

Explicit Formula – Day 2
Unit 6: Representations of Linear Relations

Find the explicit formula.

<p>1. $-17, -25, -33, -41, \dots$</p> $\begin{array}{l} -25 - (-17) = -8 \\ -33 - (-25) = -8 \\ -41 - (-33) = -8 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -17 = -8(1) + b \\ -17 = -8 + b \\ +8 \quad +8 \\ \hline -9 = b \end{array}$ <p>$a_n = -8n - 9$</p>	<p>2. $-13, -113, -213, -313, \dots$</p> $\begin{array}{l} -113 - (-13) = -100 \\ -213 - (-113) = -100 \\ -313 - (-213) = -100 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -13 = -100(1) + b \\ -13 = -100 + b \\ +100 \quad +100 \\ \hline 87 = b \end{array}$ <p>$a_n = -100n + 87$</p>
<p>3. $38, 43, 48, 53, \dots$</p> $\begin{array}{l} 43 - (38) = 5 \\ 48 - (43) = 5 \\ 53 - (48) = 5 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ 38 = 5(1) + b \\ 38 = 5 + b \\ -5 \quad -5 \\ \hline 33 = b \end{array}$ <p>$a_n = 5n + 33$</p>	<p>4. $-8, 92, 192, 292, \dots$</p> $\begin{array}{l} 92 - (-8) = 100 \\ 192 - (92) = 100 \\ 292 - (192) = 100 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -8 = 100(1) + b \\ -8 = 100 + b \\ -100 \quad -100 \\ \hline -108 = b \end{array}$ <p>$a_n = 100n - 108$</p>
<p>5. $-17, -23, -29, -35, \dots$</p> $\begin{array}{l} -23 - (-17) = -6 \\ -29 - (-23) = -6 \\ -35 - (-29) = -6 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -17 = -6(1) + b \\ -17 = -6 + b \\ +6 \quad +6 \\ \hline -11 = b \end{array}$ <p>$a_n = -6n - 11$</p>	<p>6. $17, 13, 9, 5, \dots$</p> $\begin{array}{l} 13 - (17) = -4 \\ 9 - (13) = -4 \\ 5 - (9) = -4 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ 17 = -4(1) + b \\ 17 = -4 + b \\ +4 \quad +4 \\ \hline 21 = b \end{array}$ <p>$a_n = -4n + 21$</p>
<p>7. $-23, -28, -33, -38, \dots$</p> $\begin{array}{l} -28 - (-23) = -5 \\ -33 - (-28) = -5 \\ -38 - (-33) = -5 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -23 = -5(1) + b \\ -23 = -5 + b \\ +5 \quad +5 \\ \hline -18 = b \end{array}$ <p>$a_n = -5n - 18$</p>	<p>8. $-9, 1, 11, 21, \dots$</p> $\begin{array}{l} 1 - (-9) = 10 \\ 11 - (1) = 10 \\ 21 - (11) = 10 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -9 = 10(1) + b \\ -9 = 10 + b \\ -10 \quad -10 \\ \hline -19 = b \end{array}$ <p>$a_n = 10n - 19$</p>
<p>9. $5, 15, 25, 35, \dots$</p> $\begin{array}{l} 15 - (5) = 10 \\ 25 - (15) = 10 \\ 35 - (25) = 10 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ 5 = 10(1) + b \\ 5 = 10 + b \\ -10 \quad -10 \\ \hline -5 = b \end{array}$ <p>$a_n = 10n - 5$</p>	<p>10. $-11, 9, 29, 49, \dots$</p> $\begin{array}{l} 9 - (-11) = 20 \\ 29 - (9) = 20 \\ 49 - (29) = 20 \end{array}$ $\begin{array}{l} a_n = d \cdot n + b \\ -11 = 20(1) + b \\ -11 = 20 + b \\ -20 \quad -20 \\ \hline -31 = b \end{array}$ <p>$a_n = 20n - 31$</p>

11. -36, -46, -56, -66, ...

$$\begin{aligned}
 -46 - (-36) &= -10 & a_n &= d \cdot n + b \\
 -56 - (-46) &= -10 & -36 &= -10(1) + b \\
 -66 - (-56) &= -10 & -36 &= -10 + b \\
 & & +10 & +10 \\
 \hline
 & & -26 &= b
 \end{aligned}$$

$$a_n = -10n - 26$$

12. -1, 7, 15, 23, ...

$$\begin{aligned}
 7 - (-1) &= 8 & a_n &= d \cdot n + b \\
 15 - (7) &= 8 & -1 &= 8(1) + b \\
 23 - (15) &= 8 & -1 &= 8 + b \\
 & & -8 & -8 \\
 \hline
 & & -9 &= b
 \end{aligned}$$

$$a_n = 8n - 9$$

13. -33, -133, -233, -333, ...

$$\begin{aligned}
 -133 - (-33) &= -100 & a_n &= d \cdot n + b \\
 -233 - (-133) &= -100 & -33 &= -100(1) + b \\
 -333 - (-233) &= -100 & -33 &= -100 + b \\
 & & +100 & +100 \\
 \hline
 & & 67 &= b
 \end{aligned}$$

$$a_n = -100n + 67$$

14. 17, 9, 1, -7, ...

$$\begin{aligned}
 9 - (17) &= -8 & a_n &= d \cdot n + b \\
 1 - (9) &= -8 & 17 &= -8(1) + b \\
 -7 - (1) &= -8 & 17 &= -8 + b \\
 & & +8 & +8 \\
 \hline
 & & 25 &= b
 \end{aligned}$$

$$a_n = -8n + 25$$

15. 22, 12, 2, -8, ...

$$\begin{aligned}
 12 - (22) &= -10 & a_n &= d \cdot n + b \\
 2 - (12) &= -10 & 22 &= -10(1) + b \\
 -8 - (2) &= -10 & 22 &= -10 + b \\
 & & +10 & +10 \\
 \hline
 & & 32 &= b
 \end{aligned}$$

$$a_n = -10n + 32$$

16. 13, 11, 9, 7, ...

$$\begin{aligned}
 11 - (13) &= -2 & a_n &= d \cdot n + b \\
 9 - (11) &= -2 & 13 &= -2(1) + b \\
 7 - (9) &= -2 & 13 &= -2 + b \\
 & & +2 & +2 \\
 \hline
 & & 15 &= b
 \end{aligned}$$

$$a_n = -2n + 15$$

17. 23, 13, 3, -7, ...

$$\begin{aligned}
 13 - (23) &= -10 & a_n &= d \cdot n + b \\
 3 - (13) &= -10 & 23 &= -10(1) + b \\
 -7 - (3) &= -10 & 23 &= -10 + b \\
 & & +10 & +10 \\
 \hline
 & & 33 &= b
 \end{aligned}$$

$$a_n = -10n + 33$$

18. 13, 22, 31, 40, ...

$$\begin{aligned}
 22 - (13) &= 9 & a_n &= d \cdot n + b \\
 31 - (22) &= 9 & 13 &= 9(1) + b \\
 40 - (31) &= 9 & 13 &= 9 + b \\
 & & -9 & -9 \\
 \hline
 & & 4 &= b
 \end{aligned}$$

$$a_n = 9n + 4$$

19. -1, -7, -13, -19, ...

$$\begin{aligned}
 -7 - (-1) &= -6 & a_n &= d \cdot n + b \\
 -13 - (-7) &= -6 & -1 &= -6(1) + b \\
 -19 - (-13) &= -6 & -1 &= -6 + b \\
 & & +6 & +6 \\
 \hline
 & & 5 &= b
 \end{aligned}$$

$$a_n = -6n + 5$$

20. 11, 9, 7, 5, ...

$$\begin{aligned}
 9 - (11) &= -2 & a_n &= d \cdot n + b \\
 7 - (9) &= -2 & 11 &= -2(1) + b \\
 5 - (7) &= -2 & 11 &= -2 + b \\
 & & +2 & +2 \\
 \hline
 & & 13 &= b
 \end{aligned}$$

$$a_n = -2n + 13$$