This document provides revised scaffolded questions to help students prepare for question 18 (Sequences group) of the enVision Algebra 2 Progress Monitoring Assessment Form C. Each question includes scaffolded steps to build understanding from basic concepts to the level required by the assessment, with clear guidance for concept-naive students. This is followed by the original assessment questions.

Scaffolded Review Questions

Scaffolded Question for Assessment Item 18: Arithmetic Sequences

The original question involves determining if the sequence (Monday: 240, Tuesday: 290, Friday: 440) is arithmetic and predicting Saturday's attendance. The following questions build understanding of arithmetic sequences.

18.1 **Identifying Arithmetic Sequences**: A sequence is arithmetic if the differences between consecutive terms are constant (this constant difference is called the common difference, d):

   a) $4, 7, 10, 13, \ldots$ Differences: $7 - 4 = 3$, $10 - 7 = 3$, $13 - 10 = 3$. Arithmetic? <u>Yes</u>. Common difference: $d = 3$.

   b) $8, 6, 4, 2, \ldots$ Differences: $6 - 8 = \underline{-2}$, $4 - 6 = \underline{-2}$, $2 - 4 = \underline{-2}$. Arithmetic? <u>Yes</u>. Common difference: $d = \underline{-2}$.

   c) Why must differences be constant for an arithmetic sequence? <u>That is the definition of an arithm</u>

18.2 **Finding Common Differences from Context**: Given festival attendance:

   a) Monday $= 200$, Tuesday $= 250$: $d = 250 - 200 = \underline{50}$

   b) Monday $= 240$, Tuesday $= 290$: $d = 290 - 240 = \underline{50}$

   c) If Wednesday's attendance based on the trend from (b) is 340, check the difference: $340 - 290 = \underline{50}$. Is it consistent with the previous difference? <u>Yes</u>.

18.3 **Recursive Formulas**: For an arithmetic sequence, the recursive formula is $a_n = a_{n-1} + d$, where a_1 is the first term and a_n is the n-th term.

   a) Sequence: $5, 9, 13, 17, \ldots$ First term: $a_1 = 5$. Common difference: $d = 9 - 5 = 4$. Recursive Formula: $a_1 = 5$, $a_n = a_{n-1} + 4$ (for $n > 1$).

   b) Sequence representing attendance: 240 (Monday), 290 (Tuesday), 340 (Wednesday, if arithmetic), ... First term (Monday's attendance): $a_1 = \underline{240}$. Common difference (if arithmetic): $d = \underline{50}$. Recursive Formula: $a_1 = \underline{240}$, $a_n = a_{n-1} + \underline{50}$ (for $n > 1$).

18.4 **Applying to the Original Problem**: Monday attendance $(a_1) = 240$. Tuesday attendance $(a_2) = 290$. Friday attendance $(a_5) = 440$. (Monday is day 1, Tuesday day 2, Wed day 3, Thurs day 4, Friday day 5)

a) **Part A: Is it arithmetic? Check recursive formula.** Calculate potential common difference from Monday to Tuesday: $d = a_2 - a_1 = 290 - 240 = \underline{50}$. If the sequence is arithmetic with $d = 50$: Wednesday $(a_3) = a_2 + d = 290 + 50 = 340$. Thursday $(a_4) = a_3 + d = 340 + 50 = 390$. Friday $(a_5) = a_4 + d = 390 + 50 = 440$. Does this calculated Friday attendance match the given Friday attendance (440)? <u>Yes</u>. So, is the sequence arithmetic? <u>Yes</u>. Recursive formula: $a_1 = \underline{240}$, $a_n = a_{n-1} + \underline{50}$ (for $n > 1$). (This matches option C from the assessment).

b) **Part B: Predict Saturday's attendance.** Saturday is the 6th day (a_6). Using the recursive formula: $a_6 = a_5 + d$. $a_6 = 440 + 50 = \underline{490}$ people.

Original Assessment Question

Question 18

The number of people attending a music festival has been increasing over the last several days. On Monday, 240 people attended. On Tuesday, 290 people attended. And on Friday, 440 people attended.

Part A Is the sequence that represents the festival attendance arithmetic? If it is, choose the recursive formula for the sequence.

A. No; the music festival attendance cannot be represented by an arithmetic sequence.

B. Yes; $a(n) = 290 + n$

C. Yes; $a_1 = 240, a_n = a_{n-1} + 50$

D. Yes; $a_1 = 240, a_n = a_{n+1} + 50$

Part B If the trend continues, how many people will attend on Saturday?

$\boxed{}$ people