Geometry Chapter 4 Test Review

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

1. Given $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and $m\angle 1 = 42$. Find the measure of $\angle 7$.

   $\angle 1$ and $\angle 7$ are supplementary angles.

   a. $52^\circ$  
   b. $142^\circ$  
   c. $42^\circ$  
   d. $138^\circ$

2. In the figure, $j \parallel k$. Name three angles congruent to $\angle 7$.

   $\angle 1$ and $\angle 7$ are corresponding angles.

   a. $\angle 3$, $\angle 12$, $\angle 15$  
   b. $\angle 4$, $\angle 3$, $\angle 15$  
   c. $\angle 4$, $\angle 12$, $\angle 15$  
   d. $\angle 4$, $\angle 12$, $\angle 3$

Find the measure of the angle.

3. $\angle 1$  
   a. $m\angle 1 = 60$  
   b. $m\angle 1 = 10$  
   c. $m\angle 1 = 90$  
   d. $m\angle 1 = 100$

4. $\angle 2$  
   a. $m\angle 2 = 100$  
   b. $m\angle 2 = 120$  
   c. $m\angle 2 = 60$  
   d. $m\angle 2 = 30$

5. $\angle 3$  
   a. $m\angle 3 = 90$  
   b. $m\angle 3 = 50$  
   c. $m\angle 3 = 30$  
   d. $m\angle 3 = 60$

6. $\angle 4$  
   a. $m\angle 4 = 40$  
   b. $m\angle 4 = 60$  
   c. $m\angle 4 = 90$  
   d. $m\angle 4 = 30$

7. $\angle 5$
8. Find \(x\) so that \(e \parallel f\).

\[
\begin{align*}
\text{(a)} & \quad 115 & \quad \text{(c)} & \quad 105 \\
\text{(b)} & \quad 22 & \quad \text{(d)} & \quad 50
\end{align*}
\]

9.

\[
\begin{align*}
\text{(a)} & \quad 96 & \quad \text{(c)} & \quad 78 \\
\text{(b)} & \quad 87 & \quad \text{(d)} & \quad 90
\end{align*}
\]

10.

\[
\begin{align*}
\text{(a)} & \quad 30 & \quad \text{(c)} & \quad 155 \\
\text{(b)} & \quad 42 & \quad \text{(d)} & \quad 145
\end{align*}
\]

11.

\[
\begin{align*}
\text{(a)} & \quad 90 & \quad \text{(c)} & \quad 8 \\
\text{(b)} & \quad 10 & \quad \text{(d)} & \quad 110
\end{align*}
\]

12.

\[
\begin{align*}
\text{(a)} & \quad 60 & \quad \text{(c)} & \quad 21
\end{align*}
\]
b. 30
d. 63

13. Write the slope-intercept form of the equation of the line passing through the point \((-1, 1)\) and perpendicular to the line \(y = -\frac{1}{3}x - 1\).
   a. \(y = -\frac{1}{3}x - 4\)  c. \(y = 3x - 4\)
   b. \(y = 3x + 4\)  d. \(y = -\frac{1}{3}x + 4\)

**Short Answer**

*Describe the pair of segments in the prism as parallel, skew, or intersecting.*

14. \(\overline{TY}, \overline{WZ}\)
15. \(\overline{XZ}, \overline{TW}\)
16. \(\overline{WV}, \overline{ZW}\)
17. \(\overline{VX}, \overline{WZ}\)
18. \(\overline{TV}, \overline{YZ}\)

*Name the parts of the pyramid shown below.*

19. all segments parallel to \(\overline{BD}\)
20. all segments skew to \(\overline{AB}\)
21. five planes
22. two pairs of intersecting planes

*Identify the pair of angles as alternate interior, alternate exterior, consecutive interior, or vertical.*

23. $\angle 7$ and $\angle 1$
24. $\angle 6$ and $\angle 4$
25. $\angle 4$ and $\angle 5$
26. $\angle 5$ and $\angle 3$
27. $\angle 6$ and $\angle 3$
28. What is the measure of $\angle C$? Lines $PQ$ and $RS$ are parallel.

29. If $m\angle 3 = 3x$ and $m\angle 7 = x + 80$, find $x$, $m\angle 3$, and $m\angle 7$.
30. If $m\angle 4 = 3x$ and $m\angle 5 = 6x - 180$, find $x$, $m\angle 4$, and $m\angle 5$.
31. If $m\angle 8 = 3x - 30$ and $m\angle 2 = 90 - x$, find $x$, $m\angle 8$, and $m\angle 2$.
32. If $m\angle 6 = 14x - 80$ and $m\angle 3 = 12x$, find $x$, $m\angle 6$, and $m\angle 3$.
33. If $m\angle 1 = 25x + 20$ and $m\angle 3 = 10x + 80$, find $x$, $m\angle 1$, and $m\angle 3$.

*Find $x$ so that $e \parallel f.*
34. Name the pairs of parallel lines or segments.

35. Given the set of points, determine if $\overrightarrow{PQ}$ and $\overrightarrow{RS}$ are parallel, perpendicular, or neither.

36. Find the slope of the line through the points $(9, -8)$ and $(-4, 3)$.

37. Use the slope and $y$-intercept to graph $2x + 8y = 24$.

38. Write the equation of a line with slope 5 passing through the point $(-4, -1)$.

39. Find an equation of the line that passes through the point $(-6, -6)$ and is parallel to the line $9x + 2y = -1$. 

40. Use the slope and $y$-intercept to graph $y = 2x + 1$.

41. Use the slope and $y$-intercept to graph $-2x + 8y = 24$.
Geometry Chapter 4 Test Review
Answer Section

MULTIPLE CHOICE

1. **ANS: D**
   If two parallel lines are cut by a transversal then each pair of:
   1. alternate interior angles is congruent.
   2. consecutive interior angles is supplementary.
   3. alternate exterior angles is congruent.

2. **ANS: C**
   If two parallel lines are cut by a transversal then each pair of:
   1. alternate interior angles is congruent.
   2. consecutive interior angles is supplementary.
   3. alternate exterior angles is congruent.
   4. corresponding angles is congruent.
   Vertical angles are congruent.

3. **ANS: A**
   Vertical angles are congruent.

4. **ANS: B**
   Linear pairs are supplementary.
5. **ANS: D**
   If two parallel lines are cut by a transversal, then each pair of corresponding angles is congruent.

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6. **ANS: D**
   If two parallel lines are cut by a transversal then each pair of:
   1. alternate interior angles is congruent.
   2. consecutive interior angles is supplementary.
   3. alternate exterior angles is congruent.
   4. corresponding angles is congruent.
   Vertical angles are congruent.

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7. **ANS: A**
   If two parallel lines are cut by a transversal then each pair of:
   1. alternate interior angles is congruent.
   2. consecutive interior angles is supplementary.
   3. alternate exterior angles is congruent.
   4. corresponding angles is congruent.
   Vertical angles are congruent.

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8. **ANS: B**
   $5x^\circ$ and $110^\circ$ are alternate interior angles. If both the angles are congruent, then $e \parallel f$. Use these facts to write an equation and solve for $x$.

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9. **ANS: C**
If both the angles are congruent, then $e \parallel f$. Use these facts to write an equation and solve for $x$.

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10. ANS: A

$3x + 15^\circ$ and $2x + 15^\circ$ are consecutive interior angles. If both the angles are supplementary, then $e \parallel f$. Use these facts to write an equation and solve for $x$.

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11. ANS: B

$90^\circ$ and $10x - 10^\circ$ are corresponding angles. If both the angles are congruent, then $e \parallel f$. Use these facts to write an equation and solve for $x$.

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12. ANS: C

$63^\circ$ and $3x^\circ$ are alternate exterior angles. If both the angles are congruent, then $e \parallel f$. Use these facts to write an equation and solve for $x$.

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13. ANS: C

Two distinct nonvertical lines are perpendicular if and only if the product of their slopes is $-1$. An equation of the line having slope $m$ and $y$-intercept $b$ is $y = mx + b$. To determine the $y$-intercept substitute $x, y$, and the slope into the equation and solve for $b$.

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SHORT ANSWER

14. ANS: parallel  
Two segments are parallel if and only if they are in the same plane and do not intersect.

15. ANS: skew  
Two segments that are not in the same plane are skew if and only if they do not intersect.

16. ANS: intersecting  
The segments are not parallel or skew and meet at point W.

17. ANS: parallel  
Two segments are parallel if and only if they are in the same plane and do not intersect.

18. ANS: skew  
Two segments that are not in the same plane are skew if and only if they do not intersect.

19. ANS: \( \overline{AE} \)  
Two segments are parallel if and only if they are in the same plane and do not intersect.

20. ANS: \( \overline{CD}, \overline{CE} \)  
Two segments that are not in the same plane are skew if and only if they do not intersect.

21. ANS: planes \( ABC, BDC, DEC, EAC, \) and \( ABD \)  
A plane is a flat surface that extends without end in all directions. A plane can be named by three noncollinear points.

22. ANS: planes \( ABC \) and \( BDC; BDC \) and \( DEC; DEC \) and \( EAC; EAC \) and \( ABC; ABD \) and \( ABC, ABD \) and \( BDC, ABD \) and \( DEC, \) or \( ABD \) and \( EAC. \)  
If two distinct planes intersect then their intersection is a line.

23. ANS: alternate exterior  
Interior angles lie between the two lines. Exterior angles lie outside the two lines. 
Alternate interior angles are interior angles on opposite side of the transversal. 
Alternate exterior angles are exterior angles on opposite side of the transversal. 
Consecutive interior angles are interior angles on the same side of the transversal. 
Vertical angles are two nonadjacent angles formed by a pair of intersecting lines.
24. ANS:
alternate interior
Interior angles lie between the two lines. Exterior angles lie outside the two lines.
Alternate interior angles are interior angles on opposite side of the transversal.
Alternate exterior angles are exterior angles on opposite side of the transversal.
Consecutive interior angles are interior angles on the same side of the transversal.
Vertical angles are two nonadjacent angles formed by a pair of intersecting lines.

25. ANS:
consecutive interior
Interior angles lie between the two lines. Exterior angles lie outside the two lines.
Alternate interior angles are interior angles on opposite side of the transversal.
Alternate exterior angles are exterior angles on opposite side of the transversal.
Consecutive interior angles are interior angles on the same side of the transversal.
Vertical angles are two nonadjacent angles formed by a pair of intersecting lines.

26. ANS:
alternate interior
Interior angles lie between the two lines. Exterior angles lie outside the two lines.
Alternate interior angles are interior angles on opposite side of the transversal.
Alternate exterior angles are exterior angles on opposite side of the transversal.
Consecutive interior angles are interior angles on the same side of the transversal.
Vertical angles are two nonadjacent angles formed by a pair of intersecting lines.

27. ANS:
consecutive interior
Interior angles lie between the two lines. Exterior angles lie outside the two lines.
Alternate interior angles are interior angles on opposite side of the transversal.
Alternate exterior angles are exterior angles on opposite side of the transversal.
Consecutive interior angles are interior angles on the same side of the transversal.
Vertical angles are two nonadjacent angles formed by a pair of intersecting lines.

28. ANS:
120°
If two parallel lines are cut by a transversal then each pair of:
1. alternate interior angles is congruent.
2. consecutive interior angles is supplementary.
3. alternate exterior angles is congruent.

29. ANS:
x = 40, \( m\angle 3 = 120, m\angle 7 = 120 \)
\( \angle 3 \) and \( \angle 7 \) are corresponding angles. Therefore, they are congruent.

30. ANS:
x = 40, \( m\angle 4 = 120, \) and \( m\angle 5 = 60 \)
\( \angle 4 \) and \( \angle 5 \) are consecutive interior angles. Therefore, they are supplementary.

31. ANS:
x = 30, \( m\angle 8 = 60, \) and \( m\angle 2 = 60 \)
\( \angle 8 \) and \( \angle 2 \) are alternate exterior angles. Therefore, they are congruent.
32. **ANS:**
   \[
   x = 10, \quad m\angle 6 = 60, \quad \text{and} \quad m\angle 3 = 120
   \]
   \(\angle 6\) and \(\angle 3\) are consecutive interior angles. Therefore, they are supplementary.

33. **ANS:**
   \[
   x = 4, \quad m\angle 1 = 120, \quad \text{and} \quad m\angle 3 = 120
   \]
   \(\angle 1\) and \(\angle 3\) are vertical angles. Therefore, they are congruent.

34. **ANS:**
   74
   \(x - 7^\circ\) and 67° form a pair of corresponding angles. If both the angles are congruent, then \(e \parallel f\). Use these facts to write an equation and solve for \(x\).

35. **ANS:**
   24
   72° and 3x° form a pair of alternate interior angles. If both the angles are congruent, then \(e \parallel f\). Use these facts to write an equation and solve for \(x\).

36. **ANS:**
   10
   7x + 9° and 13x - 29° form a pair of consecutive interior angles. If both the angles are supplementary, then \(e \parallel f\). Use these facts to write an equation and solve for \(x\).

37. **ANS:**
   \(j \parallel k\) and \(l \parallel m\)
   In a plane, if two lines are cut by a transversal so that a pair of:
   1. corresponding angles is congruent, or
   2. alternate interior angles is congruent, or
   3. alternate exterior angles is congruent, or
   4. consecutive interior angles is supplementary,
   then the two lines are parallel.
   If two lines are perpendicular to the same line, then the lines are parallel.

38. **ANS:**
   \[
   m = 11, \quad 13
   \]
   The slope \(m\) of a line containing two points with coordinates \((x_1, y_1)\) and \((x_2, y_2)\) is given by the formula
   \[
   m = \frac{y_2 - y_1}{x_2 - x_1}, \quad \text{where} \quad x_2 \neq x_1.
   \]

39. **ANS:**
   parallel
   Two distinct nonvertical lines are parallel if and only if they have the same slope.
   Two distinct nonvertical lines are perpendicular if and only if the product of their slopes is \(-1\).

40. **ANS:**
    perpendicular
Two distinct nonvertical lines are parallel if and only if they have the same slope.
Two distinct nonvertical lines are perpendicular if and only if the product of their slopes is $-1$.

41. ANS:

An equation of the line having slope $m$ and $y$-intercept $b$ is $y = mx + b$.

42. ANS:

An equation of the line having slope $m$ and $y$-intercept $b$ is $y = mx + b$.

43. ANS:
$y = 5x + 19$

An equation of the line having slope $m$ and $y$-intercept $b$ is $y = mx + b$. To determine the $y$-intercept substitute $x, y$, and the slope into the equation and solve for $b$.

44. ANS:
$9x + 2y = -66$

Two distinct nonvertical lines are parallel if and only if they have the same slope.
An equation of the line having slope $m$ and $y$-intercept $b$ is $y = mx + b$. To determine the $y$-intercept substitute $x$, $y$, and the slope into the equation and solve for $b$. 