Honors Geometry Mid-Term Exam

Study Guide

Solve each proportion.

1. \( \frac{b + 1}{b - 1} = \frac{10}{9} \)
   - a. \( \frac{9}{10} \)
   - b. \( \frac{1}{19} \)
   - c. 19
   - d. \( \frac{10}{9} \)

2. \( \frac{2}{40} = \frac{n}{12} \)
   - a. \( \frac{5}{3} \)
   - b. \( \frac{1}{240} \)
   - c. \( \frac{3}{5} \)
   - d. 240

3. In rhombus \( ABCD \), if \( AB = 18 \), find \( CD \).
   - a. 9
   - b. \( 18\sqrt{2} \)
   - c. 36
   - d. 18

Find each measure.

4. \( m\angle 1, m\angle 2, m\angle 3 \)
   - a. \( m\angle 1 = 63, m\angle 2 = 80, m\angle 3 = 54 \)
   - b. \( m\angle 1 = 46, m\angle 2 = 54, m\angle 3 = 63 \)
   - c. \( m\angle 1 = 63, m\angle 2 = 46, m\angle 3 = 54 \)
   - d. \( m\angle 1 = 46, m\angle 2 = 80, m\angle 3 = 71 \)
In the figure, $\overrightarrow{KJ}$ and $\overrightarrow{KL}$ are opposite rays. $\angle 1 \equiv \angle 2$ and $\overrightarrow{KM}$ bisects $\angle NKL$.

5. If $m\angle JKM = 5x + 18$ and $m\angle 4 = x$, what is $m\angle 4$?
   a. 12
   b. 27
   c. 33
   d. 153

Determine whether each pair of figures is similar. Justify your answer.

6. a. $\triangle DEF$ is not similar to $\triangle ABC$. Corresponding angles are not the same.
   b. $\triangle DEF$ is not similar to $\triangle ABC$. The ratios of the corresponding sides are not the same.
   c. $\triangle DEF \sim \triangle ABC$ because the corresponding angles of each triangle are congruent. The ratio of the corresponding sides is 2.
   d. $\triangle DEF \sim \triangle ABC$ because the corresponding angles of each triangle are congruent. The ratio of the corresponding sides is 1.

7. Find the measure of each interior angle for a regular pentagon. Round to the nearest tenth if necessary.
   a. 540
   b. 108
   c. 72
   d. 360
Find $x$ and the measures of the indicated parts.

8. $AB$

   - $x = \frac{14}{3}, AB = 28$
   - $x = \frac{14}{3}, AB = \frac{28}{3}$
   - $x = \frac{3}{2}, AB = 6$
   - $x = \frac{3}{2}, AB = 3$

9. $BC$ and $AC$

   - $x = 3, BC = 6, AC = 10$
   - $x = 3, BC = 6, AC = 12$
   - $x = 9, BC = 12, AC = 18$
   - $x = 9, BC = 12, AC = 10$

10. $AB$ and $BC$

    - $x = -1.6, AB = 7.2, BC = 4.6$
    - $x = 5, AB = 6, BC = 2$
    - $x = 5, AB = 14, BC = 8$
    - $x = -1.6, AB = 0.8, BC = 1.4$
11. For trapezoid $JKLM$, $A$ and $B$ are midpoints of the legs. Find $ML$.

![Diagram of trapezoid with midpoints](image)

- a. 44.5
- b. 1.5
- c. 22.25
- d. 20

12. The measures of two complementary angles are $12q - 9$ and $8q + 14$. Find the measures of the angles.

- a. $4.25$
- b. $42, 48$
- c. $8.75$
- d. $96, 84$

*Determine the slope of the line that contains the given points.*

13. $T(3, -6), V(7, 8)$

- a. $\frac{7}{2}$
- b. $\frac{2}{7}$
- c. $\frac{2}{7}$
- d. $\frac{1}{9}$

14. In the figure, $m\angle NML = 120\degree, PQ \parallel TU$ and $KL \parallel NM$. Find the measure of angle $TLR$.

![Diagram of angles and parallel lines](image)

- a. 40
- b. 120
- c. 100
- d. 60
Determine whether the quadrilateral is a parallelogram. Justify your answer.

15. 

Find the coordinates of the midpoint of a segment having the given endpoints.

16. \(Q(-7, 11), R(-4, -10)\)

a. \((2, -7)\)  

b. \((-3, 21)\)  

c. \((-5.5, 0.5)\)  

d. \((-1.5, 10.5)\)

Determine whether statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write invalid.

17. (1) If you do your chores you will please your mother.
(2) If you please your mother you will get a hug.
(3) If you do your chores you will get a hug.

a. yes; Law of Detachment  

b. yes; Law of Syllogism  

c. invalid

18. (1) Two segments have the same measure.
(2) If two segments have the same measure they are congruent.
(3) The two segments are congruent.

a. yes; Law of Syllogism  

b. yes; Law of Detachment  

c. invalid
19. Find $PS$ if $\triangle ABC \sim \triangle PQR$, $AD$ is an altitude of $\triangle ABC$, $PS$ is an altitude of $\triangle PQR$, $AD = 12$, $AC = 16$, and $PR = 10$.

![Diagram of triangles with altitudes AD and PS]

- a. 7.5  
- b. 4.62  
- c. 19.5  
- d. 19.2

Write the contrapositive of the conditional statement. Determine whether the contrapositive is true or false. If it is false, find a counterexample.

20. If you have a gerbil, then you are a pet owner.

- a. If you are not a pet owner, then you do not have a gerbil. True
- b. If you are not a gerbil, then you are not a pet owner. True
- c. If you are not a pet owner, then you have a gerbil. False; if you are not a pet owner then you have no pets.
- d. If you do not have a gerbil, then you are not a pet owner. False; you could have a dog.

Write the inverse of the conditional statement. Determine whether the inverse is true or false. If it is false, find a counterexample.

21. All quadrilaterals are four-sided figures.

- a. No four-sided figures are not quadrilaterals. True
- b. All non-quadrilaterals are four-sided figures. False; a triangle is a non-quadrilateral.
- c. All four-sided figures are quadrilaterals. True
- d. No quadrilaterals are not four-sided figures. True
Find the length of each side of the polygon for the given perimeter.

22. \( P = 72 \) units. Find the length of each side.

\[
\begin{align*}
2r-3 & \quad 2r+9 \\
4 & \quad 8
\end{align*}
\]

a. 10 units, 34 units, 6 units, 22 units  
b. 9 units, 35 units, 5 units, 23 units  
c. 8 units, 33 units, 4 units, 21 units  
d. 9 units, 36 units, 4 units, 23 units

Refer to Figure 1.

23. Name a line that contains point \( J \).

a. \( \overrightarrow{DB} \)  
b. \( n \)  
c. \( \overrightarrow{p} \)  
d. \( \overrightarrow{GF} \)
Determine whether $\overrightarrow{WX}$ and $\overrightarrow{YZ}$ are parallel, perpendicular, or neither.

24. $W(2, -4), X(-1, 5), Y(4, -8), Z(8, -5)$
   a. parallel
   b. perpendicular
   c. neither

25. $W(-4, 5), X(-1, 3), Y(0, -1), Z(7, 3)$
   a. perpendicular
   b. neither
   c. parallel

26. For a recent project, a teacher purchased 250 pieces of red construction paper and 114 pieces of blue construction paper. What is the ratio of red to blue?
   a. 182:125
   b. 57:125
   c. 125:57
   d. 125:182

Determine the relationship between the measures of the given angles.

27. $\angle PVC, \angle KCT$

   a. $\angle PVC < \angle KCT$
   b. $\angle PVC = \angle KCT$
   c. $\angle PVC > \angle KCT$
Use the Distance Formula to find the distance between each pair of points.

28. $T(3, -3)$, $H(4, 5)$

- a. $\sqrt{45}$
- b. 4.5
- c. $\sqrt{53}$
- d. 7

Write an equation in slope-intercept form of the line having the given slope and y-intercept.

29. $m = -\frac{2}{3}$, $(0, -7)$

- a. $y = -\frac{2}{3}x - 7$
- b. $y = -7x - \frac{2}{3}$
- c. $y = -\frac{7}{3}x$
- d. $y = \frac{14}{3}x$

Use the number line to find the measure.

30. $MG$

- a. -3
- b. 4
- c. 5
- d. 8
In the figure, \( \overline{GK} \) bisects \( \angle FGH \).

31. If \( m\angle FGK = 6w + 9 \) and \( m\angle FGH = 114 \), find \( w \).
   a. 8
   b. 57
   c. 17.5
   d. 4

32. Triangle \( FJH \) is an equilateral triangle. Find \( x \) and \( y \).

   a. \( x = 7, y = 14 \)
   b. \( x = \frac{7}{3}, y = 16 \)
   c. \( x = 7, y = 16 \)
   d. \( x = \frac{7}{5}, y = 14 \)
Determine whether the conjecture is true or false. Give a counterexample for any false conjecture.

33. Given:

\[ \angle BCA \cong \angle BAC \]

Conjecture:

a. False; the angles are not complementary.
b. False; the angles are not vertical.
c. False; there is no indication of the measures of the angles.
d. True

Determine whether the given measures can be the lengths of the sides of a triangle. Write yes or no. Explain.

34. 4, 7, 12

a. Yes; the sum of the lengths of any two sides is greater than the third.
b. Yes; the third side is the longest.
c. No; the sum of the lengths of two sides is not greater than the third.
d. No; the first side is not long enough.

Determine whether each pair of triangles is similar. Justify your answer.

35.

a. No; the sides are not congruent.
b. Yes: \( \triangle EDF \sim \triangle BCA \) by SSS Similarity
c. Yes: \( \triangle EDF \sim \triangle BCA \) by SAS Similarity
d. Yes: \( \triangle EDF \sim \triangle BCA \) by ASA Similarity
Complete the statement about parallelogram $ABCD$.

36. $CD \equiv$
   a. $AB$; Diagonals of parallelograms bisect each other.
   b. $BC$; Opposite sides of parallelograms are congruent.
   c. $AB$; Opposite sides of parallelograms are congruent.
   d. $BC$; Diagonals of parallelograms bisect each other.

37. Find the measure of each exterior angle for a regular nonagon. Round to the nearest tenth if necessary.
   a. 360
   b. 1260
   c. 140
   d. 40

Quadrilateral $ABCD$ is a rectangle.

38. If $\angle ADB = -4p + 95$ and $\angle CDB = -5p + 40$, find $\angle CBD$.
   a. 45
   b. 15
   c. 75
   d. 5

39. If $AG = 9h + 14$ and $DG = -5h + 126$, find $BD$.
   a. 86
   b. 8
   c. 43
   d. 172
40. Name two acute vertical angles.
   a. \( \angle GQI, \angle IQM \)
   b. \( \angle KQL, \angle IQH \)
   c. \( \angle HQL, \angle IQK \)
   d. \( \angle KQL, \angle KQM \)

41. In the figure, \( \overline{AB} \parallel \overline{CD} \). Find \( x \) and \( y \).

   a. \( x = 29, y = 141 \)
   b. \( x = 49, y = 141 \)
   c. \( x = 41, y = 149 \)
   d. \( x = 141, y = 49 \)
Refer to parallelogram \(ABCD\) to answer to following questions.

42. What is the distance between points \(A\) and \(C\)?
   
   a. \(2\sqrt{34}\)
   
   b. \(3\sqrt{2}\)
   
   c. \(6\sqrt{2}\)
   
   d. \(\sqrt{34}\)

Identify the similar triangles. Find \(x\).

43. \(\Delta DEF \sim \Delta ABC; x = 15\)
   
   a. \(\Delta DEF \sim \Delta ABC; x = 15\)
   
   b. \(\Delta DEF \sim \Delta BAC; x = 15\)
   
   c. \(\Delta DEF \sim \Delta ABC; x = 20\)
   
   d. \(\Delta DEF \sim \Delta BAC; x = 20\)

44. A scale model of a yacht is 15 inches long. The actual length of the yacht is 135 feet. How many times as long as the actual yacht is the model?

   a. \(\frac{5}{27}\)
   
   b. \(\frac{1}{108}\)
   
   c. \(\frac{1}{9}\)
   
   d. \(\frac{1}{15}\)
45. At Whitewater Junior High School, there are 360 students and 39 teachers. What is the ratio of students to each teacher rounded to the nearest tenth?
   a. 1:9.2  
   b. 120:13  
   c. 9.2:1  
   d. 13:120

Determine the relationship between the lengths of the given sides.

46. \( \overline{UL}, \overline{RH} \)

\[ \begin{array}{c}
\begin{array}{c}
R \\
111^\circ \\
1^\circ \\
H \\
89^\circ \\
B \\
56^\circ \\
L \\
78^\circ \\
G \\
35^\circ \\
22^\circ \\
\end{array}
\end{array} \]

a. cannot be determined  
   b. \( \overline{UL} < \overline{RH} \)  
   c. \( \overline{UL} > \overline{RH} \)  
   d. \( \overline{UL} = \overline{RH} \)

Write the converse of the conditional statement. Determine whether the converse is true or false. If it is false, find a counterexample.

47. If the figure has four sides, then the figure is a quadrilateral.
   a. If the figure is a quadrilateral, then the figure has four sides. False; it could have five sides.
   b. If the figure has four sides, then the figure is a quadrilateral. True
   c. If the figure is a quadrilateral, then the figure has four sides. True
   d. A four-sided figure is a quadrilateral. True

Name the congruent angles and sides for the pair of congruent triangles.

48. \( \triangle GHK \equiv \triangle XZT \)
   a. \( \angle G \equiv \angle T, \angle H \equiv \angle X, \angle K \equiv \angle Z, \overline{GH} \equiv \overline{TX}, \overline{HK} \equiv \overline{XZ}, \overline{GK} \equiv \overline{TZ} \)
   b. \( \angle G \equiv \angle Z, \angle H \equiv \angle T, \angle K \equiv \angle X, \overline{GH} \equiv \overline{XT}, \overline{HK} \equiv \overline{TX}, \overline{GK} \equiv \overline{ZX} \)
   c. \( \angle G \equiv \angle X, \angle H \equiv \angle Z, \angle K \equiv \angle T, \overline{GH} \equiv \overline{XZ}, \overline{HK} \equiv \overline{XT}, \overline{GK} \equiv \overline{ZX} \)
   d. \( \angle G \equiv \angle T, \angle H \equiv \angle Z, \angle K \equiv \angle X, \overline{GH} \equiv \overline{TZ}, \overline{HK} \equiv \overline{ZX}, \overline{GK} \equiv \overline{TX} \)
49. $ZC$ is an altitude, $\angle CYW = 8x + 27$, and $\angle WZC = 13x$. Find $m\angle WZC$.

- a. 39
- b. 32
- c. 36
- d. 24

50. Name three points that are collinear.

- a. $C, D, H$
- b. $B, G, F$
- c. $J, G, F$
- d. $J, D, G$