Arithmetic Sequences

Problems about arithmetic sequences.

Problem   **1**   *Trish has a bank account which has $23 currently. She decides to set up a savings plan in which each week she will deposit $2 into this account. (Sadly, it does not earn interest.)*

Would we use an arithmetic sequence to describe the balance in her account each week?

Multiple Choice:

   (a) *Yes, this is an arithmetic sequence.* ✓

   (b) *No, this is not an arithmetic sequence.*

Problem   **1.1**   *Each Saturday, Tabitha goes to her local farmer's market. Last week, she bought 4 ounces of almond flour, and this week she decided she needed twice as much almond flour as she did last week. Quickly, she develops a habit of buying twice as much almond flour as the previous week each time she goes to the farmer's market.*

Would we use an arithmetic sequence to describe this situation?

Multiple Choice:

   (a) *Yes, this is an arithmetic sequence.*

   (b) *No, this is not an arithmetic sequence.* ✓

Problem   **2**   *Trish has a bank account which has $23 currently. She decides to set up a savings plan in which each week she will deposit $2 into this account. (Sadly, it does not earn interest.)*

Fill out the following table corresponding to the amount Trish has in her bank account n weeks from now.

n	Account Balance
1	25
2	27
3	29
4	31
5	33
6	35
7	37
8	39

Problem 3 *Trish has a bank account which has $23 currently. She decides to set up a savings plan in which each week she will deposit $2 into this account. (Sadly, it does not earn interest.)*

How much money does Trish have in her bank account after 52 weeks have passed?

Trish deposits $\boxed{127}$ in her bank account.
given

Problem 4 *Trish has a bank account which has $23 currently. She decides to set up a savings plan in which each week she will deposit $2 into this account. (Sadly, it does not earn interest.)*

Write an expression for the amount of money Trish will have in her bank account n weeks from now.

Trish will deposit $\boxed{23 + 2n}$ in her bank account.
given

Problem 5 *Terry is starting a small business. In year 2, they have 325 customers, and based on previous growth, their goal is to increase the number of customers by 230 each year.*

How many customers does Terry hope to have in year 5?

Terry hopes to have $\boxed{1015}$ customers in year 5.
given

Problem 6 *Terry is starting a small business. In year 2, they have 325 customers, and based on previous growth, their goal is to increase the number of customers by 230 each year.*

Write a recursive formula for the number of customers Terry has in year n, using "Next" and "Now" to describe the situation.

Terry hopes to have (Next ✓/ Now/ n/ 230/ 325) = (Next/ Now ✓/ n/ 230/ 325) + (Next/ Now/ n/ 230 ✓/ 325).

Problem 7 *Terry is starting a small business. In year 2, they have 325 customers, and based on previous growth, their goal is to increase the number of customers by 230 each year.*

Write a recursive formula for the number of customers Terry has in year n, using "$f(n+1)$" and "$f(n)$" to describe the situation.

Terry hopes to have $(f(n+1)$ ✓/ $f(n)$/ n/ 230/ 325) = $(f(n+1)$/ $f(n)$ ✓/ n / 230/ 325) + $(f(n+1)$/ $f(n)$/ n/ 230 ✓/ 325).

Problem 8 *Tripp is training for a bike ride across the state. In week 8 of his training, he rode 32.2 miles. Each week, his trainer has recommended that he ride 6.3 miles more than he did the previous week.*

How far will Tripp ride in week 12 of his training?

Tripp will ride $\boxed{57.4}$ *miles in week 12.*
given

Problem 9 *Tripp is training for a bike ride across the state. In week 8 of his training, he rode 32.2 miles. Each week, his trainer has recommended that he ride 6.3 miles more than he did the previous week.*

Write a recursive function for the number of miles $f(n)$ Tripp will ride in week n of his training. Use $f(n-1)$ in your equation.

Tripp will ride $f(n) =$ $\boxed{f(n-1) + 6.3}$ *miles in week n.*
given

Problem 10 *Tripp is training for a bike ride across the state. In week 8 of his training, he rode 32.2 miles. Each week, his trainer has recommended that he ride 6.3 miles more than he did the previous week.*

Write an explicit function for the number of miles $f(n)$ Tripp will ride in week n of his training.

Tripp will ride $f(n) =$ $\boxed{6.3n - 18.2}$ *miles in week n.*
given

Problem 11 *Tripp is training for a bike ride across the state. In week 8 of his training, he rode 32.2 miles. Each week, his trainer has recommended that he ride 6.3 miles more than he did the previous week.*

During what week will Tripp first ride more than 200 miles?

Tripp will ride more than 200 miles beginning in week $\boxed{27}$.
$\underset{\text{given}}{}$

Problem 12 *Therese is monitoring her neighborhood swimming pool as it fills with water at a constant rate of 16 gallons per minute. After 20 minutes, the pool has 454 gallons. How much water did the pool have before Therese began filling the pool?*

The pool had $\boxed{134}$ *gallons when Therese began.*
$\underset{\text{given}}{}$

Problem 13 *Therese is monitoring her neighborhood swimming pool as it fills with water at a constant rate of 16 gallons per minute. After 20 minutes, the pool has 454 gallons. Write an equation for the number of gallons in the pool after n minutes.*

The pool has $f(n) = \boxed{134 + 16n}$ *gallons after n minutes.*
$\underset{\text{given}}{}$

Problem 14 *Assume the sequence below is an arithmetic sequence. Fill in the blanks.*

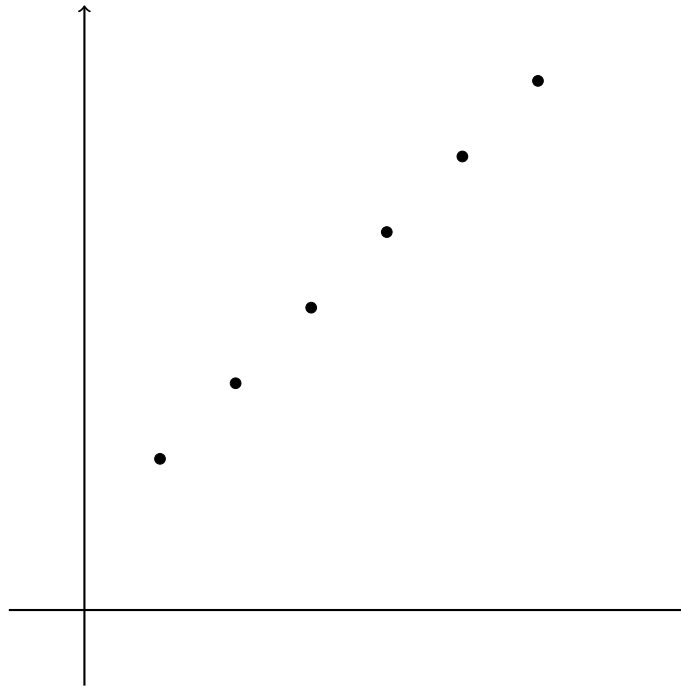$$\boxed{-5}, -1, 3, \boxed{7}, \boxed{11}, \boxed{15}, \boxed{19}, \dots$$

Problem 15 *Assume the sequence below is an arithmetic sequence. Fill in the blanks.*

$$\dots, \boxed{-5}, -10, \boxed{-15}, \boxed{-20}, \boxed{-25}, -30, \boxed{-35}, \dots$$

Problem 16 *Assume the sequence below is an arithmetic sequence. Fill in the blanks.*

$$\dots, \boxed{2.7}, \boxed{3.3}, 3.9, \boxed{4.5}, \boxed{5.1}, 5.7, \boxed{6.3}, \dots$$

Problem   17   *Imagine drawing a graph like the one below to represent each of the situations with Trish, Terry, Tripp, and Therese.*

In which of the situations does it make sense to connect the dots with a line?

Select All Correct Answers:

- (a) *Trish and her bank account.*
- (b) *Terry and their small business.*
- (c) *Tripp and his bike travel.*
- (d) *Therese and the swimming pool.* ✓