

Algebra 1 · Arithmetic and Geometric Sequences · Test Answer Key

Common Core F-IF.A.3, F-BF.A.2, F-LE.A.2 · mathovore.fr

Use this key to score the test out of 20 points. Each solution shows the full work and the scoring note shows how the points are awarded. Accept equivalent explicit formulas, such as the $a_1 + (n-1)d$ form or the simplified linear form, and award partial credit only where the note allows it.

Algebra 1 Common Core: F-IF.A.3 · F-BF.A.2 · F-LE.A.2

Question 1: Identify the sequence (2 points)

- a. Differences: 7, 7, 7. **Arithmetic**, $d = 7$, next term $33 + 7 = 40$.
- b. Ratios: $-2, -2, -2$. **Geometric**, $r = -2$, next term $-24 \cdot (-2) = 48$.

Scoring: 1 point for each part: the correct classification with its difference or ratio, and the correct next term.

Question 2: Arithmetic formula (2 points)

- a. $d = -4$, so $a_n = 9 - 4(n-1)$ (equivalently $a_n = 13 - 4n$).
- b. $a_{12} = 9 - 4(11) = 9 - 44 = -35$.

Scoring: 1 point for a correct formula (any equivalent form); 1 point for $a_{12} = -35$.

Question 3: Geometric formula (2 points)

- a. $r = 14 \div 7 = 2$, so $a_n = 7 \cdot 2^{n-1}$.
- b. $a_9 = 7 \cdot 2^8 = 7 \cdot 256 = 1792$.

Scoring: 1 point for the formula with the correct ratio and exponent $n-1$; 1 point for the value 1792.

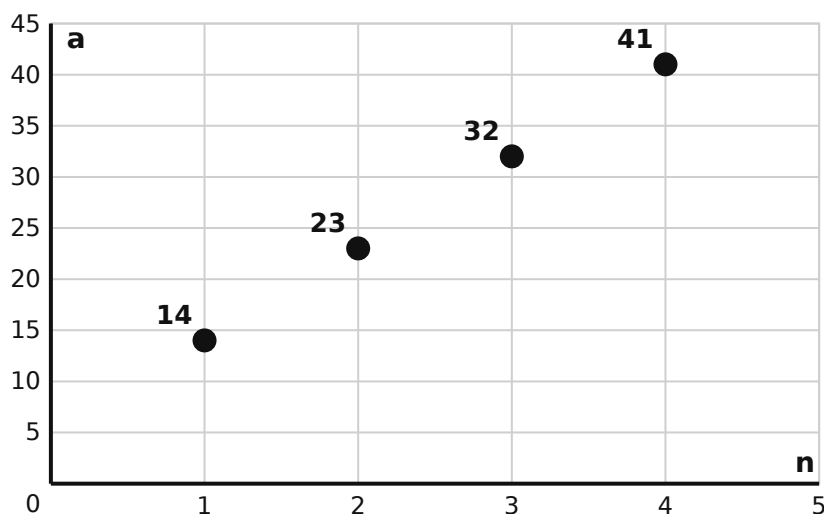
Question 4: Recursive formulas (2 points)

- a. $d = 85 - 100 = -15$: $a_1 = 100$, $a_n = a_{n-1} - 15$.
- b. $a_2 = 10$, $a_3 = 50$, $a_4 = 250$.

Scoring: 1 point for part (a), including the starting value and the rule; 1 point for $a_4 = 250$.

Question 5: Sequence from a table (3 points)

- a. $23-14=9$, $32-23=9$, $41-32=9$. So $d=9$.
b. $a_n=14+9(n-1)=9n+5$. The formula is $a_n=14+9(n-1)$.
c. $9n+5=140$, so $9n=135$ and $n=15$. The 15th term is 140.

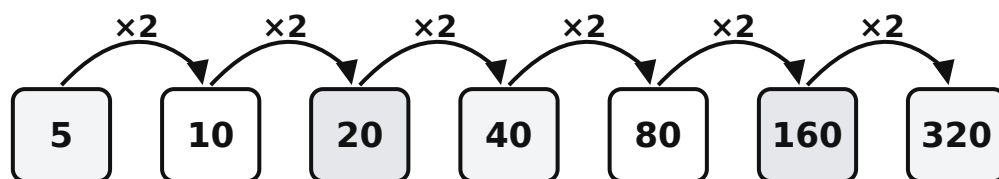


The points lie on a line with slope 9.

Scoring: 1 point for each part; in part (c) the equation must be set up and solved for n .

Question 6: Sequence from a graph (3 points)

- a. The terms are 5, 10, 20, 40, so $r=10\div5=2$.
b. $a_n=5\cdot2^{n-1}$.
c. $a_7=5\cdot2^6=5\cdot64=320$.



Continuing to multiply by 2 reaches 320 at term 7.

Scoring: 1 point for each part.

Question 7: Arithmetic from two terms (2 points)

- a. There are 5 steps from term 4 to term 9: $5d=44-19=25$, so $d=5$.
b. $a_1=19-3(5)=4$, so $a_n=4+5(n-1)=5n-1$. Check: $a_9=5(9)-1=44$.

Scoring: 1 point for the common difference; 1 point for the formula (any equivalent form).

Question 8: Geometric from two terms (2 points)

- a. From term 2 to term 4 the ratio is used twice: $r^2 = \frac{48}{12} = 4$, and $r > 0$, so $r = 2$.
b. $a_5 = 96$ and $a_6 = 192$. Also $a_1 = 6$ and $6 \cdot 2^5 = 192$. So $a_6 = 192$.

Scoring: 1 point for $r = 2$ (with the positive root chosen); 1 point for $a_6 = 192$.

Question 9: Growing plant (2 points)

- a. $a_n = 4 + 1.5(n-1)$. $a_9 = 4 + 1.5(8) = 16$ inches.
b. $4 + 1.5(n-1) > 30$ gives $1.5(n-1) > 26$, so $n-1 > 17.33$ and $n = 19$. Check: week 18 is 29.5 inches, week 19 is 31 inches. It is **week 19**.

Scoring: 1 point for the formula and week-9 height; 1 point for week 19 with a correct check or inequality.

Total
20 points