NAME __key Spring 1__

Write the Recursive and Explicit formula for the following sequences:

1. $-40, -33, -26, -19, \ldots$

Recursive: $a_1 = -40$ $a_n = a_{n-1} + 7$

Explicit: $a_n = -40 + (n-1)(7)$
$a_n = -40 + 7n - 7$
$a_n = 7n - 47$

2. $5.2, 7, 8.8, 10.6, \ldots$

Recursive: $a_1 = 5.2$ $a_n = a_{n-1} + 1.8$

Explicit: $a_n = 5.2 + (n-1)(1.8)$
$a_n = 5.2 + 1.8n - 1.8$
$a_n = 1.8n + 3.4$

3. $-2, -9, -16, -23, \ldots$

Recursive: $a_1 = -2$ $a_n = a_{n-1} - 7$

Explicit: $a_n = -2 + (n-1)(-7)$
$a_n = -2 - 7n + 7$
$a_n = 5 - 7n$

4. $75, 80, 85, \ldots$

Recursive: $a_1 = 75$ $a_n = a_{n-1} + 5$

Explicit: $a_n = 75 + (n-1)(5)$
$a_n = 75 + 5n - 5$
$a_n = 5n + 80$

5. Find the next 5 terms if $a_1 = 6, d = -4$

$6, \underline{2}, \underline{-2}, \underline{-6}, \underline{-10}, \underline{-14}$

6. In an arithmetic sequence, the first term is $\frac{-1}{3}$ and the Common difference is -2. What is the 8th term?

$a_8 = -\frac{1}{3} + (8-1)(-2)$
$a_8 = -\frac{1}{3} - 14$
$a_8 = -14\frac{1}{3}$ or $\frac{-43}{3}$ or -14.33

7. Find a_{29} of the sequence $182, 176, 170 \ldots$

$a_1 = 182$
$d = -6$
$n = 29$

$a_{29} = 182 + (29-1)(-6)$
$a_{29} = 182 - 168$
$a_{29} = 14$

8. The 12th term of an arithmetic sequence is 30 and the Common difference is 3. Find the first term.

$a_{12} = 30$
$d = 3$
$a_1 = ?$

$30 = a_1 + (12-1)(3)$
$30 = a_1 + 33$
$-3 = a_1$

9. Find the number of terms in the sequence:

$-6, -2, 2, \ldots 158$

$a_1 = -6$
$d = +4$
$a_n = 158$

$158 = -6 + (n-1)(+4)$
$164 = (n-1)(+4)$
$41 = n-1$
$\boxed{42 = n}$ 158 is the 42nd term

10. Which term is 153 if the sequence begins $-9, -3, 3, 9 \ldots$

$a_n = 153$
$a_1 = -9$
$d = 6$

$153 = -9 + (n-1)(6)$
$162 = (n-1)(6)$
$27 = n-1$
$\boxed{28 = n}$ 153 is the 28th term

11. In an arithmetic sequence, $a_{13} = 2$ and $a_{21} = 4$. Find a_{101}.

Step 1: manipulate formula
$a_n = 2 + (n-13)d$

Step 2: find d
$4 = 2 + (21-13)d$
$2 = 8d$
$\frac{1}{4} = d$

Step 3: update eqn
$a_n = 2 + (n-13)(\frac{1}{4})$

Step 4: find a_{101} $a_{101} = 2 + (101-13)(\frac{1}{4})$

$\boxed{a_{101} = 24}$

12. In an arithmetic sequence, $a_{16} = 40$ and $a_{22} = 58$. Find a_{32}.

Step 1: manipulate formula $a_n = 40 + (n-16)(d)$

Step 2: find d
$58 = 40 + (22-16)d$
$18 = 6d$
$d = 3$

Step 3: update eqn
$a_n = 40 + (n-16)(3)$

Step 4: find a_{32}
$a_{32} = 40 + (32-16)(3)$
$\boxed{a_{32} = 88}$

13. Find the common difference if the first term Of an arithmetic sequence is 2 and the 11th term is 9.5.

$a_{11} = a_1 + (11-1)d$

$9.5 = 2 + 10d$
$7.5 = 10d$

$\boxed{d = .75 \text{ or } \frac{3}{4}}$

14. The 3rd term of an arithmetic sequence is 2 and the 18th term is 47. Find the common difference.

*since we don't know the first term, manipulate the equation

$a_n = a_3 + (n-3)d$
$a_n = 2 + (n-3)d$

use other term to find d:

$47 = 2 + (18-3)d$
$45 = 15d$

$\boxed{d = 3}$