explicit formula: function rule that relates each term of a sequence to the term number

$$A(n) = A(1) + (n-1)d$$

n^{th} term; first term; term number; common difference

Problem 4:

Justine's grandfather put $100 into a savings account on her first birthday. He put $125, $150, $175 into the account on her next three birthdays. If the pattern continues, how much will he deposit on her 16th birthday?

$A(n) = A(1) + (n-1)d$

$A(16) = 100 + (16-1)25$

$A(16) = 100 + 15(25)$

$A(16) = 100 + 375$

$A(16) = 475$

$475

Ex: 22, 44, 66, 88, ... $d = 22$

Find the 22nd term. $n = 22$

$A(n) = A(1) + (n-1)d$

$A(22) = 22 + (22-1)(22)$

$22 + (21)(22)$

$22 + 462$

$22 \times 21 = 22$

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Problem 5:

An arithmetic sequence is represented by the recursive formula

$$A(n) = A(n-1) + 15$$ d

If the first term is 42, write the explicit formula.

$$A(n) = A(1) + (n-1)d$$

$$A(n) = 42 + (n-1)(15)$$

Ex: Write the explicit formula, given the recursive formula

a. $A(n) = A(n-1) + 12$ (d); $A(1) = 12$

$$A(n) = A(1) + (n-1)d$$

$$A(n) = 12 + (n-1)(12)$$

b. $A(n) = A(n-1) + 3$; $A(1) = 6$

$$A(n) = A(1) + (n-1)d$$

$$A(n) = 6 + (n-1)(3)$$

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Problem 6:

Write the recursive formula, given the explicit formula

$A(n) = 8 + (n-1)(11)$ ($A(1)$, d)

$A(n) = A(n-1) + d$

$A(n) = A(n-1) + 11 \; ; \; A(1) = 8$

Ex: $A(n) = 5 + (n-1)(3)$ (d)

$A(n) = A(n-1) + d$

$A(n) = A(n-1) + 3 \; ; \; A(1) = 5$

Ex: $A(n) = 4 + (n-1)(1)$

$A(n) = A(n-1) + d$

$A(n) = A(n-1) + 1 \; ; \; A(1) = 4$

Find the fourth, sixth, and eleventh terms ($n=4$, $n=6$, $n=11$)

$A(n) = -3 + (n-1)5$

$n = 4$ $A(4) = -3 + (4-1)5$

$= -3 + (3)(5) = -3 + 15 = \boxed{12}$

$n = 6$ $A(6) = -3 + (6-1)5$

$-3 + (5)(5) = -3 + 25 = \boxed{22}$

$n = 11$ $A(11) = -3 + (11-1)5$

$-3 + (10)(5) = -3 + 50 = \boxed{47}$