Warmup 4/(19)

1. **Write the explicit rule AND the recursive rule for the arithmetic sequence.**

   PLEASE GET:
   Calculator
   One giant whiteboard per pair

   3, 23, 43, 63, …

   Explicit: $a_n = 3 + 20(n -1)$
   Recursive: $f(1) = 3$;
   $\qquad f(n) = f(n-1)+20$

Find the indicated term of the arithmetic sequence.

10th term: 7, 17, 27, 37, …

97

Find the indicated term of the geometric sequence.

12th term: 4, 8, 16, 32, …

8192

Write the explicit rule AND the recursive rule for the arithmetic sequence.

15, 26, 37, 48, …

Explicit: $a_n = 15 + 11(n -1)$
Recursive: $f(1) = 15$;
$\qquad f(n) = f(n-1)+11$

Write the explicit rule AND the recursive rule for the arithmetic sequence.

29, 22, 15, 8, …

Explicit: $a_n = 29 - 7(n -1)$
Recursive: $f(1) = 29$;
$\qquad f(n) = f(n-1)-7$

The first four terms of a sequence are shown.

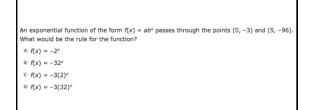$$-\frac{1}{2}, \quad -\frac{3}{10}, \quad -\frac{9}{50}, \quad -\frac{27}{250}, \dots$$

What is the formula for the sequence?

$a_n = -\frac{3}{5}\left(\frac{1}{2}\right)^{n-1}$

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Steve has a baseball collection valued at $525. The value increases by 1.2% annually. Create an equation that represents the value, *y*, of the collection after *t* years.

$$y = 525(1.012)^t$$

Per capita income is the total income for a geographic area
divided by the number of people in that area. In Florida, the per capita personal income (PCPI) of $30,098 is increasing at a rate of 3.6%. Find the PCPI after 8 years.
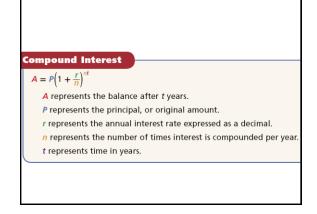
$y = 30,098(1.036)^x$; $39,940.70$

An exponential function of the form $f(x) = ab^x$ passes through the points (0, −3) and (5, −96). What would be the rule for the function?

A $f(x) = −2^x$

B $f(x) = −32^x$

C $f(x) = −3(2)^x$

D $f(x) = −3(32)^x$

C

Compound Interest

- **Compound Interest** is paid on the initial amount *and* interest already earned in the past.

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A represents the balance after *t* years.

P represents the principal, or original amount.

r represents the annual interest rate expressed as a decimal.

n represents the number of times interest is compounded per year.

t represents time in years.

Reading Math

For compound interest

- *annually* means "once per year" ($n = 1$).
- *quarterly* means "4 times per year" ($n = 4$).
- *monthly* means "12 times per year" ($n = 12$).

Compound Interest

Billy puts $10,000 in a savings account. The interest rate for his bank is .8% compounded quarterly.

- Write an equation to model this situation.

    $f(t) = 10,000(1.002)^{4t}$

- How much will he have in his account in five years?

    $10,407.69

Compound Interest

Kiptyn has $5000 on his credit card statement that he has not paid off. His credit card company charges 15% interest compounded monthly.

- Write an equation to model this situation.

    $K(t) = 5000(1.0125)^{12t}$

- How much will he owe in three years?

    $7819.72

- How much more is this than the amount he would have paid if he had not procrastinated his payment? $2819.72

Compound Interest

Ben puts $5,000 in a savings account. The interest rate for his bank is 9% compounded annually.

- Write an equation to model this situation.

    $f(t) = 5,000(1.09)^{t}$

- How much will he have in his account in three years? $6,475.15

- How much money will he have if he deposited $6,000 for 3 years?

    $1,295.02

Compound Interest

Ron has $6500 on his credit card statement that he has not paid off. His credit card company charges 24% interest compounded monthly.

- Write an equation to model this situation.

    $K(t) = 6500(1.02)^{12t}$

- How much will he owe in 7 years?

    $34,302.66

- How much more is this than the amount he would have paid if he had not procrastinated his payment? $27802.66