Pattern Pathways

Find the change, then keep the pattern going.

3.PFA.1 · The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition and subtraction of whole numbers), including those in context, using various representations. Identify and describe increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines). Analyze an increasing or decreasing pattern and generalize the change to extend the pattern or identify missing terms using various representations. Solve contextual problems that involve identifying, describing, and extending patterns. Create increasing and decreasing patterns using objects, pictures, numbers, and number lines. Investigate and explain the connection between two different representations of the same increasing or decreasing pattern.

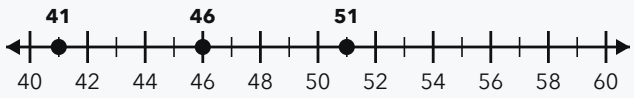
Name _____ Date _____

Follow the Change

Increasing patterns get larger; decreasing patterns get smaller. These examples use a constant whole-number addition or subtraction. Compare neighboring terms to find the change.

Worked example

Use the number line. The pattern is 41, 46, 51, ___. What is the next term?



1. 41 to 46 is add 5.
2. 46 to 51 is add 5.
3. Add 5 to 51.
4. 51 + 5 = 56.

56

1. Practice

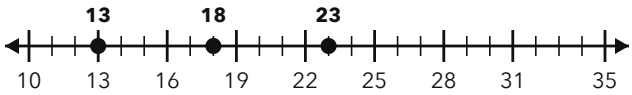
Extend the increasing pattern: 7, 11, 15, ___, ___.

2. Practice

Extend the pattern and describe its rule: 30, 25, 20, ___.

3. Practice

The marked points show a pattern on the number line. Write the next two terms and describe the rule.



4. Practice

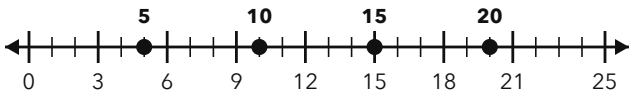
Create an increasing pattern with four terms. Start at 9 and add 6 each time.

5. Practice

Choose a starting whole number and a subtraction rule. Create four decreasing terms that stay at or above zero. Draw matching labeled hops on a number line and explain how the list and hops show the same pattern.

6. Practice

The list and number line show the same pattern: 5, 10, 15, 20. Describe how the two representations are connected.



7. Apply

Before playing a video game, Kai has 2 stars. After each level, he earns 8 more stars. Write the number of stars Kai has after levels 1, 2, 3, and 4.

8. Apply

Maya gives away 7 sticker cards each day. The table shows how many cards she has left at the end of each day. How many cards does she have left at the end of Wednesday and Thursday?

Maya's Sticker Cards

Day	Cards Left
Monday	36
Tuesday	29
Wednesday	___
Thursday	___

9. Challenge

Pattern A is 5, 10, 15, __, __, __. Pattern B is 30, 25, 20, __, __, __. Write the next three terms in each pattern. Then explain how the patterns are connected.

What to accept

Accept equivalent descriptions of the rules, such as "go up by 5" or "take away 5." For the connection items, accept responses that correctly state the shared terms and opposite directions.

1. Practice

19, 23

2. Practice

15; subtract 5 each time

3. Practice

28, 33; add 5 each time

4. Practice

9, 15, 21, 27

5. Practice

Answers vary. Example: 20, 16, 12, 8; subtract 4. Mark 20, 16, 12, 8 on an equally spaced number line and draw three leftward hops of 4.

6. Practice

Both show 5, 10, 15, 20. The pattern adds 5 each time.

7. Apply

10, 18, 26, 34

Start with 2 stars and add 8 after each level. Continue adding 8 four times.

8. Apply

22 on Wednesday and 15 on Thursday

The number of cards decreases by 7 each day. Subtract 7 from 29, then subtract 7 again.

9. Challenge

Pattern A: 20, 25, 30. Pattern B: 15, 10, 5. They use the same numbers in reverse order. Pattern A adds 5, and Pattern B subtracts 5.