# WARM UP

*For the following sequence...*

*a) determine the common difference*

*b) write the next three terms of the sequence*

*c) find the 25th term.*

**-2, 3, 8, 13, ...**

$+5$    $+5$

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18, 23, 28

$+5$    $+5$

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$a_{25} = -2 + (25 - 1) \cdot 5$

$a_{25} = -2 + 24 \cdot 5$

$a_{25} = -2 + 120$

$a_{25} = $    $ANS = 118$

# Notes Discussion

$$3, -10, -23, -36, \ldots$$

$$-114 = 3 + (n-1)(-13)$$

$a_n$ term given    1st term    Location    common diff.

$$-114 = 3 + -13n + 13$$

$$-114 = -16 - 13n$$

$$\phantom{-114}\; -16 \quad -16$$

$$-130 = -13n$$

$$\frac{-130}{-13} = \frac{-13n}{-13}$$

$$\boxed{n = 10}$$

Can n be a decimal?

Yes: 6    9 NO!

★ n can only be whole #!

## Clear Learning Targets

*You will be able to create functions based on arithmetic sequences and use them to solve related problems.*

Arithmetic Sequences as Functions

What if we wanted to create a rule that would allow us to find the nth term of our arithmetic sequence, without having to plug in *all* the numbers every single time?

We can use **functions** to accomplish this!

**Example #1:** Create a function for the following arithmetic sequence. Then determine the 12th term.

*-2, 3, 8, 13, ...*

$d = 5$
$a_1 = -2$

$f(n) = \dots$

$a_n = a_1 + (n-1)d$

$f(n) = a_1 + (n-1)d$

$f(n) = -2 + (n-1)(5)$

$f(n) = -2 + 5n - 5$

$f(n) = -7 + 5n$

TEST

$f(25) = -7 + 5(25)$

$= -7 + 125$

$118$

25

MACHINE

$f(12) = -7 + 5(12)$

$f(12) = -7 + 60$

$f(12) = 53$