# Unit 2 Review

Name: _____

**Make a conjecture about each pattern. Write the next two items.**

**1.** $-1, -8, -27, -64, \ldots$

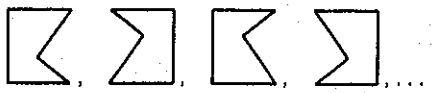
_____

**2.** 1, 11, 21, 1211, 111221, . . . (*Hint:* Try reading the numbers aloud in different ways.)

_____

**3.** A, E, F, H, I, . . .

_____

**4.** 

_____

**Determine if each conjecture is true. If not, write or draw a counterexample.**

**5.** Three points that determine a plane also determine a triangle. _____

**6.** An image reflected across the $x$-axis cannot appear identical to its preimage. _____

**7.** If $a > b$ and $b > c$, then $a - b < a - c$. _____

**8.** If $n$ is an integer ($n \neq 0$), then $\frac{1}{n} > \left(\frac{1}{n}\right)^3$. _____

**Show that each conjecture is false by finding a counterexample.**

**11.** For any number $n$, $2n > n$.

_____

**12.** Two rays having the same endpoint make an acute angle. (Sketch a counterexample.)

**Find the next item in each pattern.**

1. 100, 81, 64, 49, . . .

2. 

3. Alabama, Alaska, Arizona, . . .

4. west, south, east, . . .

**Complete each conjecture.**

5. The square of any negative number is _____.

6. The number of segments determined by $n$ points is _____.

**Show that each conjecture is false by finding a counterexample.**

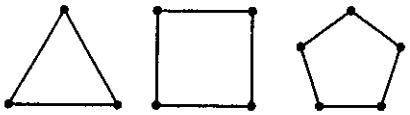
7. For any integer $n$, $n^3 > 0$.

8. Each angle in a right triangle has a different measure.

**For Exercises 6–8, complete each conjecture by looking for a pattern in the examples.**

6. The sum of two odd numbers is _____.
   $3 + 5 = 8$  $13 + 3 = 16$  $1 + 1 = 2$

7. The number of sides of a polygon that has $n$ vertices is _____.



8. When a tree is cut horizontally, a series of rings is visible in the stump. Make a conjecture about the number of rings and the age of the tree based on the data in the table.

| **Number of Rings** | 3 | 15 | 22 | 60 |
|---|---|---|---|---|
| **Age of Tree (years)** | 3 | 15 | 22 | 60 |

9. Assume your conjecture in Exercise 8 is true. Find the number of rings in an 82-year-old oak tree. _____

**Find the next item in each pattern.**

1. 2, 4, 6, 8, . . .

2. Z, Y, X, . . .

3. fall, winter, spring, . . .

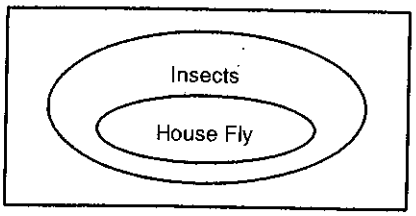
**Rewrite each famous saying as a conditional in Exercises 1–3.**

1. "No man is an island." John Donne, *Devotions upon Emergent Occasions*

2. "Nothing happens unless first a dream." Carl Sandburg, "Washington Monument by Night"

3. "Never put off till tomorrow what you can do today." Thomas Jefferson, letter to Thomas Jefferson Smith, Feb. 21, 1825

4. Write the information in this Venn diagram as a conditional statement.




**Use the following conditional statement for Exercises 7–12.**
If it is a bicycle, then it has two wheels.

7. Give the hypothesis of the conditional statement.

8. Give the conclusion of the conditional statement.

**Use the following statements for Exercises 13 and 14.**
Ella says, "When it rains, I go indoors." Casey replies, "I play in the rain if there is no lightning."

13. Rewrite Ella's statement as an "if, then" statement.

14. Rewrite Casey's statement as an "if, then" statement.

**Identify the hypothesis and conclusion of each conditional.**

1. If you can see the stars, then it is night.

   Hypothesis: _____

   Conclusion: _____

2. A pencil writes well if it is sharp.

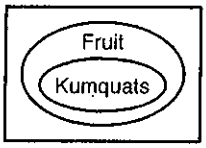
   Hypothesis: _____

   Conclusion: _____

**Write a conditional statement from each of the following.**

3. Three noncollinear points determine a plane.

   _____

4. 


   _____

   _____

   _____

**Determine if each conditional is true. If false, give a counterexample.**

5. If two points are noncollinear, then a right triangle contains one obtuse angle.

   _____

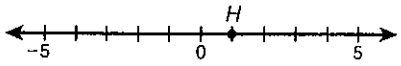
6. If a liquid is water, then it is composed of hydrogen and oxygen.

   _____

7. If a living thing is green, then it is a plant.

   _____

8. "If *G* is at 4, then *GH* is 3." Write the converse,inverse, and contrapositive of this statement. Find the truth value of each.




   Converse: _____

   Inverse: _____

**Determine whether a true biconditional can be written from each conditional statement. If not, give a counterexample.**

5. If the lamp is unplugged, then the bulb does not shine.

   _____

6. The date can be the 29th if and only if it is not February.

   _____

**Write each definition as a biconditional.**

7. A cube is a three-dimensional solid with six square faces.

   _____

   _____

8. Tanya claims that the definition of *doofus* is "her younger brother."

   _____

   _____

   _____

**Write the converse from each given biconditional.**

3. Biconditional: A cat is happy if and only if it is purring.

   Conditional: If a cat is happy, then it is purring.

   Converse: _____

4. Biconditional: A figure is a segment if and only if it is straight and has two endpoints.

   Conditional: If a figure is a segment, then it is straight and has two endpoints.

   Converse: _____

**Write a biconditional from each given conditional and converse.**

5. Conditional: If two angles share a side, then they are adjacent.

   Converse: If two angles are adjacent, then they share a side.

   Biconditional: _____

6. Conditional: If your temperature is normal, then your temperature is 98.6°F.

   Converse: If your temperature is 98.6°F, then your temperature is normal.

   Biconditional: _____

**Write *True* or *False* for each statement. A biconditional is true only if both the conditional and the converse are true. If the biconditional is false, give a counterexample.**

7. Conditional: If $x = 1$, then $x > 0$. _____

   Converse: If $x > 0$, then $x = 1$. _____

   Biconditional: $x = 1$ if and only if $x > 0$. _____

   Counterexample: _____

8. Conditional: If it is 3:30 A.M., then it is night. _____

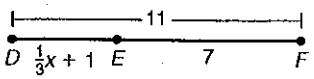
   Converse: If it is night, then it is 3:30 A.M. _____

   Biconditional: It is 3:30 A.M. if and only if it is night. _____

   Counterexample: _____

9. Maria says, "I will graduate from high school if and only if I earn a high school diploma." Tell if Maria's biconditional statement is true or false. _____

14. Write a justification for each step.




$DE + EF = DF$ _____

$\left(\frac{1}{3}x + 1\right) + 7 = 11$ _____

$\frac{1}{3}x + 8 = 11$ _____

$\frac{1}{3}x = 3$ _____

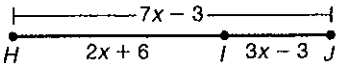
$x = 9$ _____

**Solve each equation. Show all your steps and write a justification for each step.**

1. $\frac{1}{5}(a + 10) = -3$

2. $t + 6.5 = 3t - 1.3$

**Write a justification for each step.**

4. 


| | |
|---|---|
| $HJ = HI + IJ$ | _____ |
| $7x - 3 = (2x + 6) + (3x - 3)$ | _____ |
| $7x - 3 = 5x + 3$ | _____ |
| $7x = 5x + 6$ | _____ |
| $2x = 6$ | _____ |
| $x = 3$ | _____ |

**Identify the property that justifies each statement.**

5. $m = n$, so $n = m$.

_____

6. $\angle ABC \cong \angle ABC$

_____

7. $\overline{KL} \cong \overline{LK}$

_____

8. $p = q$ and $q = -1$, so $p = -1$.

_____

**Solve each equation. Write a justification for each step.**

1. $\frac{n}{6} - 3 = 10$

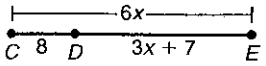
2. $5 + x = 2x$

3. $\frac{y + 4}{7} = 3$

4. $4(t - 3) = -20$

**Write a justification for each step.**

**5.** $CE = CD + DE$ _____



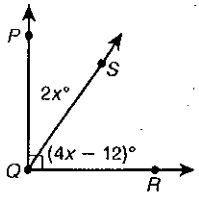

$6x = 8 + (3x + 7)$ _____

$6x = 15 + 3x$ _____

$3x = 15$ _____

$x = 5$ _____

**6.** $m\angle PQR = m\angle PQS + m\angle SQR$ _____




$90° = 2x° + (4x - 12)°$ _____

$90 = 6x - 12$ _____

$102 = 6x$ _____

$17 = x$ _____

**Identify the property that justifies each statement.**

**7.** If $\angle ABC \cong \angle DEF$, then $\angle DEF \cong \angle ABC$.

_____

**8.** $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$, so $\angle 1 \cong \angle 3$.

_____

**9.** If $FG = HJ$, then $HJ = FG$.

_____

**10.** $\overline{WX} \cong \overline{WX}$

_____