Directions: For each of the following, determine if the given sequence is arithmetic, geometric, or neither.

1. $12, 7, 2, -3, -8, \ldots$

Arithmetic with common difference $d = -5$

2. $5, 10, 20, 40, \ldots$

Geometric with common ratio $r = 2$

3. $20, 10, 5, \frac{5}{2}, \ldots$

Geometric with common ratio $r = \frac{1}{2}$

4. $\frac{1}{3}, 1, \frac{5}{3}, \frac{7}{3}, 3, \ldots$

Arithmetic with common difference $d = \frac{2}{3}$

5. $1, 1, 2, 3, 5, 8, 13, \ldots$

Neither

6. $b_n = \frac{n+3}{2}$

$\frac{3}{2}, \frac{4}{2}, \frac{5}{2}, \frac{6}{2} \ldots$ Arithmetic with common difference $d = \frac{1}{2}$

Directions: Let a_n be an arithmetic sequence with the following properties. For each of the following, find an expression for a_n, and then find a_{11}.

7. $a_3 = 7$ and $a_8 = 17$

$a_8 = a_3 + d(8-3)$
$17 = 7 + 5d$
$10 = 5d$
$d = 2$

$a_n = 7 + 2(n-3)$
$a_{11} = 7 + 2(11-3) = 23$

8. $a_2 = -3$ and $a_6 = -9$

$a_6 = a_2 + d(6-2)$
$-9 = -3 + 4d$
$-6 = 4d$
$d = -\frac{6}{4} = -\frac{3}{2}$

$a_n = -3 - \frac{3}{2}(n-2)$
$a_{11} = -3 - \frac{3}{2}(11-2)$
$= -3 - \frac{3}{2}(9) = -\frac{33}{2}$

9. $a_5 = 7$ and $d = -4$

$a_5 = a_0 - 4(5)$
$7 = a_0 - 20$
$27 = a_0$

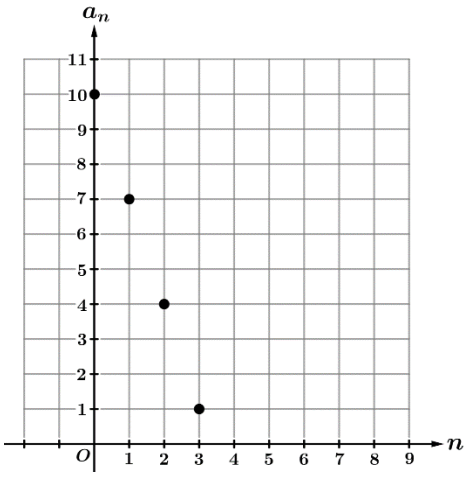
$a_n = 27 - 4n$
$a_{11} = 27 - 4(11) = -17$

10. $a_4 = -1$ and $d = \frac{2}{3}$

$a_4 = a_0 + \frac{2}{3}(4)$
$-1 = a_0 + \frac{8}{3}$
$-\frac{11}{3} = a_0$

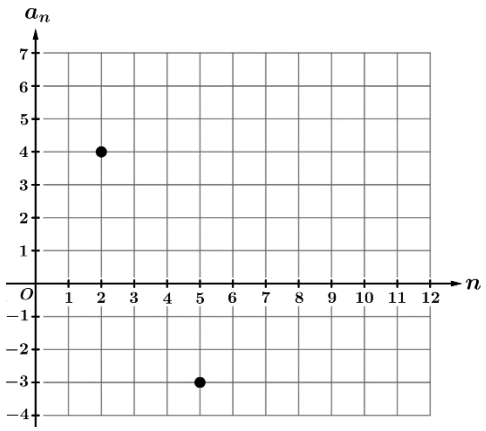
$a_n = -\frac{11}{3} + \frac{2}{3}n$
$a_{11} = -\frac{11}{3} + \frac{2}{3}(11) = \frac{11}{3}$

11.



$a_n = 10 - 3n$ $a_{11} = 10 - 3(11) = -23$

12.



$a_n = 4 - \frac{7}{3}(n-2)$ $a_{11} = 4 - \frac{7}{3}(11-2)$
$= 4 - 21 = -17$

Directions: Let g_n be a geometric sequence with the following properties. For each of the following, find an expression for g_n, and then find g_6.

13. $g_1 = 5$ and $r = -2$

$g_1 = g_0(-2)^1$

$5 = g_0(-2)$

$-\frac{5}{2} = g_0$

$g_n = -\frac{5}{2}(-2)^n$

$g_6 = -\frac{5}{2}(-2)^6$

$= -\frac{5}{2}(64) = -160$

14. $g_2 = 8$ and $r = \frac{1}{2}$

$g_2 = g_0\left(\frac{1}{2}\right)^2$

$8 = g_0\left(\frac{1}{4}\right)$

$32 = g_0$

$g_n = 32\left(\frac{1}{2}\right)^n$

$g_6 = 32\left(\frac{1}{2}\right)^6$

$= 32\left(\frac{1}{64}\right) = \frac{1}{2}$

15. $g_2 = 1$ and $g_5 = 27$

$g_5 = g_2(r)^{(5-2)}$

$27 = 1(r)^3$

$r = 3$

$g_n = 1(3)^{(n-2)}$

$g_6 = 3^{6-2} = 3^4 = 81$

16. $g_4 = -12$ and $g_7 = \frac{32}{9}$

$g_7 = g_4(r)^{(7-4)}$

$\frac{32}{9} = -12(r)^3$

$r^3 = -\frac{32}{108} = -\frac{8}{27}$

$r = -\frac{2}{3}$

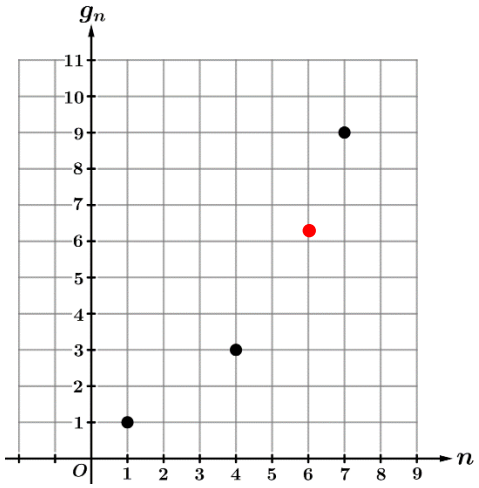
$g_n = -12\left(-\frac{2}{3}\right)^{(n-4)}$

$g_6 = -12\left(-\frac{2}{3}\right)^{(6-4)}$

$= -12\left(-\frac{2}{3}\right)^2 - 12\left(\frac{4}{9}\right)$

$= -\frac{48}{9} = -\frac{16}{3}$

17.



$g_4 = g_1(r)^{(4-1)}$

$3 = 1(r)^3$

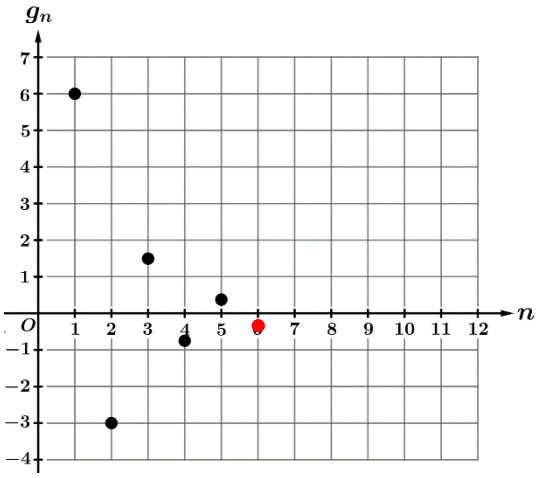
$3 = 1(r)^3$

$r = 3^{1/3}$

$g_n = 1\left(3^{1/3}\right)^{(n-1)} = 3^{(n-1)/3}$

$g_6 = 3^{(6-1)/3} = 3^{5/3} = 6.2402\ldots$

18.



$g_2 = g_1(r)^{(2-1)}$

$-3 = 6(r)^1$

$r = -\frac{3}{6} = -\frac{1}{2}$

$g_n = 6\left(-\frac{1}{2}\right)^{(n-1)}$

$g_6 = 6\left(-\frac{1}{2}\right)^{(6-1)} = 6\left(-\frac{1}{2}\right)^5$

$= -\frac{6}{32} = -\frac{3}{16}$