

U5D5 Exponential Models

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U5D5
Exponenti...

Unit 5 Lesson 5

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Exponential Model (Growth) - Return on Investment

$A = P(1+i)^n$ $A \rightarrow$ Amount (includes principal & interest)
 $P \rightarrow$ Principal (amount invested or borrowed)
 $i \rightarrow$ interest rate as a decimal
 $n \rightarrow$ number of years

MAP4C1: Graphical Models * This will be more complicated in Unit 7.

You have invested \$5000 in a GIC that earns 6.5% per year compounded annually. Complete the table below and graph the amount your investment is worth at the end of each year.

$A = 5000(1.065)^n$

Date	n	Value (\$)	Ratio
2008	0	\$5,000	
2009	1	5325	1.065
2010	2	5671	1.064
2011	3	6039	1.064
2012	4	6432	1.065
2013	5	6850	1.065
2014	6	7295	1.065
2015	7	7769	1.065
2016	8	8274	1.065

First Diff. (handwritten): 325, 346, 368, 393, 418, 445, 474, 505

For the ratio column, use the first differences - it's like calculating second differences but you divide instead of subtracting.

chop off decimal instead of rounding

1. Is this relationship exponential?
Yes
How can you tell?

2. How long will it take for your investment to double in value?

from graph \rightarrow curve
 from table \rightarrow ratio column
 constant or close to constant (because of chopped values)
 from equation \rightarrow variable in exponent

2. From graph 11 years.

Rule of 72

$72 \div$ Compound interest rate

$72 \div 6.5 = 11.08$ years to double

$A = 5000(1.065)^{11}$ $A = 5000(1.065)^{12}$

$A \approx 9996$ $A = 10645$

\therefore it takes about 11 years to double.