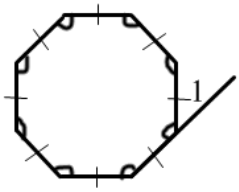

a) x =_____

b) m∡GAH = _____

c) m∡CAB =_____d) m∡G = _____

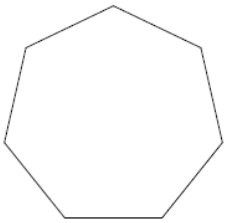
38. The interior angle sum of a regular polygon is 1980°. How many sides does the polygon have?

39. Find m∠1 = _____




40. An exterior angle of a regular polygon is 24°. Find the number of sides in the polygon.

41. Find the interior angle sum for each polygon:

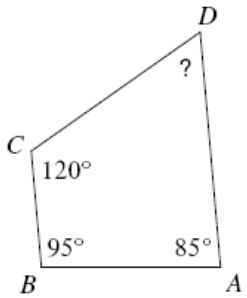
a. 

b. dodecagon

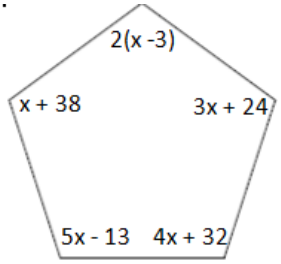
c. 1002-gon

42. Find the missing measure:

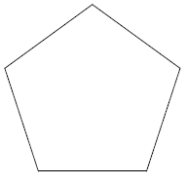
a.

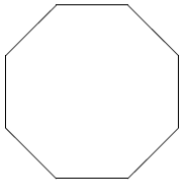



b.

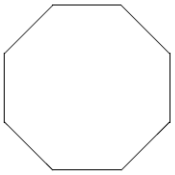


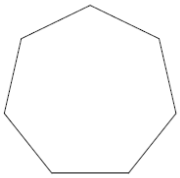
43. Find the measure of **one interior angle** for the following regular polygons.

a. 

b. 

44. Find the measure of **one exterior angle** for the following regular polygons (round to tenths in necessary):

a. 

b. 

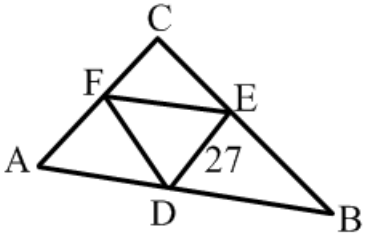
45. Given one **interior angle** measure of a regular polygon, find the number of sides the polygon has:

a. 120˚

b. 156˚

46. List the names of polygons 3 through 14.

47. In the diagram below F, E, and D are midpoints.



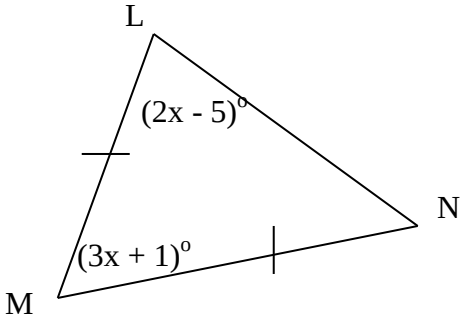

AC = _____

If AB = 55, then FE = _____

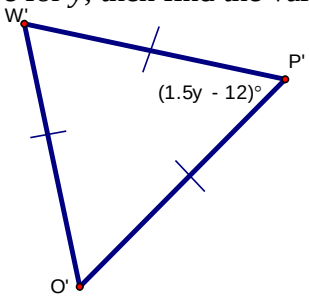
If AB = 55 and FD = 20, find the perimeter of $\Delta ABC$ _____

48. x = _____

m∠N =_____




49. Solve for *y*, then find the value of the ∠*P* in the figure below.



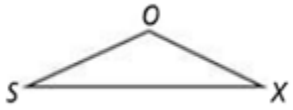
50. Can the following groups of sides be the sides of a triangle? Explain.

*a. 15, 10, 5*

*b. 20, 21, 3*

c. *7, 4, 15*

51. In the figure below, $m\angle S = 24°$ and $m\angle O = 130°$. Which side of $\triangle SOX$ is the shortest side? Why?




52. Determine $m\measuredangle A$, $m\measuredangle B$, and $m\measuredangle C$ *if* $\angle A$ is supplementary to $\angle B$ and complementary to $\angle C$.

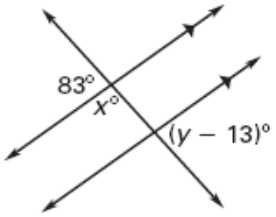
$$m\angle A = (x + 10)°,\ m\angle B = (12x + 1)°,\ m\angle C = (5x + 2)°$$

53. Write the conditional and converse of the statement, and determine if the converse is true. If it is not, write a counterexample.

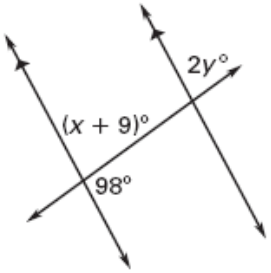
If an angle measure is 32 degrees, then it is an acute angle.

**54. Find the value of *x* and *y*.**

a.




b.

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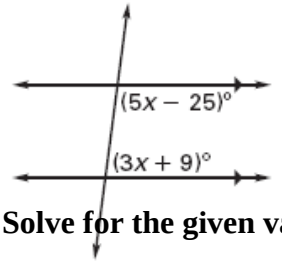
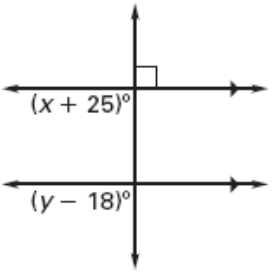
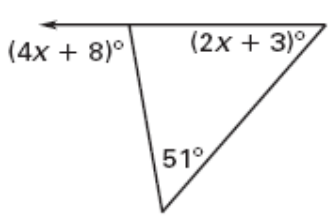



d.




**55. Solve for the given variable and find the angle measures.**

a.

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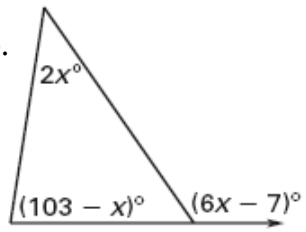
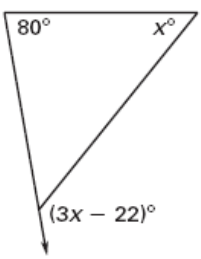
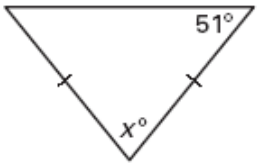
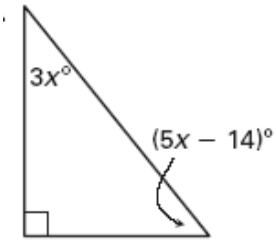
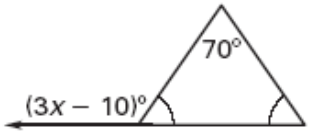



c.

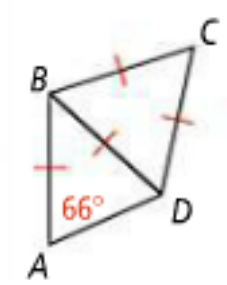


d. 


e. 


f. 


56. Use the diagram to the right.



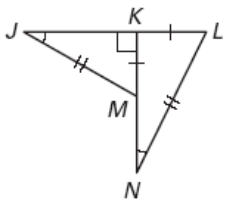

a. What type of triangle is $\Delta ABD$? _____
b. What type of triangle is $\Delta BCD$? _____
c. Find $m\angle ABC$ _____

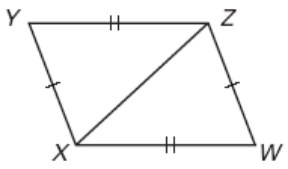
57. Use the congruency statement to fill in the corresponding congruent parts.

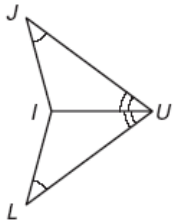
$\Delta EFI \cong \Delta HGI$ $\angle E \cong \angle$ _____ $\overline{FE} \cong$ _____ $\angle EFI \cong \angle$ _____

$\overline{FI} \cong$ _____ $\angle FIE \cong \angle$ _____ $\overline{IE} \cong$ _____

58. For the following, name which triangle congruence theorem or postulate you would use to prove the triangles congruent.

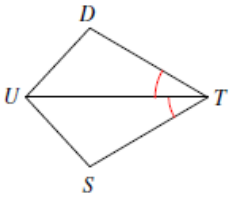
a. 


b. 

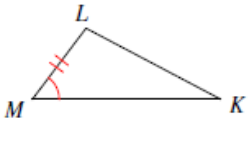

c. 

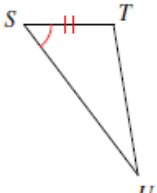

59. Mark any additional information you can FIRST (ex: vertical angles or reflexive property). Then, label and state what <u>ADDITIONAL</u> information is required in order to know that the triangles are congruent for the reason given.

a. ASA

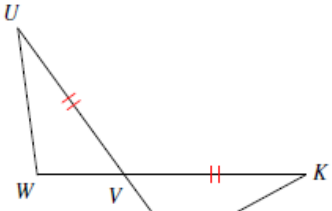



b. ASA




c. SAS

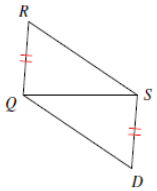


extra part: _____≅ _____
ΔDUT ≅ Δ_____

extra part: _____≅ _____
ΔLMK ≅ Δ_____

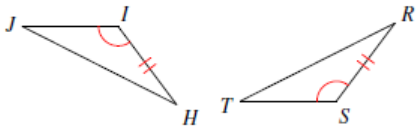
extra part: _____≅ _____
ΔUWV ≅ Δ _____

d. SSS



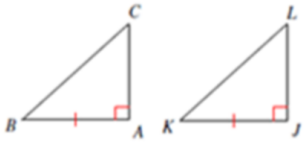

extra part: _____≅ _____
ΔRQS ≅ Δ_____

e. SAS




extra part: _____= _____
ΔJIH ≅ Δ_____

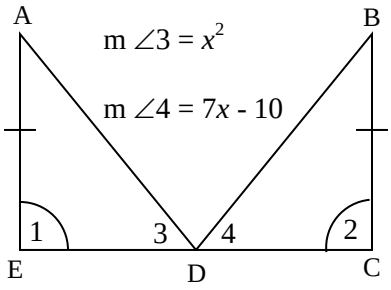
f. HL



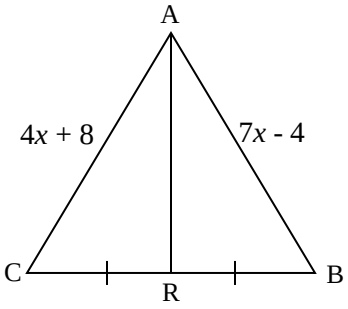

extra part: _____≅ _____
ΔBAC ≅ Δ _____

60. For which value(s) of $x$ are the triangles congruent?

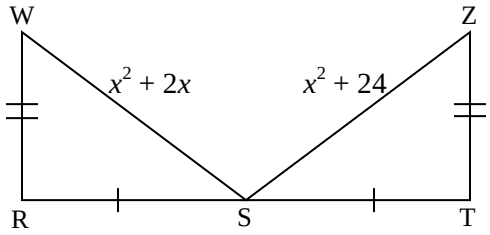
a. $x$ = _____




b. $x$ = _____

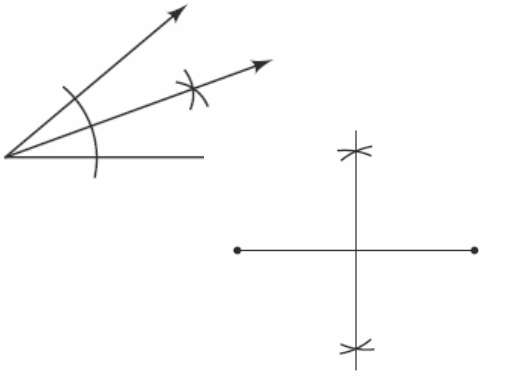



c. $x$ = _____

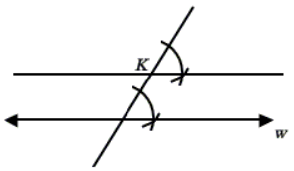



61. Describe what is being constructed in the figure at right.

62. Describe what is being constructed in the figure at right.



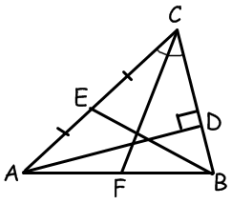
63. Describe what is being constructed in the figure at right.



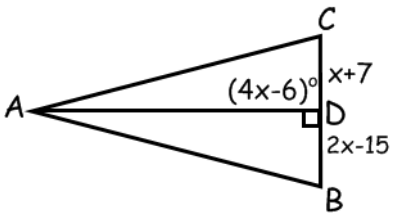

64. Refer to the figure at the right.

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

b.) _____ is an altitude of ΔABC.

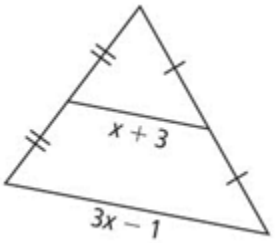



65. Find the value of x if $\overline{AD}$ is an altitude of ΔABC.

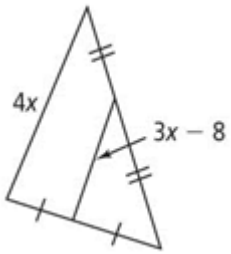



66. **Solve for $x$.**

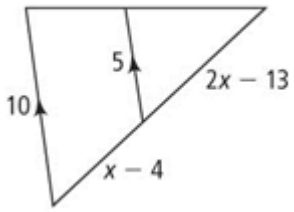
a.



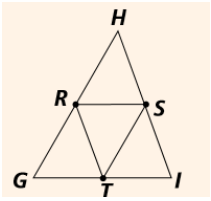

b.




c.

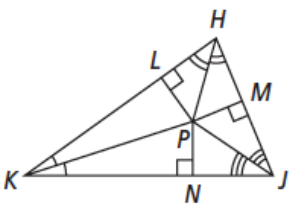



67. In $\Delta GHI$, *R, S,* and *T* are midpoints. If $m\angle G = 75°$ and $m\angle HSR = 63°$. Find the $m\angle H$.

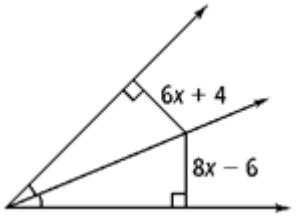



68. $PM = 4x + 7$ and $PN = 12x - 5$

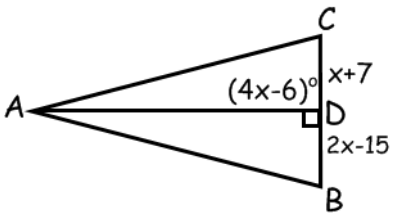
Find $PL$.




71. Solve for $x$.



69. Find the value of x if $\overline{AD}$ is an altitude of ΔABC.

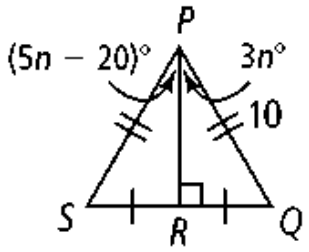



**70.** a) According to the diagram, what are the lengths of $\overline{PQ}$ and $\overline{PS}$ ?

b.) How is $\overline{PR}$ related to $\angle SPQ$?

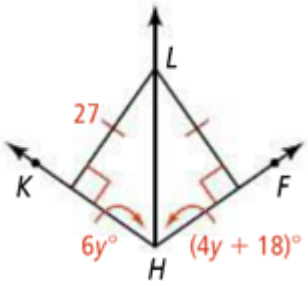
c.) Find the value of *n*.

d.) Find $m\angle SPR$ and $m\angle QPR$.

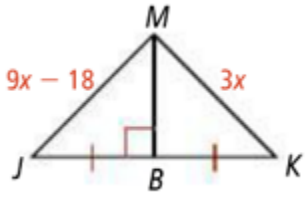



71. Find the value of the missing variables in the problems below.

a.




b.




**72. Find the range of possible measures for $\overline{XY}$ in ΔXYZ.**

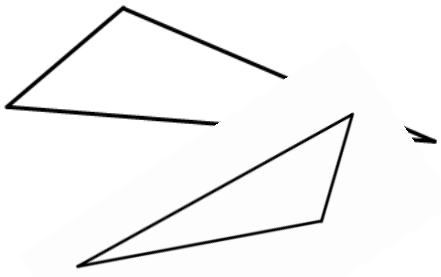
a. XZ = 6 and YZ = 6

b. XZ = 9 and YZ = 5

c. XZ = 11 and YZ = 6

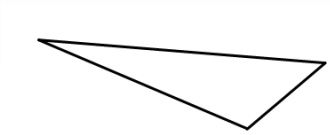
73. Draw the angle bisectors of the triangle at right.

74. Draw the perpendicular bisectors of the triangle at right.



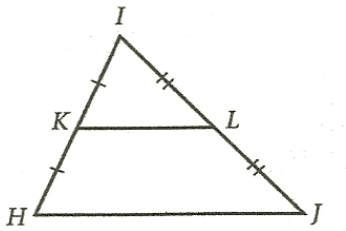
75. Draw the medians of the triangle at right.

76. Draw the altitudes of the triangle at right.

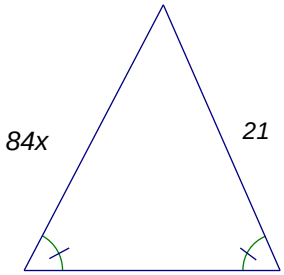


77. If HJ = 26, then KL = _____

78. If HJ = 3x – 1 and KL = x + 1, then HJ = _____

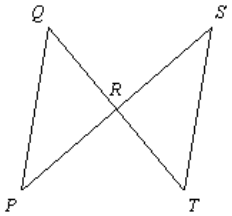



79. Solve for x.




80. Given: $m\angle SRT = 88^\circ$, $m\angle Q = 49^\circ$

Prove: $m\angle P = 43^\circ$

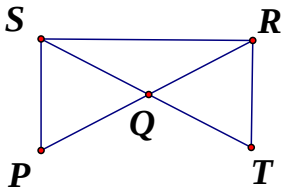



| **Statements** | **Reasons** |
|---|---|

| | |
|---|---|
| 1. $m\angle SRT = 88^\circ,\ m\angle Q = 49^\circ$ | 1. Given |
| 2. $\angle PRQ$ and $\angle SRT$ are vertical angles | 2. |
| 3. | 3. Vertical Angle Theorem |
| 4. $m\angle PRQ = m\angle$SRT | 4. |
| 5. $m\angle PRQ = 88^\circ$ | 5. |
| 6. $m\angle P + m\angle Q + m\angle PRQ = 180^\circ$ | 6. |
| 7. $m\angle P + 49^\circ + 88^\circ = 180^\circ$ | 7. |
| 8. | 8. Combine Like Terms |
| 9. | 9. Subtraction Property of Equality |

81. Given: $Q$ is the midpoint of $\overline{PR}$, $\angle P \cong \angle QRT$

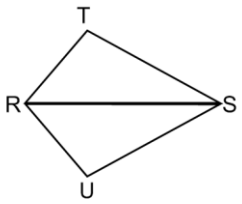
Prove: $\Delta SQP \cong \Delta TQR$




| **Statements** | **Reasons** |
|---|---|
| **1.** $Q$ is the midpoint of $\overline{PR}$ | **1.** |
| **2.** $\overline{PQ} \cong \overline{RQ}$ | **2.** |
| **3.** $\angle P \cong \angle QRT$ | **3.** |
| **4.** $\angle SQP$ and $\angle TQR$ are vertical angles | **4.** |
| **5.** $\angle SQP \cong \angle TQR$ | **5.** |
| **6.** | **6.** |

82. *Given:* $\overline{RT} \cong \overline{RU},\ \overline{TS} \cong \overline{US}$

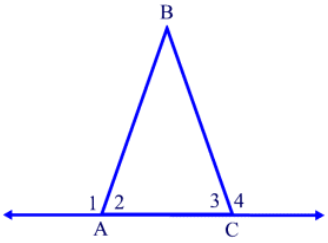
*Prove:* $\Delta TRS \cong \Delta URS$




| **Statements** | **Reasons** |
|---|---|
| 1. $\overline{RS} \cong \overline{RS}$ | 1. |
| 2. $\overline{RT} \cong \overline{RU}$ | 2. |
| 3. | 3. Given |
| 4. $\Delta TRS \cong \Delta URS$ | 4. |

83. Given: $\angle 1 \cong \angle 4$

Prove: $\Delta ABC$ is isosceles

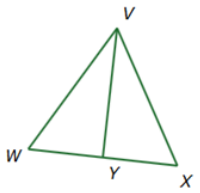


| Statements | Reasons |
|---|---|
| 1. $\angle 1 \cong \angle 4$ | 1. |
| 2. $m\angle 1 = m\angle 4$ | 2. |
| 3. $\angle 1$ and $\angle 2$ form a linear pair, $\angle 3$ and $\angle 4$ form a linear pair | 3. |
| 4. $\angle 1$ and $\angle 2$ are supplementary<br>$\angle 3$ and $\angle 4$ are supplementary | 4. |
| 5. $m\angle 1 + m\angle 2 = 180°$<br>$m\angle 3 + m\angle 4 = 180°$ | 5. |
| 6. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$ | 6. |
| 7. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$ | 7. |
| 8. $m\angle 2 = m\angle 3$ | 8. |
| 9. $\angle 2 \cong \angle 3$ | 9. |
| 10. $\overline{AB} \cong \overline{CB}$ | 10. |
| 11. | 11. |

*84.* Given: $\overline{VX} \cong \overline{VW}$

$Y$ is the midpoint of $\overline{WX}$

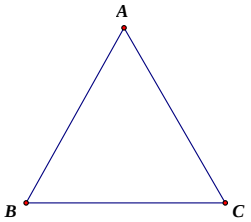
Prove: $\angle VYX \cong \angle VYW$




| Statements | Reasons |
|---|---|
| 1. $\overline{VX} \cong \overline{VW}$, $Y$ is the midpoint of $\overline{WX}$ | 1. |
| 2. $\overline{WY} \cong \overline{XY}$ | 2. |
| 3. | 3. Reflexive Property |
| 4. | 4. SSS |
| 5. | 5. |

**85.** Given: $\overline{AB} \cong \overline{AC}$, $m\angle C = 80^\circ$, $m\angle B = (3x-1)^\circ$

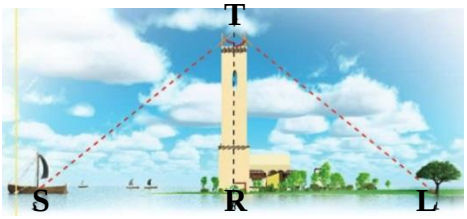
Prove: $x = 27$




| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AC}$ | 1. Given |
| 2. $\angle B \cong \angle C$ | 2. |
| 3. $m\angle B = m\angle C$ | 3. |
| 4. $m\angle C = 80^\circ$, $m\angle B = (3x-1)^\circ$ | 4. |
| 5. $3x - 1 = 80$ | 5. |
| 6. $3x = 81$ | 6. |
| 7. | 7. |

86. Given: $\angle TRS$ and $\angle TRL$ are right angles, $\angle RTS \cong \angle RTL$

Prove: $\overline{RS} \cong \overline{RL}$



| ***Statements*** | ***Reasons*** |
|---|---|
| 1. $\angle RTS \cong \angle RTL$ | 1. |
| 2. $\overline{TR} \cong \overline{TR}$ | 2. |
| 3. $\angle TRS$ and $\angle TRL$ are right angles | 3. |
| 4. $\angle TRS \cong \angle TRL$ | 4. |
| 5. $\Delta TRS \cong \Delta TRL$ | 5. |
| 6. $\overline{RS} \cong \overline{RL}$ | 6. |

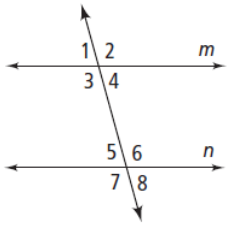
87. Given: $\angle 1$ and $\angle 3$ are supplementary

Prove: $m \| n$

| **Statements** | **Reasons** |
|---|---|
| 1) $\angle 1$ and $\angle 3$ are supplementary; transversal p | 1) |
| 2) | 2) |
| 3) $\angle 1$ and $\angle 2$ are a linear pair | 3) definition of _____ |
| 4) $\angle 1$ and $\angle 2$ are supplementary | 4) |
| 5) | 5) definition of _____ |
| 6) $m\angle 1 + m\angle 3 = m\angle 1 + m\angle 2$ | 6) |
| 7) $m\angle 3 = m\angle 2$ | 7) |
| 8) $\angle 3 \cong \angle 2$ | 8) |
| 9) $\angle 3$ and $\angle 2$ are corresponding angles | 9) |
| 10) m□n | 10) |

88. **Given:** $m \| n$

**Prove:** $m\angle 1 + m\angle 7 = 180$




| *Statements* | *Reasons* |
|---|---|
| 1. m‖n | 1. |
| 2. $\angle 1$ and $\angle 5$ are Corresp. Angles | 2. |
| 3. $\angle 1 \cong \angle 5$ | 3. |
| 4. $m\angle 1 = m\angle 5$ | 4. |
| 5. $\angle 5$ and $\angle 7$ are a Linear Pair | 5. |
| 6. | 6. Linear Pair Postulate |
| *7.* $m\angle 5 + m\angle 7 = 180$ | *7.* |
| *8.* | *8.* |