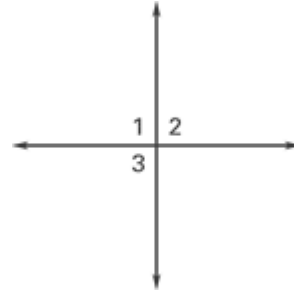# Chapter 2 Review

Short Answer
Determine whether the biconditional statement about the diagram is *true* or *false*.

1. $\angle 1$ and $\angle 2$ are supplementary if and only if they form a linear pair.

2. $\angle 3$ and $\angle 2$ are congruent if and only if $\angle 1$ and $\angle 3$ are congruent.

Name the property used to make the conclusion.

3. If $x + 7 = 23$, then $x = 16$.

4. If $4x = 40$, then $x = 10$.

5. If $x = 7$ and $y = 7$, then $x = y$.

6. If $4x = 28$, then $28 = 4x$.

7. If $x - 24 = 25$, then $x = 49$.

8. If $x - 7 = 23$, then $x = 30$.

Use the diagram to decide whether the statement is *true* or *false*.

9. Through points *A, B*, and *D*, there exists exactly one plane.

10. Through points *D, B*, and *E*, there exists exactly one plane.

11. Through points *A* and *E*, there exists exactly one line.

12. Line *AE* lies in plane *AFE*.
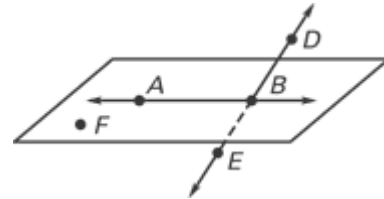
Predict the next three numbers.

13. –2, 2, 6, 10, ...

14. 1.3, 2.2, 3.1, ...

15. –1, 2, 6, 11, ...

16. $0, \frac{4}{5}, 1\frac{3}{5}, 2\frac{2}{5}, ...$

17. 11, 15, 23, 35, ...

18. –3.5, 7, –14, 28, ...

Write the inverse, converse, and contrapositive of the conditional statement.

19.   If it is snowing, then the temperature is below 32 degrees Fahrenheit.

20.   If two lines are parallel, then the two lines are in the same plane.

21.   If a point is on segment *AB*, then it is on ray *AB*.

22.   If I sail on a boat, then I will get seasick.

23.   If the measure of an angle is less than 90°, then it is an acute angle.

Decide whether the statement is *true* or *false*. If false, provide a counterexample.

24.   If four points are coplanar, then they are collinear.

25.   If a line and a plane intersect, and the line does not lie in the plane, then their intersection is a point.

Use the diagram and given information to complete the missing reasons in the proof.

26.　　　*Given:* $AB = BC$

　　　　Prove: $\frac{1}{2}AC = BC$

Statements　　　　　　　　　　　　Reasons
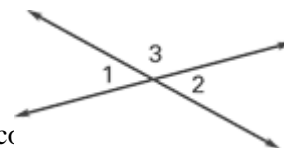
$AB = BC$ _____

$AC = AB + BC$ _____

$AC = BC + BC$ _____

$AC = 2BC$ _____

$\dfrac{1}{2}AC = BC$ _____

27.　　　*Given:* $\angle 1$ and $\angle 3$ are a linear pair. $\angle 2$ and $\angle 3$ are a linear pair.

　　　　Prove: $m\angle 1 = m\angle 2$ without using the theorem that vertical angles are co ___

Statements　　　　　　　　　　　　Reasons

$\angle 1$ and $\angle 3$ are a linear pair _____
$\angle 2$ and $\angle 3$ are a linear pair

$\angle 1$ and $\angle 3$ are supplementary _____
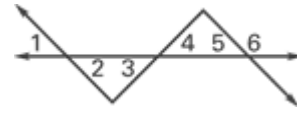$\angle 2$ and $\angle 3$ are supplementary

$\angle 1 \cong \angle 2$ _____

$m\angle 1 = m\angle 2$ _____

28.   *Given:* $\angle 2 \cong \angle 3$
        $\angle 4 \cong \angle 5$

Prove: $\angle 1$ is supplementary to $\angle 6$

Statements	Reasons
$\angle 2 \cong \angle 3$, $\angle 4 \cong \angle 5$	_____
$\angle 3 \cong \angle 4$, $\angle 1 \cong \angle 2$	
$\angle 1 \cong \angle 3$, $\angle 3 \cong \angle 5$, $\angle 1 \cong \angle 5$	
$\angle 5$ and $\angle 6$ are a linear pair	
$\angle 5$ and $\angle 6$ are supplementary	
$m\angle 5 + m\angle 6 = 180^\circ$	
$m\angle 1 = m\angle 5$	
$m\angle 1 + m\angle 6 = 180^\circ$	
$\angle 1$ is supplementary to $\angle 6$	

Rewrite the biconditional statement as two conditional statements.

29.   Two segments are congruent if and only if they have the same length.

30.   An angle is a right angle if and only if it has a measure of 90º.

Chapter 2 Review

1. true
2. false
3. subtraction property of equality
4. division property of equality
5. transitive property of equality
6. symmetric property of equality
7. addition property of equality
8. Addition property of equality
9. true
10. false
11. true
12. true
13. 14, 18, 22
14. 4.0, 4.9, 5.8
15. 17, 24, 32
16. $3\frac{1}{5}, 4, 4\frac{4}{5}$
17. 51, 71, 95
18. –56, 112, –224
19. Inverse: If it is not snowing, then the temperature is not below 32 degrees Fahrenheit.
Converse: If the temperature is below 32 degrees Fahrenheit, then it is snowing.
Contrapositive: If the temperature is not below 32 degrees Fahrenheit, then it is not snowing.
20. Inverse: If two lines are not parallel, then the two lines are not in the same plane. Converse: If two lines are in the same plane, then the two lines are parallel. Contrapositive: If two lines are not in the same plane, then the two lines are not parallel.
21. Inverse: If a point is not on segment AB, then it is not on ray AB. Converse: If a point is on ray AB, then it is on segment AB. Contrapositive: If a point is not on ray AB, then it is not on segment AB.
22. Inverse: If I do not sail on a boat, then I will not get seasick.
Converse: If I get seasick, then I am sailing on a boat.
Contrapositive: If I do not get seasick, then I am not sailing on a boat.

23. Inverse: If the measure of an angle is not less than 90°, then it is not an acute angle.
Converse: If the angle is acute, then its measure is less than 90°. Contrapositive: If the angle is not acute, then its measure is not less than 90°.
24. false; Any two points will be on a line; the other two points may not be on that line.
25. true

26.

Statements	Reasons
1. $AB = BC$	1. Given
2. $AC = AB + BC$	2. Segment Addition Postulate
3. $AC = BC + BC$	3. Substitution property of equality
4. $AC = 2BC$	4. Distributive property
5. $\frac{1}{2}AC = BC$	5. Division property of equality

27.

Statements	Reasons
1. $\angle 1$ and $\angle 2$ are a linear pair. $\angle 2$ and $\angle 3$ are a linear pair.	1. Given
2. $\angle 1$ and $\angle 3$ are supplementary. $\angle 2$ and $\angle 3$ are supplementary.	2. Linear Pair Postulate
3. $\angle 1 \cong \angle 2$	3. Congruent Supplements Thm.
4. $m\angle 1 = m\angle 2$	4. Def. of $\cong$ angles

28.

Statements	Reasons
1. $\angle 2 \cong \angle 3$, $\angle 4 \cong \angle 5$	1. Given
2. $\angle 3 \cong \angle 4$, $\angle 1 \cong \angle 2$	2. Vertical angles are $\cong$
3. $\angle 1 \cong \angle 3$, $\angle 3 \cong \angle 5$, $\angle 1 \cong \angle 5$	3. Transitive property of congruence
4. $\angle 5$ and $\angle 6$ are a linear pair	4. Definition of linear pair
5. $\angle 5$ and $\angle 6$ are supplementary	5. Linear Pair Postulate
6. $m\angle 5 + m\angle 6 = 180°$	6. Definition of supplementary angles
7. $m\angle 1 = m\angle 5$	7. Def. of $\cong$ angles
8. $m\angle 1 + m\angle 6 = 180°$	8. Substitution property of equality
9. $\angle 1$ is supplementary to $\angle 6$	9. Definition of supplementary angles

29.   If two segments are congruent, then they have the same length. If two segments have the same length, then they are congruent.

30.   If an angle is a right angle, then it has a measure of 90°. If an angle has a measure of 90°, then it is a right angle