Section 1.5 Compound Interest

- Review of Geometric growth
- Use Shifted Geometric seq.
- Apply Sequences to Money

Darcy bought a new car. She got a loan for $20,000. She is charged 2.4% ~~annual~~ interest compounded monthly. She plans to pay $300 per month to pay off the loan.

- Will she have it paid of after 5 yrs?
- How long does it take to pay off the loan?
- How much did she spend on the car?
- What monthly payment would she need to pay it off in 4 yrs?

$U_0 = 20,000$

$u_n = \frac{2.4\%}{} u_{n-1} - 300 \Rightarrow$

$1 + \frac{2.4}{100}$

$2.4 \neq 2.4\%$

$001 \ of \ 100$

$U_0 = 20,000$

$u_n = \left(1 + \frac{0.024}{12}\right) u_{n-1} - 300$

$2.4\% = \frac{2.4}{100} = 0.024$

Darcy bought a new car. She got a loan for $20,000. She is charged 2.4% **annual** interest compounded monthly. She plans to pay $300 per month to pay off the loan.

a) — Will she have it paid off after 5 yrs?

b) — How long does it take to pay off the loan?

c) — How much did she spend on the car?

d) — What monthly payment would she need to pay it off in 4 yrs?

$u_0 = 20,000$

$n = $ # of months
$u_n = $ what Darcy owes

$$u_n = \left(1 + \frac{0.024}{12}\right) u_{n-1} - 300, \quad n \geq 1$$

a) $5 \text{ yrs} \times \frac{12 \text{ month}}{1 \text{ yr}} = 60 \text{ months} = n$

$u_{60} = \$3442.57$

b)

c) $71(300) + 186 = $

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a) Will she have it paid off after 5 yrs? ⇒

b) How long does it take to pay off the loan?

c) How much did she spend on the car?

d) What monthly payment would she need to pay it off in 4 yrs?

$$\begin{cases} u_0 = 20000 \\ u_n = \left(1 + \dfrac{0.024}{12}\right)u_{n-1} - 300, \ n \geq 1 \end{cases}$$

$$\frac{2.4\%}{12} = 0.2\% \ \left(\text{div} \atop 100\right)$$

$$0.002$$

$n = \#$ months

$u_n =$ what she owes

$$u_{60} = \$3442.97$$

Darcy bought a new car. She got a loan for $20,000. She is charged 2.4% interest compounded monthly. She plans to pay $300 per month to pay off the loan.

a) Will she have it paid off after 5 yrs?

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$$\frac{2.4\%}{12} = \frac{0.024}{12} = 0.002$$

$$u_0 = 20000$$

$$u_n = u_{n-1}(1 + 0.002) - 300, \quad n \geq 1$$

$n = \#$ of month

$u_n = $ ammount owed

a) $5 \text{ yrs} \cdot \frac{12 \text{ mo}}{1 \text{ yr}} = 60 \text{ mo.} = n$ $U_{60} =$

graph

$u_0 = 12$

$u_n = (1 + 0.13)u_{n-1} - 20 \quad , \quad n \geq 1$

$nMin = 0$

$u(n) = (1 + 0.13)u(n-1) - 20$

$u(nMin) = 12$

graph

n	0	1	2	3	4	5
a_n	40,	60,	75,	85,	92,	100, ...

STAT