**LESSON 19—NOTES**

**UNDERSTANDING SEQUENCES**

Look at the pattern below and answer the questions that follow.

 4, 8, 12, 16, 20,…………..

 1.) Which number above is the in first position?\_\_\_\_\_\_\_\_\_\_\_

 2.) Which number above is in the forth position?\_\_\_\_\_\_\_\_\_\_

3.) If the pattern continues what would be the number in the sixth position?\_\_\_\_\_\_\_\_\_

4.) Complete the chart below using the pattern above

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **N****(position)** | 1 |  |  |  |  |  | N |
| **Value** | 4 | 8 | 12 | 16 | 20 |  |  |

Complete the charts for each rule:

5.) **RULE: n + 3**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | N + 3 |

6.) **RULE: 2n + 5**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | 2n + 5 |

7.) **RULE: n2 + 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | n2 + 1 |

8.) **RULE: 2x = y**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| **Y** |  |  |  |  |  |  |  |

9.) **RULE: x + 5 = y**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 5 | 6 | 7 | 8 | 11 | 14 | 15 |
| **Y** |  |  |  |  |  |  |  |

If “n” is the position of a term in the sequence, which expression can be used to find the value of the nth term in each chart. Circle the correct choice.

10.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 4 | 7 | 12 | 19 |  |

 A. n2 + 3

 B. n2 + 2

 C. 5n – 3

 D. 4n

11.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | N |
| **Value of Term** | 3 | 5 | 9 | 17 | 33 |  |

 A. 2n + 1

 B. 4n + 1

 C. n2 + 1

 D. 2n + 1

12.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 10 | 9 | 8 | 7 | 6 |
| **Value of Term** | 4 | 3 | 2 | 1 | 0 |

Which equation represents the rule for how x and y are related?

 A. x + y = 14

 B. x + y = 6

 C. x – y = 6

 D. x – y = 4

13.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 5 | 10 | 15 | 20 | 25 |
| **Value of Term** | 1 | 2 | 3 | 4 | 5 |

Which equation represents the rule for how x and y are related?

 A. x – y = 4

 B. x + y = 6

 C. x/y = 5

 D. x = 3y

For each chart below write a rule for each chart if n represents the numbers position in the sequence.

14.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 1 | 4 | 9 | 16 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 4 | 8 | 12 | 16 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 5 | 7 | 9 | 11 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For each chart below write an equation using x and y from the information in the chart.

17.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 5 | 4 | 3 | 2 | 1 |
| **Value of Term** | 10 | 8 | 6 | 4 | 2 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | 2 | 4 | 6 | 8 | 10 |
| **Y** | 4 | 16 | 36 | 64 | 100 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 7 | 8 | 9 | 10 | 11 |
| **Y** | 21 | 24 | 27 | 30 | 33 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 2 | 4 | 6 | 8 | 10 |
| **Y** | 7 | 13 | 19 | 25 | 31 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LESSON 19—NOTES—STUDENT COPY**

**UNDERSTANDING SEQUENCES**

Look at the pattern below and answer the questions that follow.

 4, 8, 12, 16, 20,…………..

 1.) Which number above is the in first position?\_\_\_\_\_\_\_\_\_\_\_

 2.) Which number above is in the forth position?\_\_\_\_\_\_\_\_\_\_

3.) If the pattern continues what would be the number in the sixth position?\_\_\_\_\_\_\_\_\_

4.) Complete the chart below using the pattern above

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **N****(position)** | 1 |  |  |  |  |  | N |
| **Value** | 4 | 8 | 12 | 16 | 20 |  |  |

Complete the charts for each rule:

5.) **RULE: n + 3**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | N + 3 |

6.) **RULE: 2n + 5**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | 2n + 5 |

7.) **RULE: n2 + 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | N |
| **Value of Term** |  |  |  |  |  |  | n2 + 1 |

8.) **RULE: 2x = y**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| **Y** |  |  |  |  |  |  |  |

9.) **RULE: x + 5 = y**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 5 | 6 | 7 | 8 | 11 | 14 | 15 |
| **Y** |  |  |  |  |  |  |  |

If “n” is the position of a term in the sequence, which expression can be used to find the value of the nth term in each chart. Circle the correct choice.

10.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 4 | 7 | 12 | 19 |  |

 A. n2 + 3

 B. n2 + 2

 C. 5n – 3

 D. 4n

11.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | N |
| **Value of Term** | 3 | 5 | 9 | 17 | 33 |  |

 A. 2n + 1

 B. 4n + 1

 C. n2 + 1

 D. 2n + 1

12.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 10 | 9 | 8 | 7 | 6 |
| **Value of Term** | 4 | 3 | 2 | 1 | 0 |

Which equation represents the rule for how x and y are related?

 A. x + y = 14

 B. x + y = 6

 C. x – y = 6

 D. x – y = 4

13.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 5 | 10 | 15 | 20 | 25 |
| **Value of Term** | 1 | 2 | 3 | 4 | 5 |

Which equation represents the rule for how x and y are related?

 A. x – y = 4

 B. x + y = 6

 C. x/y = 5

 D. x = 3y

For each chart below write a rule for each chart if n represents the numbers position in the sequence.

14.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 1 | 4 | 9 | 16 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 4 | 8 | 12 | 16 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | N |
| **Value of Term** | 5 | 7 | 9 | 11 |  |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For each chart below write an equation using x and y from the information in the chart.

17.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | 5 | 4 | 3 | 2 | 1 |
| **Value of Term** | 10 | 8 | 6 | 4 | 2 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | 2 | 4 | 6 | 8 | 10 |
| **Y** | 4 | 16 | 36 | 64 | 100 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 7 | 8 | 9 | 10 | 11 |
| **Y** | 21 | 24 | 27 | 30 | 33 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 2 | 4 | 6 | 8 | 10 |
| **Y** | 7 | 13 | 19 | 25 | 31 |

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class\_\_\_\_\_**

**LESSON 19: UNDERSTANDING SEQUENCES**

1. Which equation represents the relationship of S to T?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S** | 10 | 8 | 6 | 4 | 2 |
| **T** | 8 | 6 | 4 | 2 | 0 |

 A. T + 2 = S – 2 B. T – 2 = S

C. S + 2 = T D. S – 2 = T

2. Which equation represents the relationship of X to Y?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **Y** | 1 | 6 | 11 | 16 | 21 | 26 | 31 |

 A. y = 6x + 1 B. y = 5x + 1

 C. y = 5x + 1 D. y = x + 5

3. Which equation represents the relationship of X to Y?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **Y** | 2 | 6 | 10 | 14 | 18 | 22 | 26 |

 A. y = 4x + 2 B. y = 4x – 2

 C. y = 3x + 4 D. y = 2x + 6

4. Which rule applies to the following data?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 |
| **Y** | -3 | -2 | -1 | 0 | 1 |

 A. y = x – 3 B. y = x + 3

 C. y = 2x – 5 D. y = 2x – 3

5. Which rule applied to the following table?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 5 | 3 | 1 | -1 | -3 |
| **Y** | 13 | 7 | 1 | -5 | -11 |

 A. y = 6x – 1 B. y = 6x + 1

 C. y = 3x – 2 D. y = 2x + 3

6. Following the pattern and the equation, what should be the next 2 numbers be?

 **Rule: v + 3 = w**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **V** | 2 | 7 | 12 | 17 | 22 | ? |
| **W** | 5 | 10 | 15 | 20 | 25 | ? |

 A. v = 27 , w = 30 B. v = 26 , w = 30

 C. v = 25 , w = 26 D. v = 24 , w = 28

7. Which equation connects P and Q from the following table?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **P** | 1 | 2 | 3 | 4 | 5 |
| **Q** | 0 | 7 | 26 | 63 | 124 |

 A. Q = p2 – 1 B. Q = p3 – 1

 C. Q = p2 + 1 D. Q = p – 2

8. Which sequence is described by the expression 6n = 1, where N represents the term’s

 position in the sequence? (draw a table-one has been started for you.)

 A. 5, 13, 17, 23, 29……. B. 7, 13, 19, 25, 31…….

 C. 6, 12, 18, 24, 30……. D. 7, 8, 9, 10, 11, 12……..

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **n-position** |  |  |  |  |  |
| **value** |  |  |  |  |  |

9. Look at the following sequence of numbers. 2, 5, 10, 17,26…….

 Which expression can be used to find the value of the nth term in the sequence?

 (draw a table)

A. 2n B. 2n + 1

 C. 3n – 1 D. n2 + 1

Use the following table for questions 10 and 11.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **N** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | N |
| **Value** | 4 | 8 | 12 | 16 | 20 | 24 |  |  |  |

10. In the table above, N represents the term’s position in the sequence. What is the value of the ninth term in the sequence?

A. 28 B. 32 C. 36 D. 48

11. In the table above, which expression can be used to find the value of the nth term in the

 sequence?

 A. n + 4 B. n2 C. 3n D. 4n

12. Look at the sequence of numbers. 4, 9, 14, 19, 24…….

 Which expression can be used to find the value of the nth term in the sequence?

 (draw table)

 A. 6n B. n + 5 C. 2n + 1 D. 5n – 1

13. Which sequence is described by the expression (n – 1)2 + 1, where N represents the

 term’s position in the sequence? (draw table)

A. 1, 3, 5, 7, 9………. B. 4, 6, 8, 10, 12…….

 C. 1, 2, 5, 10, 17……… D. 0, 3, 8, 15, 24……..

Use the table to answer questions 14 and 15.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Position** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | N |
| **Value** | 6 | 9 | 12 | 15 | 18 |  |  |  |  |

14. In the table above, N represents the term’s position in the sequence. What is the value

 of the eighth term in the sequence?

 A. 21 B. 24 C. 27 D. 30

15. In the table above, which expression can be used to find the value of the nth term in

 the sequence?

A. 3n B. 3(n + 1) C. 1.5n D. 3n2

16. Look at the number pattern. Which number sentence can be used to determine N, the

 fourth number in the pattern?

 40, 35, 30, \_\_\_\_\_\_, 20, 15

 A. 30 + 5 = n B. 30 – 5 = n

 C. 20 + 5 = n D. 30 ÷ 6 = n

17. The chart shows how many students attended Kenmore Middle School at 5-year intervals. If the pattern of increase continues, which number sentence could be used to determine N, the number of students that should be expected to attend the school in 2005?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
| **Number of Students** | 450 | 525 | 600 | 675 | 750 | N |

A. 2,005 – 750 = n B. 750 + 100 = n

 C. 750 + 75 = n D. 750 + 25 = n

18. Which equation represents the rule for how X and Y are related?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 9 | 10 | 11 | 12 | 13 |
| **Y** | 4 | 5 | 6 | 7 | 8 |

 A. x – y = 5 B. x – y = 6 C. x ÷ 2 = y D. 3x = y

19. Which equation represents the rule for how X and Y are related?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 5 | 10 | 15 | 20 | 25 |
| **Y** | 1 | 2 | 3 | 4 | 5 |

 A. x – y = 4 B. x + y = 6 C. x ÷ 5 = y D. x = 3y

20. Which equation represents the rule for how X and Y are related?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 1 | 2 | 3 | 4 | 5 |
| **Y** | 4 | 8 | 12 | 16 | 20 |

 A. 4x = y B. x = 4y C. y – x = 3 D. x + 2 = y

21. Look at the number pattern. Which number sentence can be used to determine N, the seventh number in the pattern? (draw table.)

 4, 8, 12, 16, 20…………..

 A. n = 20 + 2 B. n = 20 + 4

 C. n = 4 x 7 D. n = 4 + 7

22. A small printing company tracked its profits during several months and recorded them on a chart.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month** | 1 | 2 | 3 | 4 |
| **Profits** | $115 | $230 | $345 | $460 |

 If the number of increase continues, which number sentence could be used to determine N, the company’s profits in the sixth month?

 A. n = 460 + 115 B. n = 460 + 150

 C. n = 460 x 2 D. n = 115 x 6

23. Which equation represents the rule for how X and Y are related?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 10 | 9 | 8 | 7 | 6 |
| **Y** | 4 | 3 | 2 | 1 | 0 |

 A. x + y = 14 B. x + y = 6

 C. x – y = 6 D. x – y = 4