

# Honors Math 3 - Recursive vs. Explicit Formulas

① 5.2, 7, 8.8, 10.6

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

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

② -40, -33, -26, -19, ...

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

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

③  $-\frac{8}{5}, -\frac{49}{15}, -\frac{74}{15}, -\frac{33}{5}, \dots$

Recursive:  $a_n = a_{n-1} - \frac{5}{3}$   
 $a_1 = -\frac{8}{5}$

Explicit:  $a_n = -\frac{8}{5} + (n-1)(-\frac{5}{3})$   
 $a_n = -\frac{8}{5} - \frac{5}{3}n + \frac{5}{3}$   
 $a_n = \frac{1}{15} - \frac{5}{3}n$

④  $2, \frac{2}{3}, -\frac{2}{3}, -2, \dots$

Recursive:  $a_n = a_{n-1} - \frac{4}{3}$   
 $a_1 = 2$

Explicit:  $a_n = 2 + (n-1)(-\frac{4}{3})$   
 $a_n = 2 - \frac{4}{3}n + \frac{4}{3}$   
 $a_n = \frac{10}{3} - \frac{4}{3}n$

⑤ -38, -29, -20, -11, ...

Recursive:  $a_n = a_{n-1} + 9$   
 $a_1 = -38$

Explicit:  $a_n = -38 + (n-1)(9)$   
 $a_n = -38 + 9n - 9$   
 $a_n = -47 + 9n$

⑥ -8,  $-\frac{29}{3}, -\frac{34}{3}, -13, \dots$

Recursive:  $a_n = a_{n-1} - \frac{5}{3}$   
 $a_1 = -8$

Explicit:  $a_n = -8 + (n-1)(-\frac{5}{3})$   
 $a_n = -8 - \frac{5}{3}n + \frac{5}{3}$   
 $a_n = -\frac{19}{3} - \frac{5}{3}n$

$$1, \frac{5}{2}, 4, \frac{11}{2}, \dots$$

Recursive:  $a_n = a_{n-1} + \frac{3}{2}$   
 $a_1 = 1$

Explicit:  $a_n = 1 + (n-1)(\frac{3}{2})$

$$a_n = 1 + \frac{3}{2}n - \frac{3}{2}$$

$$a_n = -\frac{1}{2} + \frac{3}{2}n$$

$$\textcircled{9} -11, -19, -27, -35, \dots$$

Recursive:  $a_n = a_{n-1} - 8$   $a_1 = -11$

Explicit:  $a_n = -11 + (n-1)(-8)$

$$a_n = -11 - 8n + 8$$

$$a_n = -3 - 8n$$

$$\textcircled{11} -30, -22, -14, -6, \dots$$

Recursive:  $a_n = a_{n-1} + 8$   
 $a_1 = -30$

Explicit:  $a_n = -30 + (n-1)(8)$

$$a_n = -30 + 8n - 8$$

$$a_n = -38 + 8n$$

$$\textcircled{8} -40, -43, -46, -49, \dots$$

Recursive:  $a_n = a_{n-1} - 3$   
 $a_1 = -40$

Explicit:  $a_n = -40 + (n-1)(-3)$

$$a_n = -40 - 3n + 3$$

$$a_n = -37 - 3n$$

$$\textcircled{10} -23, -16, -9, -2, \dots$$

Recursive:  $a_n = a_{n-1} + 7$   
 $a_1 = -23$

Explicit:  $a_n = -23 + (n-1)(7)$

$$a_n = -23 + 7n - 7$$

$$a_n = -30 + 7n$$

$$\textcircled{12} -1, -\frac{3}{2}, -2, -\frac{5}{2}, \dots$$

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

Explicit:  $a_n = -1 + (n-1)(-\frac{1}{2})$

$$a_n = -1 - \frac{1}{2}n + \frac{1}{2}$$

$$a_n = -\frac{1}{2} - \frac{1}{2}n$$