GEOMETRY - QUARTER 1 BENCHMARK

Multiple Choice
Identify the choice that best completes the statement or answers the question.

Refer to Figure 1.

1. What is another name for line $n$?
   a. line $JB$  
   b. $DC$  
   c. $GF$  
   d. $AC$

2. What is another name for line $m$?
   a. line $JG$  
   b. $JGB$  
   c. $DB$  
   d. line $JB$

3. Name a line that contains point $A$.
   a. $DC$  
   b. $m$  
   c. $K$  
   d. $DB$

4. Name a point NOT contained in $AD$ or $FG$.
   a. $K$  
   b. $A$  
   c. $H$  
   d. $D$
5. Name three points that are collinear.

![Diagram showing collinear points]

a. Q, L, M  
b. R, S, K  
c. L, P, T  
d. M, L, R


![Diagram showing coplanar points]

a. No; one is on plane P.  
b. Yes; they all lie on the same face of the pyramid.  
c. Yes; they all lie on plane P.  
d. No; three lie on the same face of the pyramid and the fourth does not.
Refer to Figure 2.

7. Which plane(s) contain point $K$?
   a. plane $AGC$  
   b. plane $ADB$, plane $ALC$  
   c. plane $CAG$, plane $ABD$  
   d. plane $DBA$

   In the figure, $KJ$ and $KL$ are opposite rays. $\angle 1 \cong \angle 2$ and $KM$ bisects $\angle NKL$.

8. Which is NOT true about $KM$?
   a. $\angle MKJ$ is acute.
   b. $\angle 3 \cong \angle MKL$
   c. Point $M$ lies in the interior of $\angle LKN$.
   d. It is an angle bisector.
Use the figure to find the angles.

9. Name a pair of obtuse adjacent angles.
   a. \(\angle KQG, \angle HQM\)
   b. \(\angle GQI, \angle IQM\)
   c. \(\angle GQJ, \angle IQJ\)
   d. \(\angle HQG, \angle IQH\)

10. Name an angle supplementary to \(\angle MQI\).
    a. \(\angle IQG\)
    b. \(\angle GQL\)
    c. \(\angle MQK\)
    d. \(\angle IQH\)

Determine whether the conjecture is true or false. Give a counterexample for any false conjecture.

11. Given: \(m^2 + 6 = 10\)
    Conjecture: \(m = 2\)
    a. False; \(m = 4\)
    b. True
    c. False; \(m = 3\)
    d. False; \(m = -2\)

12. Given: points \(R, S,\) and \(T\)
    Conjecture: \(R, S,\) and \(T\) are coplanar.
    a. False; the points do not have to be in a straight line.
    b. True
    c. False; the points to not have to form right angles.
    d. False; one point may not be between the other two.

13. Given: \(\angle ABC, \angle DBE\) are coplanar.
    Conjecture: They are vertical angles.
    a. False; the angles may be supplementary.
    b. True
    c. False; one angle may be in the interior of the other.
    d. False; the angles may be adjacent.

14. Given: Two angles are supplementary.
    Conjecture: They are both acute angles.
    a. False; either both are right or they are adjacent.
    b. True
    c. False; either both are right or one is obtuse.
    d. False; they must be vertical angles.
15. **Given:** $\angle F$ is supplementary to $\angle G$ and $\angle G$ is supplementary to $\angle H$.
**Conjecture:** $\angle F$ is supplementary to $\angle H$.
   a. False; they could be right angles.
   b. False; they could be congruent angles.
   c. True
   d. False; they could be vertical angles.

16. **Given:** segments $RT$ and $ST$; twice the measure of $ST$ is equal to the measure of $RT$.
   **Conjecture:** $S$ is the midpoint of segment $RT$.
   a. True
   b. False; point $S$ may not be on $RT$.
   c. False; lines do not have midpoints.
   d. False; $ST$ could be the segment bisector of $RT$.

   *Write the statement in if-then form.*

17. Two angles measuring 180 are supplementary.
   a. If two angles measure 180, then the angles are supplementary.
   b. If two angles measure 180, then it is true.
   c. If it is true, then two angles measure 180.
   d. If the angles are supplementary, then two angles measure 180.

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

18. All quadrilaterals are four-sided figures.
   a. All non-quadrilaterals are four-sided figures. False; a triangle is a non-quadrilateral.
   b. All four-sided figures are quadrilaterals. True
   c. No quadrilaterals are not four-sided figures. True
   d. No four-sided figures are not quadrilaterals. True

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

19. Two angles measuring 180 are supplementary.
   a. Two angles not measuring 180 are supplementary. True
   b. More than two angles measuring 180 are non-supplementary. True
   c. Non-supplementary angles are not two angles measuring 180. True
   d. Non-supplementary angles are two angles measuring 180. False; supplementary angles must measure 180.

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 do not have a gerbil, then you are not a pet owner. False; you could have a dog.
   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 are not a gerbil, then you are not a pet owner. True
In the figure below, points A, B, C, and F lie on plane \( P \). State the postulate that can be used to show each statement is true.

21. \( A \) and \( B \) are collinear.
   a. If two lines intersect, then their intersection is exactly one point.
   b. Through any two points there is exactly one line.
   c. If two points lie in a plane, then the entire line containing those points lies in that plane.
   d. A line contains at least two points.

22. \( D \) and \( B \) are collinear.
   a. Through any two points there is exactly one line.
   b. If two points lie in a plane, then the entire line containing those points lies in that plane.
   c. A line contains at least two points.
   d. If two lines intersect, then their intersection is exactly one point.

Refer to the figure below.

23. Name all segments parallel to \( \overline{GH} \).
   a. \( \overline{BG}, \overline{CH}, \overline{FG}, \overline{HI} \)
   b. \( \overline{CD}, \overline{BA}, \overline{AF}, \overline{DI} \)
   c. \( \overline{CD}, \overline{AB}, \overline{HI} \)
   d. \( \overline{BC}, \overline{AD}, \overline{FI} \)
24. Name all segments parallel to $\overline{AB}$.
   a. $\overline{AD}, \overline{BC}, \overline{GH}, \overline{FI}$
   b. $\overline{DI}, \overline{CH}, \overline{GH}, \overline{FI}$
   c. $\overline{CD}, \overline{FG}, \overline{HI}$
   d. $\overline{GH}, \overline{AD}, \overline{FI}$

25. Name all segments skew to $\overline{GF}$.
   a. $\overline{BC}, \overline{AD}, \overline{DI}, \overline{CH}$
   b. $\overline{FI}, \overline{GH}, \overline{DI}, \overline{CH}$
   c. $\overline{AD}, \overline{AB}, \overline{BC}, \overline{CD}$
   d. $\overline{CD}, \overline{CH}, \overline{DI}, \overline{HI}$

26. Name all planes intersecting plane $BAF$.
   a. $\overline{BGH}, \overline{CDA}, \overline{FID}, \overline{DIH}$
   b. $\overline{BCD}, \overline{CHG}, \overline{FID}, \overline{FIH}$
   c. $\overline{BCH}, \overline{GFI}, \overline{FGH}, \overline{CBG}$
   d. $\overline{DCH}, \overline{DAF}, \overline{CBG}, \overline{CBA}$

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

27. $\angle 2 \cong \angle 6$
   a. $a\parallel b$; congruent alternate exterior angles
   b. $a\parallel b$; congruent corresponding angles
   c. $c\parallel d$; congruent alternate exterior angles
   d. $c\parallel d$; congruent corresponding angles
28. \( \angle LHK \cong \angle JKP \)

a. \( c \parallel d; \) congruent corresponding angles
b. \( a \parallel b; \) congruent corresponding angles
c. \( a \parallel b; \) congruent alternate exterior angles
d. \( c \parallel d; \) congruent alternate exterior angles

**Short Answer**

*Refer to Figure 1.*

29. Name a point NOT contained in lines \( m, n, \) or \( p. \)

30. Name the intersection of lines \( m \) and \( n. \)
Refer to Figure 2.

31. Name the intersection of plane $KCG$ and a plane that contains points $L$ and $D$.

In the figure, $\overrightarrow{KJ}$ and $\overrightarrow{KL}$ are opposite rays. $\angle 1 \cong \angle 2$ and $KM$ bisects $\angle NKL$.

32. What bisects $\angle JKN$?

33. If $m \angle JKM = 5x + 18$ and $m \angle 4 = x$, what is $m \angle 4$?

34. If $m \angle JKP = 3r + 12$ and $m \angle 2 = 4r - 2$, what is $m \angle JKN$?

35. If $m \angle LKN = 7q + 2$ and $m \angle 4 = 4q - 5$, what is $m \angle 3$?

36. If $\angle JKN$ is a right angle and $m \angle 4 = 2(3x + 6)$, what is $x$?

Find the measurement of the segment.

37. $PR = 17.4$ mm, $RS = 16.4$ mm

$PS =$ ?
38. Find the value of the variable and $LN$ if $M$ is between $L$ and $N.$

$LQ = 4a, MN = 10a, LM = 32$

Use the Distance Formula to find the distance between each pair of points.

39.

![Graph](image)

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

40. $O(1.5, 2.5), R(0.1, -0.3)$

In the figure, $GK$ bisects $\angle FGH.$

41. If $m \angle FGK = 3w + 8$ and $m \angle FGH = 124,$ find $w.$

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

Make a conjecture about the next item in the sequence.

43. 6, 9, 7, 10, 8
44. In the figure, \( m \angle RPZ = 95 \) and \( \overrightarrow{TU} \parallel \overrightarrow{RQ} \parallel \overrightarrow{VW} \). Find the measure of angle \( UZP \).

\[
\begin{align*}
&\text{In the figure, } m \angle RPZ = 95, \overrightarrow{TU} \parallel \overrightarrow{RQ} \parallel \overrightarrow{VW}.
&\text{Find the measure of angle } UZP.
\end{align*}
\]

Determine whether \( \overrightarrow{WX} \) and \( \overrightarrow{YZ} \) are parallel, perpendicular, or neither.

45. \( W(0, -3), X(8, 0), Y(1, -8), Z(-1, -5) \)
46. \( W(-5, 0), X(-1, 6), Y(6, 6), Z(1, 3) \)

Write an equation in point-slope form of the line having the given slope that contains the given point.

47. \( m = 5, (4, 3) \)
48. \( m = -0.25, (-8, 2) \)
49. \( m = -\frac{2}{3}, \left(\frac{15}{4}, -\frac{1}{2}\right) \)
50. \( m = -3, (-2, 1) \)

Find the distance between the pair of parallel lines.

51. \( y = 3x + 4 \)
\[
\begin{align*}
&y = 3x - 4
\end{align*}
\]
52. In the figure, \( m \angle NML = 120, \overrightarrow{PQ} \parallel \overrightarrow{TU} \) and \( \overrightarrow{KL} \parallel \overrightarrow{NM} \). Find the measure of angle \( TLR \).
53. In the figure, \( AB \parallel CD \). Find \( x \) and \( y \).

54. In the figure, \( p \parallel q \). Find \( m\angle 1 \).

55. \( T(5,5), V(7,8) \)

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

56. \( m = -\frac{3}{2}, (0, -9) \)
GEOMETRY - QUARTER 1 BENCHMARK
Answer Section

MULTIPLE CHOICE

1. B
2. D
3. A
4. C
5. D
6. D
7. C
8. A
9. B
10. A
11. D
12. B
13. C
14. C
15. B
16. B
17. A
18. C
19. C
20. A
21. B
22. A
23. D
24. C
25. A
26. B
27. B
28. B

SHORT ANSWER

29. $H$
30. $D$
31. line $CG$
32. $KP$
33. 27
34. 108
35. 43
36. 5.5
37. 33.8 mm  
38. \(a = 8, LN = 112\)  
39. \(\sqrt{34}\)  
40. \((0.8, 1.1)\)  
41. 18  
42. 42, 48  
43. 11  
44. 95  
45. neither  
46. neither  
47. \(y - 3 = 5(x - 4)\)  
48. \(y - 2 = -0.25(x + 8)\)  
49. \(y + \frac{1}{2} = -\frac{2}{3} \left( x - \frac{15}{4} \right) \)  
50. \(y - 1 = -3(x + 2)\)  
51. \(d = 2.53\)  
52. 120  
53. \(x = 55, y = 137\)  
54. \(m \angle 1 = 59\)  
55. \(3/2\)  
56. \(y = -\frac{3}{2}x - 9\)