Pattern Rule Detectives

Find the rule, then make the pattern grow or shrink.

5.PFA.1.a · Identify, describe, extend, and create increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines, input/output tables, function machines).

Name _____ Date _____

Follow the Change

A pattern follows a rule that tells how each term changes. Compare nearby terms to find the change, then use the same rule to continue the pattern.

Worked example

Find the next term: 101, 108, 115, 122, ___.

1. 108 - 101 = 7.
2. Each term increases by 7.
3. 122 + 7 = 129.

129

1. Practice

Find the next term: 31, 39, 47, ___.

2. Practice

Find the next term: 86, 78, 70, ___.

3. Practice

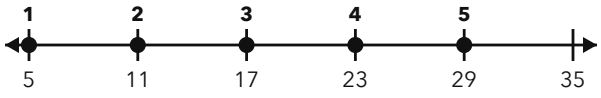
Describe the rule and find the next term: 3, 8, 13, 18, ___.

4. Practice

A function machine has these pairs: 6 becomes 30, 10 becomes 50, and 12 becomes 60. What number does 15 become?

5. Practice

The marked points on the number line are terms in a pattern from left to right. What is the next term?



6. Practice

Choose your own starting numbers and rules. Create one increasing and one decreasing pattern with four nonnegative whole-number terms each. Show one in an input/output table or a drawing, and explain both rules.

7. Apply

A game gives gems for each quest completed. Use the table to find the rule. How many gems will a player earn for 8 completed quests?

Quest Gems

Quests completed	Gems earned
1	12
2	24
3	36
5	60

8. Apply

Maya has 82 songs in a playlist. After each cleanup, she removes 6 songs. How many songs will be in the playlist after 5 cleanups?

9. Challenge

A decreasing pattern is 62, 57, 47, 32, ___. Find the next term and explain how the amounts being subtracted change.

What to accept

Accept equivalent wording for pattern rules, such as “increase by 5” for “add 5.” For the challenge, students should identify that the amount subtracted increases by 5 each time.

1. Practice

55

2. Practice

62

3. Practice

Add 5; 23

4. Practice

75

5. Practice

35

6. Practice

Answers vary. Example: increasing 3, 6, 9, 12 (+3); decreasing 20, 16, 12, 8 (-4). A matching table or drawing must encode the chosen rule.

7. Apply

12 gems for each quest; 96 gems

The number of gems increases by 12 for each completed quest. Multiply 8 by 12 to get 96.

8. Apply

52 songs

The pattern decreases by 6 songs each cleanup. Five cleanups remove 30 songs, and 82 - 30 = 52.

9. Challenge

12. The amounts subtracted are 5, 10, and 15, so subtract 20 next.