

- 1) a) Write an equation for the  $n$ th term of the arithmetic sequence. -7, -8.5, -10, -11.5, ...  
 b) Using your formula, find  $a_{12}$ .

<b>General Formula: <math>a_n = a_1 + d(n - 1)</math></b>
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$$a_1 = -7 \quad d = -1.5$$

$$\text{Equation: } a_n = -7 - 1.5(n - 1)$$

$$a_{12} = -7 - 1.5(12 - 1)$$

$$a_{12} = -7 - 1.5(11)$$

$$a_{12} = -7 - 16.5$$

$$a_{12} = -23.5$$

The 12<sup>th</sup> term in the sequence is -23.5

- 2) The first row of a dominos display has 10 dominos. Each row after the first has two more dominos than the row before it.

- a) Write the first five terms of the sequence that represents the number of dominos in each row.

<b>Row (n)</b>	1	2	3	4	5
<b>Dominos (<math>a_n</math>)</b>	10	12	14	16	18

- b) Write an equation that can be used to find the number of dominos in the  $n$ th row.

$$\text{Equation: } a_n = 10 + 2(n - 1)$$

- c) Find the number of dominos in the 15<sup>th</sup> row.

$$n = 15$$

$$a_{15} = 10 + 2(15 - 1)$$

$$a_{15} = 10 + 2(14)$$

$$a_{15} = 10 + 28$$

$$a_{15} = 38$$

There are 38 dominos in the 15<sup>th</sup> row.

- d) What row has 60 dominos in it?

$$a_n = 60$$

$$60 = 10 + 2(n - 1)$$

$$60 = 10 + 2n - 2$$

$$60 = 8 + 2n$$

$$52 = 2n$$

$$26 = n$$

There are 60 dominos in the 26<sup>th</sup> row.

- 3) During a science experiment, the temperature of a liquid substance increased  $2^{\circ}\text{F}$  every hour. After the first hour, the temperature was  $56^{\circ}\text{F}$ . Carry and Carl each wrote an equation that can be used to find the temperature of the substance after the  $n$ th hour.

Carry's Equation

$$a_n = 56 + 2(n - 1)$$

Carl's Equation

$$a_n = 2n + 54$$

- (a) Are the equations equivalent? Justify your response.

**Yes. See work shown.**

$$a_n = 56 + 2(n - 1) \leftarrow \text{Carry's equation}$$

$$a_n = 56 + 2n - 2$$

$$a_n = 54 + 2n \text{ which is equivalent to } a_n = 2n + 54 \leftarrow \text{Carl's equation}$$

- (b) What does 56 represent in Carry's equation?

**It is the temperature of the liquid after the first hour of the experiment.**

- (c) What does 54 represent in Carl's equation?

**It is the temperature of the liquid before the experiment started.**

- (d) What does the coefficient 2 represent in both equations?

**It is the rate of change. The temperature increases by  $2^{\circ}$  each hour.**