

# Fibonacci Sequences

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Examples

Workout



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Question 1: The first 4 numbers in the Fibonacci sequence are 1, 1, 2, 3, ...

- (a) What is the 5<sup>th</sup> term of the Fibonacci sequence?
- (b) What is the 6<sup>th</sup> term of the Fibonacci sequence?
- (c) Describe the rule for continuing the Fibonacci sequence.

Question 2: Find the next three terms of the following Fibonacci-style sequences

- |   |   |   |
|---|---|---|
| (a) 2, 4, 6, 10, ...  | (b) 3, 6, 9, 15, ...  | (c) 4, 8, 12, 20, ...   |
| (d) 15, 23, 38, 62, ...   | (e) 5, 12, 17, 29, ...  | (f) -3, 5, 2, 7, ...  |
| (g) 35, 60, 95, 155, ...  | (h) -1, -3, -4, -7, ...   | (i) 1.2, 2.7, 3.9, 6.6, ...                                       |
| (j) 0.11, 2.32, 2.43, 4.75, ...                                     | (k) -5.1, 1.1, -4, -2.9, ...                                      | (l) -0.5, -0.7, -1.2, -1.9, ...                                   |
| (m) $\frac{1}{11}, \frac{3}{11}, \frac{4}{11}, \frac{7}{11}, \dots$ | (n) $\frac{5}{6}, \frac{11}{12}, \frac{7}{4}, \frac{8}{3}, \dots$ | (o) $-\frac{1}{5}, \frac{1}{2}, \frac{3}{10}, \frac{4}{5}, \dots$ |

Question 3: Find the missing term in each of the Fibonacci-style sequences below.

- |                                     |   |   |
|-------------------------------------|---|---|
| (a) $\square, 13, 20, 33, \dots$    | (b) $11, \square, 26, 41, \dots$        | (c) $\square, 69, 109, 178, \dots$                    |
| (d) $\square, 3.7, 4.9, 8.6, \dots$ | (e) $26.3, \square, 64.4, 102.5, \dots$ | (f) $10.25, \square, 25.75, 41.25, \dots$             |
| (g) $6, \square, 4, 2, \dots$       | (h) $-12, \square, -4, 4, \dots$        | (i) $\square, -\frac{5}{4}, -2, -\frac{13}{4}, \dots$ |

Apply

Question 1: For each of the following Fibonacci-style sequences, find the next 4 terms.

- |                                       |  |
|---------------------------------------|--|
| (a) $a, 4a, 5a, 9a, \dots$            | (b) $3x, 3x + y, 6x + y, 9x + 2y, \dots$ |
| (c) $6a, -2a, 4a, 2a, \dots$          | (d) $2y, y + z, 3y + z, \dots$           |
| (e) $4x - 5y, 2x - y, 6x - 6y, \dots$ | (f) $-x, x + y, y, \dots$                |

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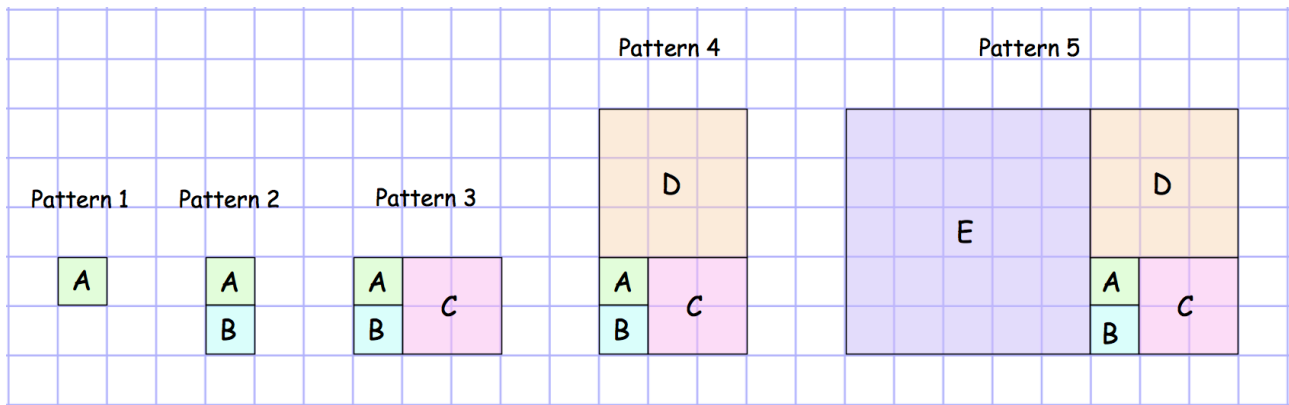
- Question 2: Beth wants to generate a Fibonacci style sequence.  
The first term is 3 and the second term is 4.
- (a) Find the 3rd term.
  - (b) Find the 4th term.

Beth thinks that the sum of the first ten terms is equal to 11 times the 7th term of her sequence.

- (c) Show that Beth is correct.

- Question 3: Using the first term of  $x$  and the second term of  $y$ , prove your answer to Question 2 (c).

- Question 4: Ethan generates the pattern below



- (a) Draw Pattern 6
- (b) What is the length of each side of square F?
- (c) What is the length of each side of square G?
- (d) What is the length of each side of square H?
- (e) What do you notice about your answers to (b), (c) and (d)?

- Question 5: Dylan is researching what happens when a term in the Fibonacci sequence is divided by the term before it.

- (a) Find the missing answers
- (b) What do you notice?
- (c) Research the Golden Number.

$$\begin{aligned}
 1 \div 1 &= 1 \\
 2 \div 1 &= 2 \\
 3 \div 2 &= 1.5 \\
 5 \div 3 &= 1.666\dots \\
 8 \div 5 &= \\
 13 \div 8 &= \\
 21 \div 13 &=
 \end{aligned}$$

Answers



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