

Keystone Algebra 1

Number Pattern

Handscoring Anchor Set

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PA Keystone Algebra 1: Number Patterns

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | | 28 |

The pattern continues.

- A.** What is the difference between the last number in row 5 and the first number in row 5?

difference: _____

- B.** Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$ _____

PA Keystone Algebra 1: Number Pattern

16. **Continued.** Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: _____

D. What is the last number in row 8?

last number: _____

PA Keystone Algebra 1: Number Pattern

Keystone Algebra 1 Number Pattern

Assessment Anchor this item will be reported under:

A1.2.1 Functions

Specific Eligible Content addressed by this item:

A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.

Scoring Guide:

| Score | In this item, the student – |
|---------------|---|
| 4 | Demonstrates a thorough understanding of analyzing and/or using patterns or relations by correctly solving problems and clearly explaining procedures. |
| 3 | Demonstrates a general understanding of analyzing and/or using patterns or relations by correctly solving problems and clearly explaining procedures with only minor errors or omissions. |
| 2 | Demonstrates a partial understanding of analyzing and/or using patterns or relations by correctly performing a significant portion of the required task. |
| 1 | Demonstrates minimal understanding of analyzing and/or using patterns or relations |
| 0 | The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question. |
| Non-scorables | B – Blank, entirely erased or written refusal to respond F – Foreign Language K – Off-task U – Unreadable |

Top Scoring Student Response And Training Notes:

| Score | Description |
|-------|--|
| 4 | Student earns 4 points. |
| 3 | Student earns 3 points. |
| 2 | Student earns 2 points. |
| 1 | Student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |

PA Keystone Algebra 1: Number Pattern

A.

| What? | Why? |
|-------|------|
| 12 | |

(1 score point)

1 point for correct answer

B.

| What? | Why? |
|---|------|
| $3(r - 1)$ OR $d = 3(r - 1)$ OR equivalent | |

(1 score point)

1 point for correct answer

C.

| What? | Why? |
|-------|------|
| 85 | |

(1 score point)

1 point for correct answer

D.

| What? | Why? |
|-------|------|
| 106 | |

(1 score point)

1 point for correct answer

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

6 / 50

C. What is the first number in row 8?

first number:

2 / 50

D. What is the last number in row 8?

last number:

3 / 50

4

- A. 1 point – correct answer.
- B. 1 point – correct answer (OK to repeat “ $d =$ ” within the answer box).
- C. 1 point – correct answer.
- D. 1 point – correct answer.

A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: $43 - 31 = 12$

11/50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d = 3(r - 1)$

8/50

C. What is the first number in row 8?

first number: 85

2/50

D. What is the last number in row 8?

last number: 106

3/50

- 4
- A. 1 point – correct answer.
 - B. 1 point – correct answer.
 - C. 1 point – correct answer.
 - D. 1 point – correct answer.

PA Keystone Algebra 1: Number Pattern, Anchor Set A-3

A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:
2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d = 43 - 31$
5 / 50

C. What is the first number in row 8?

first number:
2 / 50

D. What is the last number in row 8?

last number:
3 / 50

3

- A. 1 point – correct answer.
- B. 0 points – incorrect answer.
- C. 1 point – correct answer.
- D. 1 point – correct answer.

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | 4 | 7 | | |
| row 3 | 10 | 13 | 16 | | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

2 / 50

C. What is the first number in row 8?

first number:

2 / 50

D. What is the last number in row 8?

last number:

3 / 50

3

- A. 1 point – correct answer.
- B. 0 points – incorrect answer.
- C. 1 point – correct answer.
- D. 1 point – correct answer.

16. A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$ _____

2

- A. 1 point – correct answer.
- B. 0 points – not attempted.
- C. 1 point – correct answer.
- D. 0 points – incorrect answer.

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: 85

D. What is the last number in row 8?

last number: 109

16. A number pattern is shown below.

| | | | | | | | |
|-------|--|----|---|----|---|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | | 19 | | 22 | | 25 | 28 |
| | | | | | | 43 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 3

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = r + 3$$

2

- A. 0 points – incorrect answer.
- B. 0 points – incorrect answer.
- C. 1 point – correct answer.
- D. 1 point – correct answer.

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

| | | |
|---|-----|----------|
| 5 | 43 | = last # |
| 6 | 61 | |
| 7 | 82 | |
| 8 | 106 | |

first number: 85

D. What is the last number in row 8?

last number: 100

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | 4 | | 7 | |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 17

| | | | | | |
|----|----|----|----|----|----|
| | | | 1 | | |
| | | 4 | | 7 | |
| | | 10 | | 13 | 16 |
| | 19 | | 22 | | 25 |
| 21 | | 24 | | 27 | 30 |
| 36 | 39 | 42 | | 45 | 48 |

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = 3d - 3$$

$$d = \underline{3d - 3}$$

- 1
- A. 1 point – correct answer.
 - B. 0 points – incorrect answer (using any variable *other* than d for the row would be acceptable).
 - C. 0 points – incorrect answer.
 - D. 0 points – incorrect answer.

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: 75

D. What is the last number in row 8?

last number: 96

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: its less than

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$\begin{array}{r} r \\ \times 6 \\ \hline 36 \end{array}$$

$d =$ 25

1

- A. 0 points – incorrect answer.
- B. 0 points – incorrect answer.
- C. 1 point – correct answer.
- D. 0 points – incorrect answer.

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: _____

85

D. What is the last number in row 8?

last number: _____

161

PA Keystone Algebra 1: Number Pattern, Anchor Set A-9

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | 4 | | 7 | |
| row 3 | 10 | | 13 | | 16 |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:
1/50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$
5/50

C. What is the first number in row 8?

first number:
2/50

D. What is the last number in row 8?

last number:
2/50

- 0
- A. 0 points – incorrect answer.
 - B. 0 points – incorrect answer.
 - C. 0 points – incorrect answer.
 - D. 0 points – incorrect answer.

PA Keystone Algebra 1: Number Pattern, Anchor Set A-10

A number pattern is shown below.

| | | | | | | |
|-------|----|----|----|----|----|----|
| row 1 | | | 1 | | | |
| row 2 | | | 4 | | 7 | |
| row 3 | | 10 | | 13 | | 16 |
| row 4 | 19 | | 22 | | 25 | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:
1/50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d = r + 3$
3/50

C. What is the first number in row 8?

first number:
2/50

D. What is the last number in row 8?

last number:
2/50

- 0
- A. 0 points – incorrect answer.
 - B. 0 points – incorrect answer.
 - C. 0 points – incorrect answer.
 - D. 0 points – incorrect answer.

Keystone Algebra 1

Number Pattern

Handscoring Training Set 1

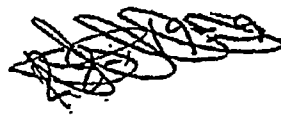
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16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?



difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = (r - 1)3$$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

19 22 25 28
31 34 37 40 43
46 49 52 55 58 61
64 67 70 73 76 79 82
85 88 91 94 97 100 103 106

first number: 85

D. What is the last number in row 8?

last number: 106

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | | 28 |

The pattern continues.

- A. What is the difference between the last number in row 5 and the first number in row 5?

$$28 - 19 = 9$$

difference: _____

9

- B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$\begin{array}{c} \uparrow \text{first} \\ f - l = d \\ \uparrow \text{last} \end{array}$$

$$d = f - l$$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: 16

D. What is the last number in row 8?

last number: 4

16. A number pattern is shown below.

| | | | | | | | |
|-------|--|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | | 19 | 22 | | 25 | | 28 |

The pattern continues,

31 34 40 43

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$x = \text{first number}$
 $y = \text{last number}$

$d = \underline{x - y}$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

$$r5 = 31$$

$$r6 = 46$$

$$r7 = 64$$

$$r8 = 85$$

first number: 85

D. What is the last number in row 8?

$$r5 = 43$$

$$r6 = 61$$

$$r7 = 82$$

$$r8 = 106$$

last number: 106

PA Keystone Algebra 1: Number Pattern, Training Set 1

T1-4

A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d = 3(r - 1)$

6 / 50

C. What is the first number in row 8?

first number:

2 / 50

D. What is the last number in row 8?

last number:

3 / 50

16. A number pattern is shown below.

| | | | | | | |
|-------|----|----|----|----|----|----|
| row 1 | | | 1 | | | |
| row 2 | | | 4 | | 7 | |
| row 3 | | 10 | | 13 | | 16 |
| row 4 | 19 | | 22 | | 25 | 28 |

The pattern continues.

- A. What is the difference between the last number in row 5 and the first number in row 5?

15
18
21
24

difference: 9

- B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = 6 + 6 + 6$$

or

$$d = 6 + 6 + 6$$

$$d = \underline{6 + 6 + 6}$$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

$$\begin{aligned} 19 + 3 &= 22 \\ 22 + 3 &= 25 \\ 25 + 3 &= 28 \\ 28 + 3 &= 31 \end{aligned}$$

first number: 31

D. What is the last number in row 8?

$$\begin{aligned} 28 + 15 &= 43 \\ 43 + 18 &= 61 \\ 61 + 21 &= 82 \\ 82 + 24 &= 106 \end{aligned}$$

last number: 106

PA Keystone Algebra 1: Number Pattern, Training Set 1

T1-6

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

17 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d = m = \frac{22-19}{28-25} = \frac{3}{3}$

9 / 50

C. What is the first number in row 8?

first number:

2 / 50

D. What is the last number in row 8?

last number:

2 / 50

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

31 34 37 40 43

difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

goes up a multiple of 3 everytime
 row 1 = 3
 row 2 = 6
 row 3 = 9

$d = \frac{3r}{2}$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

31 34 37 40 43
46 49 52 55 58 61
64 67 70 73 76 79 82
85 88 91 94 97 100 103 106

first number: _____

85

D. What is the last number in row 8?

last number: _____

106

16. A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues. 31 34 37 40 43

- A. What is the difference between the last number in row 5 and the first number in row 5?

$$\begin{array}{r} 43 - 31 \\ 12 \end{array}$$

difference: 12

- B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = 3r - 3$$

$d =$ $3r - 3$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: 85

D. What is the last number in row 8?

last number: 106

A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: the first is 31, the last is 43
30 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$
0 / 50

C. What is the first number in row 8?

first number: 85
2 / 50

D. What is the last number in row 8?

last number: 106
3 / 50

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

14 / 50

C. What is the first number in row 8?

first number:

2 / 50

D. What is the last number in row 8?

last number:

2 / 50

Subject: Algebra 1

Item: Number Pattern

Name _____

| Number | Score | Notes |
|--------|-------|-------|
| T1-1 | | |
| T1-2 | | |
| T1-3 | | |
| T1-4 | | |
| T1-5 | | |
| T1-6 | | |
| T1-7 | | |
| T1-8 | | |
| T1-9 | | |
| T1-10 | | |

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Keystone Algebra 1

Number Pattern

Handscoring Training Set 2

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A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

12

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

First Number - Last Number

26 / 50

C. What is the first number in row 8?

first number:

EQ

85

2 / 50

D. What is the last number in row 8?

last number:

EQ

106

3 / 50

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

12

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

$d = 3r - 3$

6 / 50

C. What is the first number in row 8?

first number:

EQ

85

2 / 50

D. What is the last number in row 8?

last number:

EQ

106

3 / 50

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

Eq

9

difference:

1 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

Eq

$3r-3$

$d =$

4 / 50

C. What is the first number in row 8?

Eq

208

first number:

3 / 50

D. What is the last number in row 8?

Eq

229

last number:

3 / 50

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

9

1 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

$19x=1+16$

8 / 50

C. What is the first number in row 8?

first number:

EQ

76

2 / 50

D. What is the last number in row 8?

last number:

EQ

112

3 / 50

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|----|
| row 1 | | | 1 | | |
| row 2 | | | 4 | | 7 |
| row 3 | | 10 | | 13 | 16 |
| row 4 | 19 | | 22 | | 25 |
| | | | | 28 | |

The pattern continues.

- A. What is the difference between the last number in row 5 and the first number in row 5?

31 34 37 40 43

$$\begin{array}{r} 43 \\ -31 \\ \hline 12 \end{array}$$

difference: 12

- B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

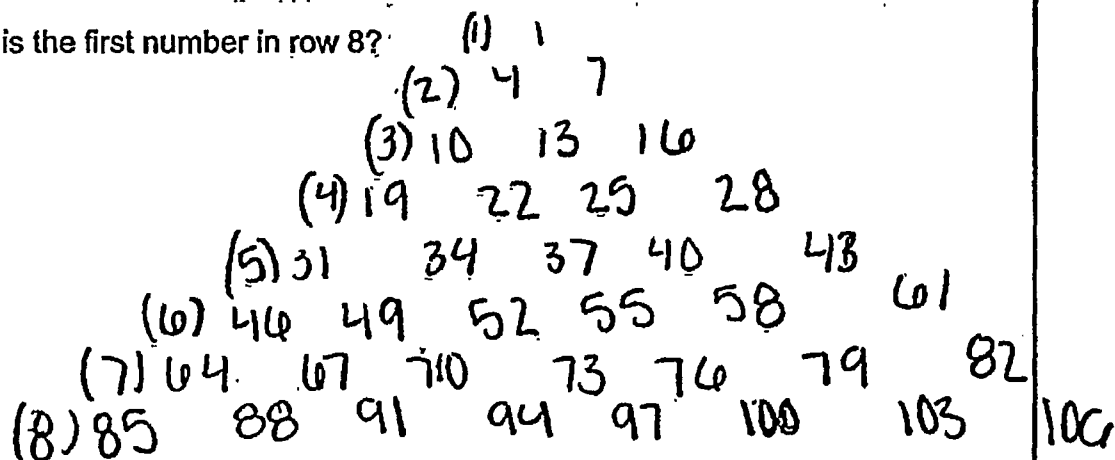
$$d = r(x - z)$$

$x = \text{first number}$
 $z = \text{last number}$

$d =$ $d = r(x - z)$

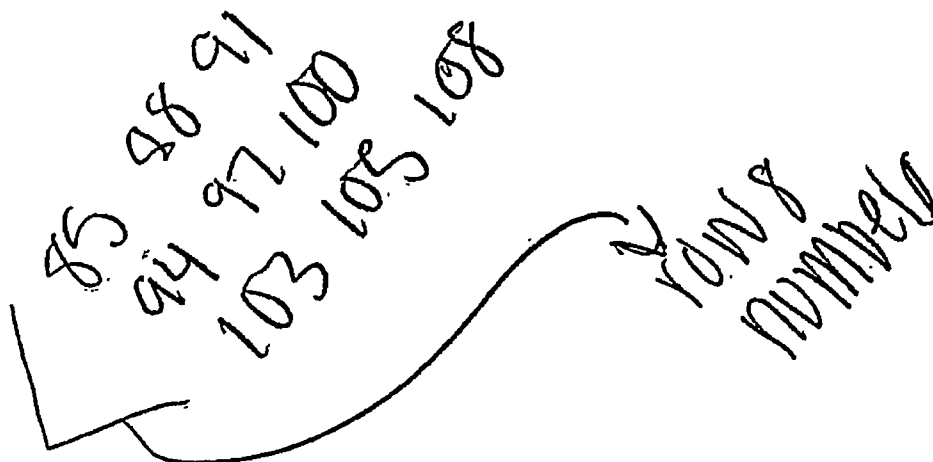
16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?



first number: eighty-five (85)

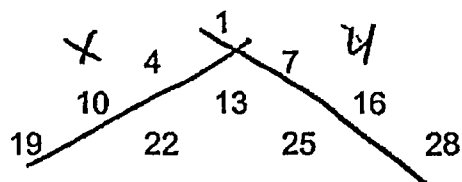
D. What is the last number in row 8?



last number: hundred & six (106)

16. A number pattern is shown below.

row 1
row 2
row 3
row 4



The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

first
in
row 5

31

last
in
row 5

43

difference: -12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$ $4 - x$

16. **Continued.** Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: -85

D. What is the last number in row 8?

last number: 106

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | 4 | 7 | | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

$43 - 31 = 12$

8 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

the first number - the last number.

34 / 50

C. What is the first number in row 8?

first number:

85

2 / 50

D. What is the last number in row 8?

last number:

106

3 / 50

16. A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

31 34 37 40 43

$$\begin{array}{r} 43 \\ - 31 \\ \hline 12 \end{array}$$

difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$3(r-1) = d$$

$d =$ $3(r-1)$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

$$3(r-1)=d$$

$$3(8-1)=d$$

$$3(7)=d$$

$$21=d$$

first number: 85

D. What is the last number in row 8?

85 88 91 94 97 100 103 (106)

last number: 106

A number pattern is shown below.

| | | | | | | |
|-------|----|----|----|----|----|----|
| row 1 | | | | 1 | | |
| row 2 | | | 4 | | 7 | |
| row 3 | | 10 | | 13 | | 16 |
| row 4 | 19 | | 22 | | 25 | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

the farther you go back the more seat are in a row

50 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

$3(r)$

4 / 50

C. What is the first number in row 8?

first number:

60

2 / 50

D. What is the last number in row 8?

last number:

64

2 / 50

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | 4 | 7 | | |
| row 3 | 10 | | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

Eq

12

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

Eq

$3(r-1)$

6 / 50

C. What is the first number in row 8?

first number:

Eq

94

2 / 50

D. What is the last number in row 8?

last number:

Eq

108

3 / 50

Subject: Algebra 1

Item: Number Pattern

Name _____

| Number | Score | Notes |
|--------|-------|-------|
| T2-1 | | |
| T2-2 | | |
| T2-3 | | |
| T2-4 | | |
| T2-5 | | |
| T2-6 | | |
| T2-7 | | |
| T2-8 | | |
| T2-9 | | |
| T2-10 | | |

Keystone Algebra 1

Number Pattern

Handscoring Practice Set^{*}

^{*}Responses in this set do not have true scores. Apply scores based on scoring criteria.

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A number pattern is shown below.

| | | | | | | |
|-------|----|----|----|----|----|----|
| row 1 | | | | 1 | | |
| row 2 | | | 4 | | 7 | |
| row 3 | | 10 | | 13 | | 16 |
| row 4 | 19 | | 22 | | 25 | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

9

1 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

$3r-3$

4 / 50

C. What is the first number in row 8?

first number:

100

3 / 50

D. What is the last number in row 8?

last number:

121

3 / 50

PA Keystone Algebra 1: Number Pattern, Practice Set

P-2

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

can no see row 5

18 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

what does this mean? be more pacific.

37 / 50

C. What is the first number in row 8?

first number:

EQ

CANT SEE IT!!!!!!!!!!!!

26 / 50

D. What is the last number in row 8?

last number:

EQ

REFER TO C.

11 / 50

PA Keystone Algebra 1: Number Pattern, Practice Set

P-3

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | 4 | 7 | | |
| row 3 | 10 | 13 | 16 | | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

12

2 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

$d = 3r - 3$

6 / 50

C. What is the first number in row 8?

first number:

EQ

85

2 / 50

D. What is the last number in row 8?

last number:

EQ

106

3 / 50

PA Keystone Algebra 1: Number Pattern, Practice Set

P-4

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | 4 | 7 | | |
| row 3 | 10 | | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

EQ

first#31 last#43
difference is 12

difference:

45 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

EQ

$d = r \times 3$

$d =$

5 / 50

C. What is the first number in row 8?

EQ

$31 + 54 = 85$
first# = 85

first number:

18 / 50

D. What is the last number in row 8?

EQ

$21 + 27 + 33 + 39 + 45 = 165$ last # = 165

last number:

34 / 50

PA Keystone Algebra 1: Number Pattern, Practice Set

P-5

A number pattern is shown below.

| | | | | | | | |
|-------|----|----|----|----|----|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | 19 | | 22 | | 25 | | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

EQ

9

1 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

EQ

$3r - 3$

4 / 50

C. What is the first number in row 8?

first number:

EQ

85

2 / 50

D. What is the last number in row 8?

last number:

EQ

106

3 / 50

PA Keystone Algebra 1: Number Pattern, Practice Set

P-6

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

number 19 is not in the 20s

27 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

$r+3$

3 / 50

C. What is the first number in row 8?

first number:

61

3 / 50

D. What is the last number in row 8?

last number:

81

2 / 50

16. A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

- A. What is the difference between the last number in row 5 and the first number in row 5?

adding multiples of 3

0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45

19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94 97 100

31

43

43
-31
12

difference: 12

- B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = 3r - 3$$

$d =$ $3r - 3$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

$$\begin{array}{r} +3 \quad 1 \\ \quad 4 \\ +6 \quad 10 \\ \quad 19 \\ +9 \quad 31 \\ \quad 46 \\ +12 \quad 64 \\ \quad 85 \\ +15 \quad 109 \\ \quad 130 \\ +18 \quad 171 \\ \quad 203 \\ +21 \quad 254 \\ \quad 281 \\ +24 \quad 355 \\ \quad 385 \end{array}$$

first number: 109

D. What is the last number in row 8?

$$\begin{aligned} d &= 3r - 3 \\ d &= 3(8) - 3 \\ d &= 24 - 3 \\ d &= 21 \end{aligned}$$

$$109 + 21 = 130$$

last number: 130

16. A number pattern is shown below.

| | | | | | | | |
|-------|--|----|---|----|---|----|----|
| row 1 | | | | 1 | | | |
| row 2 | | | 4 | | 7 | | |
| row 3 | | 10 | | 13 | | 16 | |
| row 4 | | 19 | | 22 | | 25 | 28 |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 12

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$J \cdot 3$$

$$d = (r-1)3$$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

84

first number: 85

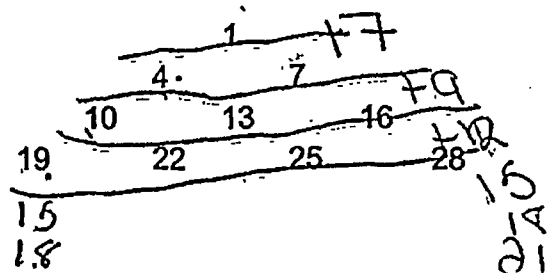
D. What is the last number in row 8?

85

last number: 106

16. A number pattern is shown below.

row 1
row 2
row 3
row 4



The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference: 9

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$$d = \text{Last number} - \text{first number} = 0$$

16. *Continued.* Please refer to the previous page for task explanation.

C. What is the first number in row 8?

first number: 97

D. What is the last number in row 8?

last number: 106

A number pattern is shown below.

| | | | | | |
|-------|----|----|----|----|--|
| row 1 | | | 1 | | |
| row 2 | | | 4 | 7 | |
| row 3 | | 10 | 13 | 16 | |
| row 4 | 19 | 22 | 25 | 28 | |

The pattern continues.

A. What is the difference between the last number in row 5 and the first number in row 5?

difference:

There is a 12 number point difference

37 / 50

B. Write an equation that can be used to find d , the difference between the last number and the first number, for any row r .

$d =$

$d = 43 - 31$

8 / 50

C. What is the first number in row 8?

first number:

85

2 / 50

D. What is the last number in row 8?

last number:

106

3 / 50

PRACTICE SET*

Subject: Algebra 1

Item: Number Pattern

Name _____

| Number | Score | Consensus | Notes |
|--------|-------|-----------|-------|
| P-1 | | | |
| P-2 | | | |
| P-3 | | | |
| P-4 | | | |
| P-5 | | | |
| P-6 | | | |
| P-7 | | | |
| P-8 | | | |
| P-9 | | | |
| P-10 | | | |

*** Responses in this set do not have true scores. Apply scores based on scoring criteria.**

Keystone Algebra 1

Number Pattern

Handscoring
Training Sets 1 and 2
True Scores/Annotations

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| Page | Score | Description |
|-------------|--------------|---|
| 1 | 4 | A. 1 point – correct answer. B. 1 point – correct answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 2 | 0 | Nothing is correct for credit in any part. |
| 3 | 3 | A. 1 point – correct answer. B. 0 points – incorrect answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 4 | 2 | A. 1 point – correct answer. B. 1 point – correct answer. C. 0 points – incorrect answer. D. 0 points – incorrect answer. |
| 5 | 1 | A. 0 points – incorrect answer. B. 0 points – incorrect answer. C. 0 points – incorrect answer. D. 1 point – correct answer. |
| 6 | 0 | Nothing is correct for credit in any part. |
| 7 | 3 | A. 1 point – correct answer. B. 0 points – incorrect answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 8 | 4 | A. 1 point – correct answer. B. 1 point – correct answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 9 | 2 | A. 0 points – insufficient answer for credit. B. 0 points – not attempted. C. 1 point – correct answer. D. 1 point – correct answer. |
| 10 | 1 | A. 1 point – correct answer. B. 0 points – incorrect answer. C. 0 points – incorrect answer. D. 0 points – incorrect answer. |

| Page | Score | Description |
|------|-------|---|
| 1 | 3 | A. 1 point – correct answer. B. 0 points – incorrect answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 2 | 4 | A. 1 point – correct answer. B. 1 point – correct answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 3 | 1 | A. 0 points – incorrect answer. B. 1 point – correct answer. C. 0 points – incorrect answer. D. 0 points – incorrect answer. |
| 4 | 0 | Nothing is correct for credit in any part. |
| 5 | 2 | A. 0 points – incorrect answer. B. 0 points – incorrect answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 6 | 1 | A. 0 points – incorrect answer. B. 0 points – incorrect answer. C. 0 points – incorrect answer. D. 1 point – correct answer |
| 7 | 3 | A. 1 point – correct answer. B. 0 points – incorrect answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 8 | 4 | A. 1 point – correct answer. B. 1 point – correct answer. C. 1 point – correct answer. D. 1 point – correct answer. |
| 9 | 0 | Nothing is correct for credit in any part. |
| 10 | 2 | A. 1 point – correct answer. B. 1 point – correct answer. C. 0 points – incorrect answer. D. 0 points – incorrect answer. |