Geometry Review Packet
Semester 1 Final

Name_______________________

Section 1.1

1. Name all the ways you can name the following ray:

AB, AC

Section 1.2

What is a(n):
2. acute angle
3. right angle
4. obtuse angle
5. straight angle

6. Change $41\frac{2}{5}^\circ$ to degrees and minutes.

$41^\circ24'$

7. Given: $\angle ABC$ is a rt. $\angle$

$m\angle ABD = 67^\circ21'37''$

Find: $m\angle DBC$

$22^\circ38'23''$

Section 1.3

8. AC must be smaller than what number?

16

9. AC must be larger than what number?

4
10. Can a triangle have sides of length 12, 13, and 26?

No \(12 + 13 < 26\)

**Given:**
\[
\begin{align*}
\angle 1 &= 2x + 40 \\
\angle 2 &= 2y + 40 \\
\angle 3 &= x + 2y
\end{align*}
\]

**Find:**
11. \(\angle 1 = 80\) \\
12. \(\angle 2 = 100\) \\
13. \(\angle 3 = 80\)

14. \(\overline{EH}\) is divided by \(F\) and \(G\) in the ratio of 5:3:2 from left to right. If \(EH = 30\), find \(FG\) and name the midpoint of \(\overline{EH}\).

\(FG = 9\) \(F\) is the midpoint

**Section 1.4**

Graph the image of quadrilateral SKHD under the following transformations:

15. Reflect across the y-axis

16. Then reflect across the x-axis

**Section 1.7**

17. What is a postulate? An idea that can’t be disproven so is accepted as true.

18. What is a definition? An accepted meaning of a word or phrase.

19. What is a theorem? An idea that is provable.
20. Which of the above (#17-19) are reversible? **Definitions**

**Section 1.8**

21. If a conditional statement is true, then what other statement is also true? **Contrapositive**

State the converse, inverse, and contrapositive for the following conditional statement:
If Cheryl is a member of the Perry basketball team, then she is a student at Perry.

22. Converse: **If Cheryl is a student at Perry, then she is a member of the Perry basketball team.**

23. Inverse: **If Cheryl is not a member of the Perry basketball team, then she is not a student at Perry.**

24. Contrapositive: **If Cheryl is not a student at Perry, then she is not a member of the Perry basketball team.**

25. Place the following statements in order, showing a proper chain of reasoning. Then write a concluding statement based upon the following information:

\[ a \implies b \]
\[ d \implies \sim c \]
\[ \sim c \implies a \]
\[ b \implies f \]
\[ d \implies f \text{ or } \sim f \implies \sim c \]

**Section 2.1**

26. If \( \overline{AB} \perp \overline{BC} \) and \( \angle 1, \angle 2 \), and \( \angle 3 \) are in the ratio 1:2:3, find the measure of each angle.
15, 30, 45

**Section 2.2**

27. One of two complementary angles is twice the other. Find the measures of the angles.
30 and 60

28. The larger of two supplementary angles exceeds 7 times the smaller by 4°. Find the measure of the larger angle.
158
Section 2.5

Given: \( \overline{GH} \cong \overline{JK} \), \( GH = x + 10 \)
\( HJ = 8, JK = 2x - 4 \)

29. Find: \( GJ \)

Section 2.6

30. Given: \( \angle HJG \cong \angle ONP \)
\( \overline{GJ} \) and \( \overline{NP} \) are bisectors
\( m\angle HGJ = 25^\circ, m\angle ONR = (2x + 10)^\circ \)

Find: \( x \)

Section 2.8

31. Is this possible? Yes, \( x = -3 \)

Section 3.2

Name the method (if any) of proving the triangles congruent. (SSS, ASA, SAS, AAS, HL)

31. 
32. 
33. SSS 
34. CBT 
35. AAS 
36. SAS
2. Identify the additional information needed to support the method for proving the triangles congruent.

\[ \triangle HGJ \cong \triangle OMK \quad \text{by SAS} \quad OK = HJ \]

\[ \angle G = \angle M \quad \text{by ASA} \quad \angle G = \angle M \]

\[ \triangle KM = GJ \quad \text{by HL} \]

\[ \triangle PSV \cong \triangle TRV \quad \text{by SAS} \quad PS = TR \]

\[ \angle SVP = \angle TVR \quad \text{by ASA} \quad \angle SVP = \angle TVR \]

\[ \angle VSP = \angle VRT \quad \text{by AAS} \quad \angle VSP = \angle VRT \]

\[ \triangle ZBW \cong \triangle XAY \quad \text{by SSS} \quad BW = AY \text{ or } AW = BY \]

\[ \angle BZW = \angle AXY \quad \text{by SAS} \quad \angle BZW = \angle AXY \]

Section 3.4

Given: \( TW \) is a median

\[ \begin{align*}
ST &= x + 40 \\
SW &= 2x + 30 \\
WV &= 5x - 6
\end{align*} \]

Find:

47. \( SW = 54 \)
48. \( WV = 54 \)
49. \( ST = 52 \)
Section 3.6

50. If the perimeter of $\triangle EFG$ is 32, is $\triangle EFG$ scalene, isosceles, or equilateral?

*Scalene $x = 6$*

51. Given: $\overline{AB}$ and $\overline{AC}$ are the legs of isosceles $\triangle ABC$.
   
   $m\angle 1 = 5x$
   
   $m\angle 3 = 2x + 12$

   Find: $m\angle 2$

   *\(x = 24\)*

   *\(60\)*

52. If the $m\angle C$ is acute, what are the restrictions on $x$?

   *\(x < 70\) and \(x > -20\)*

53. Given: $m\angle 1, m\angle 2, m\angle 3$ are in the ratio 6:5:4.

   Find the measure of each angle.

   *\(72, 60, 48\)*

54. If $\triangle HIK$ is equilateral, what are the values of $x$ and $y$?

   *\(x = 7\)*

   *\(y = 63\)*
Section 3.7

55. Given: \( m\angle P + m\angle R < 180^\circ \)
\( PQ < QR \)

Write an inequality describing the restrictions on \( x \).

\[ 6 < x < 18 \]

56. Given: \( \overline{AB} \cong \overline{AC} \)
Solve for \( x \).

\[ x = -5 \text{ or } 11 \]

Section 4.1

Find the coordinates of the midpoint of each side of \( \triangle ABC \).

57. Midpoint of \( AB = (1,4) \)

58. Midpoint of \( BC = (6,2) \)

59. Midpoint of \( AC = (1,1) \)

60. Find the coordinates of \( B \), a point on circle \( O \).

\( B(8,10) \)

Section 4.3

61. If squares \( A \) and \( C \) are folded across the dotted segments onto \( B \), find the area of \( B \) that will not be covered by either square.

\[ 8 \text{ sq units} \]
62. Is \( b \perp a \)? Justify your answer.

Yes. \( x = \frac{53}{2} \) and \( y = 37 \)

Section 4.6

63. \( \overline{AB} \) has a slope of \( \frac{5}{2} \). If \( A = (2, 7) \) and \( B = (12, c) \), what is the value of \( c \)?

\( c = 32 \)

Use slopes to justify your answers to the following questions.

64. Is \( \overline{RE} \parallel \overline{TC} \)?

Yes

65. Is \( \overline{TR} \parallel \overline{CE} \)?

Yes

66. Show that \( \angle R \) is a right angle.

\( TR = -3 \)
\( RE = \frac{1}{3} \)

67. \( \overline{BE} \) is parallel to \( \overline{AC} \) and \( \overline{AD} \) is a median, find the slope of each line.

68. \( \overline{AC} \) is perpendicular to \( \overline{BE} \).

69. \( \overline{AD} \) is parallel to \( \overline{BE} \).

70. A line through \( A \) parallel to \( \overline{BE} \).

\( 1/4 \)
Section 5.1

Use the diagram on the right for #71 - 75.

Identify each of the following pairs of angles as alternate interior, alternate exterior, or corresponding.

71. For \( \overline{BE} \) and \( \overline{CD} \) with transversal \( \overline{BC} \), \( \angle 1 \) and \( \angle C \) are **Corresponding**.

72. For \( \overline{AE} \) and \( \overline{BD} \) with transversal \( \overline{BE} \), \( \angle 2 \) and \( \angle 4 \) are **AIA**.

If \( \overline{AE} \parallel \overline{BD} \) is:

73. \( \angle 4 \equiv \angle C? \)
74. \( \angle 4 \equiv \angle 3? \)
75. \( \angle 4 \equiv \angle 2? \)

Unknown
Unknown
Yes

Section 5.2

76. If \( \angle 1 \equiv \angle 2 \), which lines are parallel?

\( PQ \) and \( RS \)

77. Write an inequality stating the restrictions on \( x \).

\(-47 < x < 130\)

Section 5.3

78. Are \( e \) and \( f \) parallel?

No

\( x = 25 \)

79. Given: \( a \parallel b \)

\( m\angle 1 = (x + 3y)^\circ \)
\( m\angle 2 = (2x + 30)^\circ \)
\( m\angle 3 = (5y + 20)^\circ \)

Find: \( m\angle 1 \)

70
80. If \( f \parallel g \), find \( m\angle 1 \).

81. Given: \( \overline{AD} \parallel \overline{BC} \)
   Name all pairs of angles that must be congruent.
   2 and 5

Sections 5.4 - 5.7

82. \( \square ABCD \)
   Find the perimeter of \( ABCD \).

36

83. Given: \( m\angle IPT = 5x - 10 \)
    \( KP = 6x \)
   Find \( KT \)

240

84. Given: \( \square KMOP \)
    \( m\angle M = (x + 3y)^\circ \)
    \( m\angle O = (x - 4)^\circ \)
    \( m\angle P = (4y - 8)^\circ \)
   Find: \( m\angle K \)

28
85. Given: RECT is a rectangle
    \[ RA = 43x \]
    \[ AC = 214x - 742 \]
    Find: The length of ET to the nearest tenth. 8.7

Sect. 6.1-6.2

86. \( a \cap b = GY \)

87. ET and point R or O determine plane b.

88. M, E and T determine plane a

89. TE and GM determine plane a

90. Name the foot of OR in a. Y

91. Is M on plane b? No

92. Given: \( \overline{WY} \perp \overline{XY} \)
    \[ \angle WYZ = \frac{1}{3}x + 68 \]
    \[ \angle WYX = 2x - 30 \]
    Is \( \overline{WY} \perp a? \)
    No
    \[ x = 60 \]

Sect. 6.3

93. Is ABCD a plane figure? Yes

94. If \( m \parallel n \), is \( AB \parallel CD? \) Yes

95. If \( AB \parallel CD, \) is \( m \parallel n? \) No

True or False.

96. \( \bigcirc \) Two lines must either intersect or be parallel.

97. \( \bigcirc \) In a plane, two lines \( \perp \) to the same line must be parallel.

98. \( \bigcirc \) In space, two lines \( \perp \) to the same line are parallel.
99. **T** If a line is \( \perp \) to a plane, it is \( \perp \) to all lines on the plane.

100. **F** Two planes can intersect at a point.

101. **F** If a line is \( \perp \) to a line in a plane, it is \( \perp \) to the plane.

102. **F** If two lines are \( \perp \) to the same line, they are parallel.

103. **T** A triangle is a plane figure.

104. **T** Three parallel lines must be co-planar.

105. **T** Every four-sided figure is a plane figure.

**Sect. 7.1**

106. Given: \( \angle 5 = 70^\circ \)  
\( \angle 3 = 130^\circ \)

Find the measures of all the angles.  
60, 50, 130, 110, 70, 70

107. Given: Diagram as shown  
Find: \( AB \) and \( \angle W \)

\( AB = 13 \)  
\( \angle W = 60^\circ \)

108. Find the restrictions on \( x \).

\(-3 < x < 27\)

109. The measures of the 3 \( \angle \)'s of a \( \triangle \) are in the ratio 2:3:5. Find the measure of each angle.  
36, 54, 90

110. Given: \( \angle T = 2x + 6 \)  
\( \angle RSU = 4x + 16 \)  
\( \angle R = x + 48 \)

Find: \( m\angle T \)

82

**Sect. 7.2**

111. Given: \( \angle A \equiv \angle D \)

B is the midpoint of \( \overline{CE} \)

Is \( \triangle ABC \equiv \triangle DBE \)? If so, by which theorem? **Yes, AAS**
112. If \( \angle I \cong \angle A \), is \( \angle IFA \cong \angle NLA \) ?
   If so, by which theorem? **No Choice Theorem**

**Sect. 7.3**

113. Find the sum of the measures of the angles in a 14-gon. **2160**

114. What is the sum of the measures of the exterior angles of an octagon? **360**

115. Find the number of diagonals in a 12-sided polygon. **54**

116. Determine the number of sides a polygon has if the sum of the interior angles is 2340°. **15**

**Sect 7.4**

117. Find the measure of each exterior angle of a regular 20-gon. **18**

118. Find the measure of an angle in a regular nonagon. **140**

119. Find the sum of the measures of the angles of a regular polygon if each exterior angle measures 30°. **1800**

**Sections 1.1 - 7.4**

Sometimes, Always or Never (S, A, or N)

**S** 120. The triangles are congruent if two sides and an angle of one are congruent to the corresponding parts of the other.

**A** 121. If two sides of a right triangle are congruent to the corresponding parts of another right triangle, the triangles are congruent.

**N** 122. All three altitudes of a triangle fall outside the triangle.

**N** 123. A right triangle is congruent to an obtuse triangle.

**S** 124. If a triangle is obtuse, it is isosceles.

**N** 125. The bisector of the vertex angle of a scalene triangle is perpendicular to the base.

**A** 126. The acute angles of a right triangle are complementary.
127. The supplement of one of the angles of a triangle is equal in measure to the sum of the other two angles of the triangle.

128. A triangle contains two obtuse angles.

129. A triangle is a plane figure.

130. Supplements of complementary angles are congruent.

131. If one of the angles of an isosceles triangle is 60°, the triangle is equilateral.

132. If the sides of one triangle are doubled to form another triangle, each angle of the second triangle is twice as large as the corresponding angle of the first triangle.

133. If the diagonals of a quadrilateral are congruent, the quadrilateral is an isosceles trapezoid.

134. If the diagonals of a quadrilateral divide each angle into two 45-degree angles, the quadrilateral is a square.

135. If a parallelogram is equilateral, it is equiangular.

136. If two of the angles of a trapezoid are congruent, the trapezoid is isosceles.

137. A square is a rhombus.

138. A rhombus is a square.

139. A kite is a parallelogram.

140. A rectangle is a polygon.

141. A polygon has the same number of vertices as sides.

142. A parallelogram has three diagonals.

143. A trapezoid has three bases.

144. A quadrilateral is a parallelogram if the diagonals are congruent.

145. A quadrilateral is a parallelogram if one pair of opposite sides is congruent and one pair of opposite sides is parallel.

146. A quadrilateral is a parallelogram if each pair of consecutive angles is supplementary.

147. A quadrilateral is a parallelogram if all angles are right angles.
148. If one of the diagonals of a quadrilateral is the perpendicular bisector of the other, the quadrilateral is a kite.

149. Two parallel lines determine a plane.

150. If a plane contains one of two skew lines, it contains the other.

151. If a line and a plane never meet, they are parallel.

152. If two parallel lines lie in different planes, the planes are parallel.

153. If a line is perpendicular to two planes, the planes are parallel.

154. If a plane and a line not in the plane are each perpendicular to the same line, then they are parallel to each other.

155. In a plane, two lines perpendicular to the same line are parallel.

156. In space, two lines perpendicular to the same line are parallel.

157. If a line is perpendicular to a plane, it is perpendicular to every line in the plane.

158. If a line is perpendicular to a line in a plane, it is perpendicular to the plane.

159. Two lines perpendicular to the same line are parallel.

160. Three parallel lines are coplanar.

**Geometry Final Proof Review**

161. Given: \( \angle BAC \cong \angle ACD \)
\( \angle BCA \cong \angle DAC \)
\( \angle EDA \cong \angle ABC \)

Prove: \( ABCD \) is a rectangle

162. Given: \( CD \perp m \)

\( \triangle ABC \) is isosceles, with base \( AB \)

Prove: \( \angle DAB \cong \angle DBA \)
163. Given: \( \overline{AE} \) is an altitude
\( \overline{FD} \) is an altitude
\( \overline{ABDC} \) is a parallelogram
Prove: \( BF \cong EC \)

164. Given: \( \overline{AE} \cong \overline{EB} \)
\( \overline{DE} \cong \overline{EC} \)
Prove: \( \triangle ACD \cong \triangle BDC \)

165. Given: \( \odot A \)
\( \overline{AC} \) is an altitude
Prove: \( \overline{AC} \) is a median

166. Given: \( \text{ACEG is a rectangle} \)
\( B, D, F \) & \( H \) are midpoints
Prove: \( \text{BHFD is a parallelogram} \)
167. Given: \( \circ O, \overline{BO} \) is an altitude

Prove: \( \overline{AB} \cong \overline{CB} \)

168. Given: \( \overline{AE} \perp \overline{ED} \)
\( \overline{CD} \perp \overline{ED} \)
\( \angle AEF \cong \angle CDF \)

Prove: \( \overline{AD} \cong \overline{EC} \)

169. Given: \( \triangle ACE \) is isosceles with base \( \overline{CE} \)
B, D, F are midpoints

Prove: \( \triangle ABD \cong \triangle AFD \)

170. Given: \( \angle 1 \) is complementary to \( \angle 4 \)
\( \angle 2 \) is complementary to \( \angle 3 \)
\( \overline{RT} \) bisects \( \angle SRV \)

Prove: \( \angle S \cong \angle V \)
171. Given: \( \triangle ABC \) is isosceles with base \( BC \)
\[ BF \cong CG, \quad FH \perp BC, \quad GI \perp BC \]
\( \angle OFG \cong \angle OGF \)
Prove: \( \triangle HFO \cong \triangle IGO \)

172. Given: Diagram as shown
\( \angle 1 \cong \angle 4 \)
Prove: \( \angle 2 \cong \angle 3 \)

173. Given: \( OP \cong RS \)
\[ KO \cong KS \]
\( M \) is the midpoint of \( OK \)
\( T \) is the midpoint of \( KS \)
Prove: \( MP \cong TR \)

174. Given: \( PR \cong ST \)
\[ NP \cong VT \]
\( \angle P \cong \angle T \)
Prove: \( \triangle WRS \) is isosceles
175. Given: $\triangle XYZ$ is isosceles with base $YZ$

$A, B$ trisect $YZ$

Prove: $\overline{XA} \cong \overline{XB}$

176. Given: $P$ is the midpoint of $\overline{XZ}$

$\angle 1 \cong \angle 2$

Prove: $\overline{XY} \cong \overline{YZ}$

177. Given: $AF \parallel EC$

$AF \cong EC$

$BE \cong FD$

Prove: $ABCD$ is a parallelogram