1.1 Recursive Formulas
Sequences & Series

Write a formula for the recursive function

a) find a common difference (2^{nd} term − 1^{st} term)
or
common ratio (geometric) $\left(\frac{2^{nd}\text{ term}}{1^{st}\text{ term}}\right)$

b) write formula

ex1 $-15, -11, -7, -3, \ldots$

now find 10^{th} term=

ex1 $0, 1/6, 1/3, 1/2, \ldots$

now find 21^{st} term=

ex1 $12.7, 16.8, 20.9, 25, \ldots$

now find 31^{st} term=

Proportions

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

1. what % is 30 out of 72?

2. 17 is 85% of what #?

3. 28% of 210 is what #?

HW p34 #1-4, 5 ace, 8, 10, 11, 12, 15

1.2 Growth and Decay

Geometric Sequences

r = pattern #

* Growth $r > 1$ * $U_n = r U_{n-1}$
* Decay $0 < r < 1$

Find the recursive formula and the 12th term.

ex1) $-24, -16, -8, \ldots$

ex2) $7, 21, 63, 189, \ldots$

ex3) $2.8, 1.4, .7, .35, \ldots$

To find % change:

$$\frac{\text{difference b/w terms}}{\text{original amt}} = \frac{\%}{100}$$

Find % change for ex 2 & 3.

Formulas:

Growth $U_n = (1 + \%) U_{n-1}$

Decay $U_n = (1 - \%) U_{n-1}$

Constant $U_n = 1 \cdot U_{n-1}$

GCF Factoring or Combine Like Terms

$U_{n-1} + .029U_{n-1}$ $\quad$ $B - .12B$

A Car depreciates at 4% per year. The car initially cost $21,500. Find the value after..

One year:
Five year:
Ten year:

Alan invests $64,000 in an account that pays 6% annual interest. If his investment is compounded monthly, find the amount after..

Seven months:
18 months:

Suppose quarterly:
weekly:

HW: pg 41 1-10, 12ac, 18-20

1.3 First Look at Limits

* Arithmetic: add/subtract same # to previous term
* Geometric: multiply same # to previous term
* Shifted Geometric: multiply by same # and add/subtract by same #.

Label & give common difference/ratio.

Ex| $u_0 = 48$
$u_n = (1 - .2)u_{n-1} + 10$

Ex| $u_0 = 50$
$u_n = u_{n-1} - 3$

Ex| $u_0 = 72$
$u_n = 1.5u_{n-1}$

Solve: $x = .04x + 60$

$w = 17 + w$

$z = .42z$

Find the long run value: Use Calculator

① switch mode to seq: enter: table

or

② enter on home screen; use "enter" many times

ex] $u_0 = 60$
$u_n = .8u_{n-1} + 20$

nMin=
u(n)=
u(nMin)=

long run =

ex] $u_0 = 36$
$u_n = .2u_{n-1}$

long run =

On Sept 2, 2017, Nelly invested $30,000 in an account earning 2.4% annually, compounded monthly. A month later she withdrew $50 and continued to withdraw $50 on the 2nd of every month.

a) write a recursive formula
b) list the 1st 5 terms.

c) what does u_5 represent?
d) what is the balance on Sept 2, 2018?
Sept 2, 2019?

1.5 Loans & Investments

Assume the sequence generated by $u_0 = 450$ and $u_n = (1 + .039)u_{n-1} + 50$ represents a financial situation and n is measured in years.

(1)

a) Is this a loan or an investment? Why?

b) What is the principle?

c) What is the deposit or payment amount?

d) What is the annual interest rate?

e) What is the frequency with which interest is compounded?

(2) Same ?'s as above use: $u_0 = 500$ and $u_n = (1 + \frac{.04}{4})u_{n-1} - 25$

a)

b) c) d) e)

(3) Find the first month's interest on a $32,000 loan at an annual interest rate of

a) 4.9%

b) 5.9%

c) 6.9%

d) 7.9%

(4) Write a recursive formula for each financial situation.

a) You borrow $10,000 at an annual interest rate of 10%, compounded monthly, and each payment is $300.

b) You buy $7,000 worth of furniture on a credit card with an annual interest rate of 18.75% compounded monthly. You plan to pay $250 each month.

HW: p 64 5-7, 9, 10, 12, 15