HAVE YOU...?

[1] Taken out your packet

[2] Taken out your notebook

[3] Completed the Warm Up

0:00:00

Alert Sounds
Bell 1

Counter
Count Down

Style
Rectangle

Action
Nothing

Color

WARM UP

Find the equation of the line perpendicular to y = 3x+7 that goes through the point (-1,4).

$$y - 4 = -\frac{1}{3}(x+1)$$

$-\frac{1}{3}$
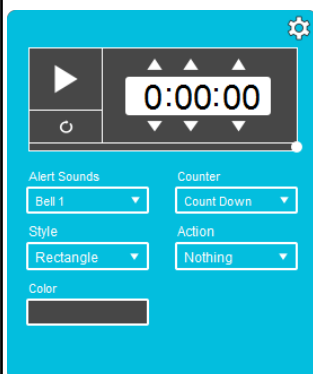
Agenda

Warm Up

Math Talk

Notes/Examples

Work time

Math Talk

▶   ▲ ▲ ▲
0:05:00
↻   ▼ ▼ ▼
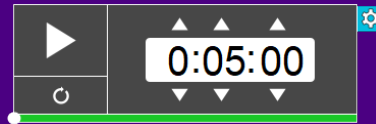
Estimation 180

Write down a Too Low, Too High, Estimate
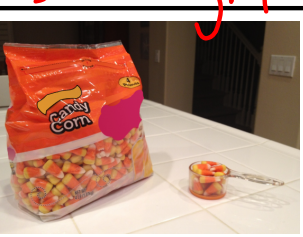
How many pieces of candy corn come in the bag?

Too low:

Too much:

Estimate:

http://www.estimation180.com/day-26.html

Too Low 100 Too High 1000 Estimate 850 James	Too Low 200 Too High 1000000 Estimate 1600 Brooklyn
Too Low 200 Too High 2000 Estimate 1,128 Haley	Too Low 300 Too High 2000 Estimate 1,592 Elena

UNIT 2: LINEAR MODELS & SEQUENCES

Learning Targets

I can define orally and in writing: sequence, term (u_1), general term (u_n), recursive formula, recursive rule, arithmetic sequence, common difference

I can write the recursive formula for an arithmetic sequence.

I can read and write recursive formulas with subscript notation.

I can find terms of a sequence given recursively.

Let's come up with a <u>recursive formula</u> to show the following pattern and find the next 3 terms.

ex) 5, 8, 11, $\underline{14}$, $\underline{17}$, $\underline{20}$

Recursive Routine

$$U_1 = 5$$
$$U_n = U_{n-1} + 3$$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

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ex) 5, 8, 11, $\underline{\ 14\ }$, $\underline{\ 17\ }$, $\underline{\ 20\ }$

Recursive Routine   Calculator

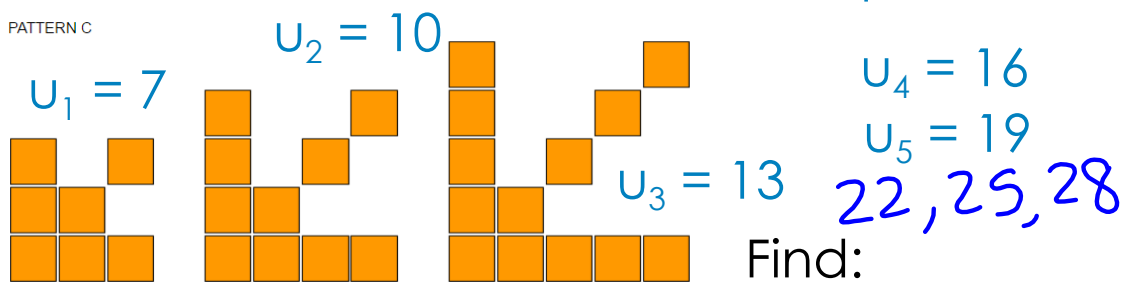| $u_1 = 5$ | 5 enter |
| $u_n = u_{n-1} + 3$ | ans + 3 enter, enter, enter... |

You ***MUST*** count carefully.

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Use this to find the 15th term! _____

Let's write a recursive formula for pattern C.

PATTERN C

$u_1 = 7$

$u_2 = 10$

$u_3 = 13$

$u_4 = 16$

$u_5 = 19$

22, 25, 28

Find:

next 3 terms

$u_{20} = \underline{64}$

$u_{12} = 40$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Let's write a recursive formula for pattern E.

PATTERN E

$u_1 = 7$ $u_2 = 15$ $u_3 = 23$

$u_4 = 31$

$u_5 = 39$

Isn't there an EASIER way?????

Find:

next 3 terms

$u_{12} = \underline{\ \ \ }$

$u_\_ = 71$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Stand and Talk...

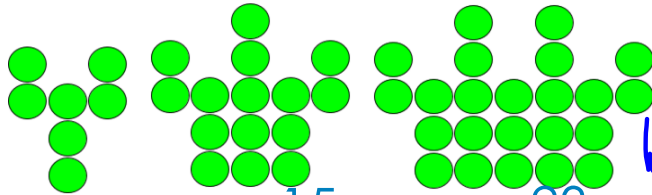## What is similar?

What is different?

What is similar?   What is different?

$$u_n = 1.37n + 2.27$$

$$y = 1.37x + 2.27$$

$$\begin{cases} u_0 = 2.27 \\ u_n = u_{n-1} + 1.37 \end{cases}$$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Let's write an **EXPLICIT** formula for pattern E.

PATTERN E

$U_4 = 31$

$U_5 = 39$

$U_6 \ 47 \quad U_7 \ 55$

$U_1 = 7 \quad U_2 = 15 \quad U_3 = 23 \quad$ <u>Find:</u>

$U_8 \ 63$

$U_9 \ 71$

$U_{12} = \underline{95}$

$U_9 = 71$

$8 \qquad 8$

$U_0 = -1$

$U_{12} = -1 + 8(12)$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

$U_n = -1 + 8n$

$71 = -1 + 8n$
$+1 \quad +1$
$\overline{\qquad\qquad}$
$72 = 8n$
$\overline{8} \quad \overline{8}$

Given the recursive rule, write the explicit formula and find the 15th term:

Recursive:

$U_1 = 4$

$U_n = U_{n-1} + 3$

Explicit:

$U_n = 1 + 3n$

$U_n = 4 + 3(n-1)$
$4 + 3n - 3$

15th term:

$U_{15} =$

$1 + 3(15)$

46

Recursive:

$U_0 = -6$

$U_n = U_{n-1} - 2$

Explicit:

$U_n = -6 - 2n$

15th term:

$U_{15} = -36$

$-6 - 2(15)$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Given the explicit formula, write the recursive rule: $3, 1, -1, -3, -5, -7, -9 -11, -13$

Explicit: **Recursive:**   **9th term:**

$u_n = -2n + 5$ $u_1 = 3$ $u_9 = -13$

$\downarrow\ u_0$ $u_n = u_{n-1} -2$ $-2(9) + 15$

Explicit: **Recursive:**   **9th term:**

$u_n = 3n$ $u_1 = 3$ $u_9 = 27$
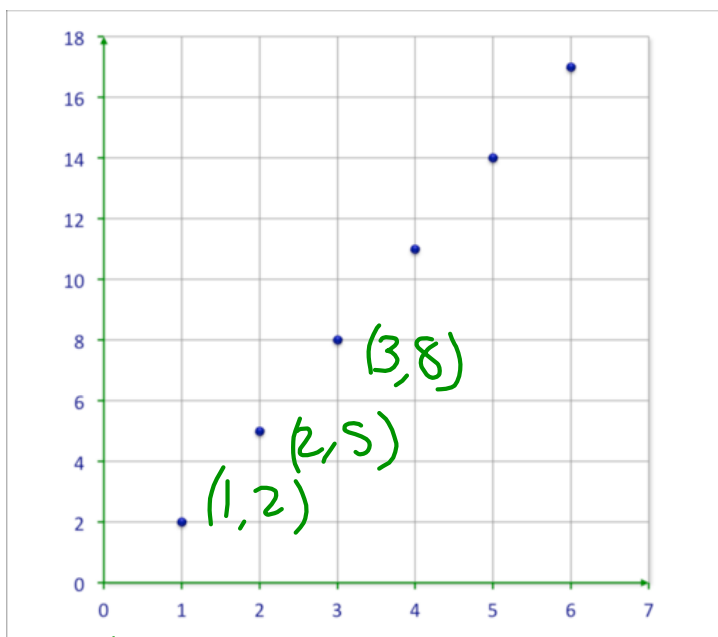
          $u_n = u_{n-1} +3$

$3,$

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

Write a recursive rule and an explicit formula from the graph:

$(3,8)$

$(2,5)$

$(1,2)$

Recursive:

$u_1 = 2$
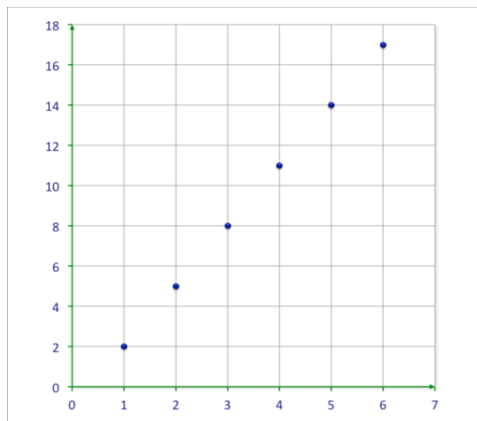
$u_n = u_{n-1} +3$

Explicit:

$u_n = -1 +3n$

Hint: write a list of terms

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

What do you notice about the shape of the graph? How is it similar to/different from graphs you are used to seeing?
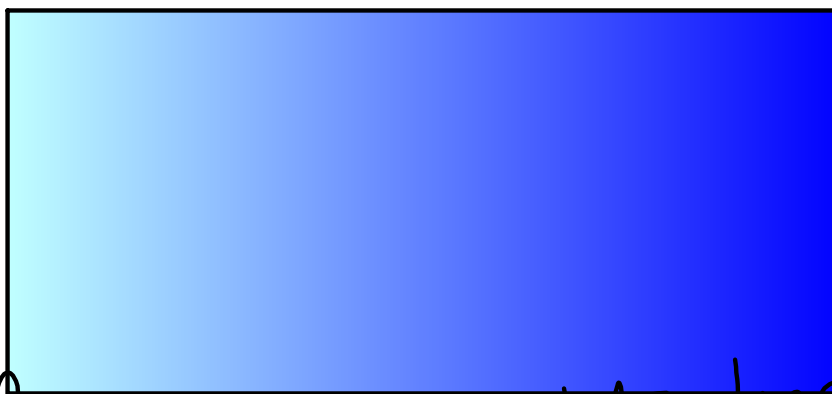
Recursive:

Explicit:

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear).

LT: I can write an equation for a linear function in ANY form (recursive, explicit, or linear)

What is the difference between the _graphs_ of sequence/explicit formulas and lines?

Un

Explict/Recursive   y - line

Did you meet the goal?

I can define orally and in writing: sequence, term (u_1), general term (u_n), recursive formula, recursive rule, arithmetic sequence, common difference

I can write the recursive formula for an arithmetic sequence.

I can read and write recursive formulas with subscript notation.

I can find terms of a sequence given recursively.

Mastery Work:

Worksheet #4

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10. APPLICATION Inspector 47 at the Zap battery plant keeps a record of which AA batteries she finds defective. Although the battery numbers at right do not make an exact sequence, she estimates an arithmetic sequence.

a. Write a recursive formula for an arithmetic sequence that estimates which batteries are defective. Explain your reasoning.

b. Predict the numbers of the next five defective batteries.

c. How many batteries in 100,000 will be defective?

Defective Batteries

255, 500, 773,
998, 1227, 1510,
1721, 2010,
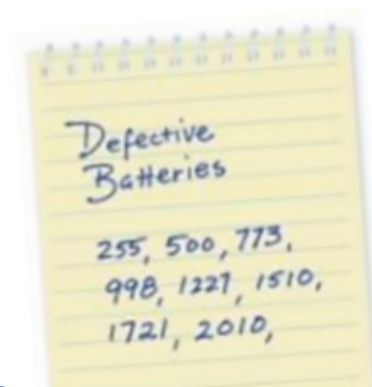
2010
2260
2510
2760
3010
3260
3

$U_1 = 250$

$U_n = U_{n-1} + 250$

$$\frac{4}{1000} = \frac{x}{100,000}$$

400

9. A car leaves town heading west at 57 km/h.

  a. How far will the car travel in 7 h?

  b. A second car leaves town 2 h after the first car, but it is traveling at 72 km/h. To the nearest hour, when will the second car pass the first?

	A	B
1	57	—
2	114	—
3	171	72
4	228	144
5	285	216
6	342	288
7	399	360
8	456	432
9	513	504
10	570	576