

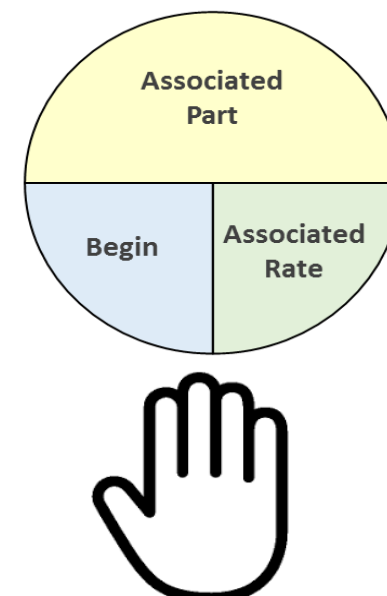
Excel & Business Math
Video/Class Project #23
Important Formulas for Increase & Decrease Problems: (8 Awesome Examples)

Topics

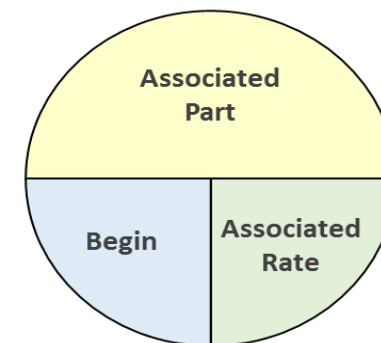
1) Increase Decrease Problems	1
2) Increase Example with: Table Method, Diagram Method and List of all Formulas	2
3) Decrease Example with: Table Method, Diagram Method and List of all Formulas.....	3
4) Example 1: Stock Market Drop.....	4
5) Example 2: Go to Yahoo Finance to get Market Values.....	5
6) Example 3: Iowa Farm Value Example	6
7) Example 4: Markdown and Markup Examples.....	7
8) Example 5: Last Year's Sales Example	8
9) Example 6: Stock Prices for Individual Stocks	9

	A	B	C	D	E	F	G
1	Increase / Decrease Problems:						
2	Problems where you have a Begin amount that changes over time, either up or down (increase or decrease), and results in an End amount.						
3	Think of house prices, stock value, earnings for a company, savings account balances...						
4							
5	Basic Change Formula: Begin Amount + Change (up or down) = End Amount.						
6	Increase example: 100 + 10 = 110						
7	Decrease example: 100 + -10 = 90						
8							
9							
10	Increase in Your Savings Account						
11	Begin Amount	Change	End Amount				
12	\$100.00	\$10.00	\$110.00	=A12+B12			
13							
14	Decrease in Your Savings Account						
15	Begin Amount	Change	End Amount				
16	\$100.00	-\$10.00	\$90.00	=A16+B16			

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Increase Example:												
2													
3	Savings	\$100					\$110						
4	Account	Begin of Month					End of Month			Time			
5													
6	Increase / Decrease Formula Terms:												
7													
8	Old Term:	New Terms:	New Terms:	Formula									
9	Base =	Begin (Base) =	Begin	Begin	\$100	100.00%	** Begin is always 100%						
10	Part =	End (Part) =	End Part	End Part	\$110								
11	Rate =	Rate =	Rate	End Part/Begin	1.1	110.00%	** Rate is what you multiply by Begin to get End Part						
12		Change (Part) =	Change Part	End Part - Begin	\$10		** Sign tells you whether the problem is an Increase (+) or Decrease (-)						
13		Rate of Change (ROC) =	ROC	Change Part/Begin	0.1	10.00%	** Rate of Change is what you multiply by Begin to get Change Part						
14													
15			Test Rates:										
16			End Part	Begin*Rate	\$110	Check ✓	=E9*E11						
17			Change Part	Begin*ROC	\$10	Check ✓	=E9*E13						
18													
19	Draw a Picture to help you "see" Increase Problem and relationship between Terms:												
20													
21			End Part	Change Part	Rate	ROC							
22			\$110	\$10	110.00%	10.00%							
23				Begin		Begin							
24				\$100		100%							
25													
26													
27													
28			Totals	\$110	110.00%								
29													
30	With these relationships between the terms and numbers, we can create many different formulas:												
31													
32	Term:	Formula:	Result										
33	Begin	End Part - Change Part	\$100										
34	Begin	End Part/Rate	\$100										
35	Begin	Change Part/ROC	\$100										
36	End Part	Begin * Rate	\$110										
37	End Part	Begin * (1 + ROC)	\$110										
38	End Part	Begin + Change Part	\$110										
39	Rate	End Part/Begin	110%										
40	Rate	1 + ROC	110%										
41	Change Part	End Part - Begin	\$10										
42	Change Part	Begin * ROC	\$10										
43	ROC	(End Part - Begin)/Begin	10%										
44	ROC	End Part/Begin - 1	10%										
45	ROC	Rate - 1	10%										
46													



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Decrease Example:												
2													
3	Savings	\$100					\$90						
4	Account	Begin of Month					End of Month		Time				
5													
6	Increase / Decrease Formula Terms:												
7													
8	Old Term:	New Terms:	New Terms:	Formula									
9	Base =	Begin (Base) =	Begin		\$100	100.00%	** Begin is always 100%						
10	Part =	End (Part) =	End Part		\$90								
11	Rate =	Rate =	Rate	End Part/Begin	0.9	90.00%	** Rate is what you multiply by Begin to get End Part						
12		Change (Part) =	Change Part	End Part - Begin	-\$10		** Sign tells you whether the problem is an Increase (+) or Decrease (-)						
13		Rate of Change (ROC) =	ROC	Change Part/Begin	-0.1	-10.00%	** Rate of Change is what you multiply by Begin to get Change Part						
14													
15			Test Rates:										
16			End Part	Begin*Rate	\$90	Check ✓							
17			Change Part	Begin*ROC	-\$10	Check ✓							
18													
19	Draw a Picture to help you "see" Decrease Problem and relationship between Terms:												
20													
21	Begin	\$100	Change Part	0	ROC								
22			-\$10	100.00%	-10.0%								
23			End Part		Rate								
24			\$90		90%								
25													
26													
27													
28	Totals	\$90			90.00%								
29													
30	With these relationships between the terms and numbers, we can create many different formulas:												
31													
32	Term:	Formula:	Result										
33	Begin	End Part - Change Part	\$100										
34	Begin	End Part/Rate	\$100										
35	Begin	Change Part/ROC	\$100										
36	End Part	Begin * Rate	\$90										
37	End Part	Begin * (1 + ROC)	\$90										
38	End Part	Begin + Change Part	\$90										
39	Rate	End Part/Begin	90%										
40	Rate	1 + ROC	90%										
41	Change Part	End Part - Begin	-\$10										
42	Change Part	Begin * ROC	-\$10										
43	ROC	(End Part - Begin)/Begin	-10%										
44	ROC	End Part/Begin- 1	-10%										
45	ROC	Rate - 1	-10%										
46													



=C24-C22
 =C24/E24
 =C22/E22
 =B22*E24
 =B22*(1+E22)
 =B22+C22
 =C24/B22
 =1+E22
 =C24-B22
 =B22*E22
 =(C24-B22)/B22
 =C24/B22-1
 =E24-1

	A	B	C	D	E	F	G	H
1	The Nightly News reported that on Monday 2/5/2018, the DJI Stock Market fell by 4.605% with the largest dollar value drop in its history of \$1,175.21.							
2	What was the starting Stock Market Value and the Ending Stock Market value?							
3								
4								
5	Terms:	Description	Formula	Amount				
6	Begin	\$ Value of DJI Stock Market at Begin of Day	End Part/Rate	\$25,520.30	=D9/D10	Term:	Formula:	
7	End Part	\$ Value of DJI Stock Market at End of Day	Rate * Begin	\$24,345.09	=D6*D8	Begin	End Part - Change Pa	
8	Rate	% we multiply by Begin to get End	1+ ROC	95.395%	=1+D10	Begin	End Part/Rate	
9	Change Part	\$ Amount drop in DJI Stock Market		-\$1,175.21		Begin	Change Part/ROC	
10	Rate of Change (ROC)	% drop in DJI Stock Market		-4.605%		End Part	Begin * Rate	
11						End Part	Begin * (1 + ROC)	
12	End Part = Begin + Change Part		Check:	\$24,345.09	=D6+D9	End Part	Begin + Change Part	
13	ROC = End Part / Begin -1		Check:	-0.04605	=D7/D6-1	Rate	End Part/Begin	
14								
15	Begin	Change Part	Begin	Rate of Change (ROC)		Rate	1 + ROC	
16	\$25,520.30	-\$1,175.21	100.00%	-4.61%		Change Part	End Part - Begin	
17		End Part		Rate		Change Part	Begin * ROC	
18		\$24,345.09		95.40%		ROC	(End Part - Begin)/Be	
19						ROC	End Part/Begin- 1	
20						ROC	Rate - 1	
21								
22	Total	\$24,345.09		95.40%				
23								

	A	B	C	D	E	F	G	H	I	J	K
1	You suspected that the Nightly News report on Monday 2/5/2018 round the percent used to describe the stock market fall ("the DJI Stock Market fell by 4.605%")										
2	So you went to Yahoo Finance (https://finance.yahoo.com/) and looked up the actual Start and End Stock Market Values so you could calculate the unrounded % fall in the market.										
3											
4											
5	Terms:	Description	Formula	Amount							
6	Begin	DJI Stock Market Value before open		25,520.96							
7	End Part	DJI Stock Market Value after close		24,345.75							
8	Rate	What you multiply by Begin to get End	End Part /Begin	0.953951184	=D7/D6						
9	Change Part	DJI Stock Market \$ Drop in Value	End Part - Change	-1,175.21							
10	Rate of Change (ROC)	DJI Stock Market % Drop in Value	Rate - 1	-0.046048816	=D8-1						
11											
12	ROC = Change/Begin		Check:	-0.046048816	=D9/D6						
13	Check if two ROC are equal		Check:	TRUE	=D12=D10						
14											
15	Begin	Change Part	Begin	Rate of Change (ROC)							
16	\$25,520.96	-\$1,175.21	100.00%	-0.046048816							
17		End Part		Rate							
18		\$24,345.75		0.953951184							
19											
20											
21											
22	Total	\$24,345.75		0.953951184							
23											

Term:	Formula:
Begin	End Part - Change Part
Begin	End Part/Rate
Begin	Change Part/ROC
End Part	Begin * Rate
End Part	Begin * (1 + ROC)
End Part	Begin + Change Part
Rate	End Part/Begin
Rate	1 + ROC
Change Part	End Part - Begin
Change Part	Begin * ROC
ROC	(End Part - Begin)/Begin
ROC	End Part/Begin- 1
ROC	Rate - 1

Term:	Formula:
Begin	End Part - Change Part
Begin	End Part/Rate
Begin	Change Part/ROC
End Part	Begin * Rate
End Part	Begin * (1 + ROC)
End Part	Begin + Change Part
Rate	End Part/Begin
Rate	1 + ROC
Change Part	End Part - Begin
Change Part	Begin * ROC
ROC	(End Part - Begin)/Begin
ROC	End Part/Begin- 1
ROC	Rate - 1

	A	B	C	D	E	F	G	H	I
1	The value of Iowa farmland increased 4.3% this year to a statewide average value of \$1857 per acre. How much per acre did the Iowa farmland increase this year (Round to the dollar).								
2									
3	Terms:	Description	Formula	Amount					
4	Begin	Iowa farmland statewide average value at Start of Year	End Part/Rate	\$1,780.44	=D5/D6				
5	End Part	Iowa farmland statewide average value at End of Year		\$1,857.00					
6	Rate	What you multiply by Begin to get End	1 + ROC	104.30%	=1+D8				
7	Change Part	Increase in Iowa farmland ave. value	End Part- Begin	\$76.56					
8	Rate of Change	% Increase in Iowa farmland statewide average value for year		4.30%					
9									
10	Change = Begin * ROC		Check:	\$76.56	=D4*D8				
11	End = Begin + Change		Check:	\$1,857.00	=D10+D4				
12									
13	End Part	Change Part	Rate	Rate of Change					
14	\$1,857.00	\$76.56	104.30%	4.30%					
15		Begin		Begin					
16		\$1,780.44		100.00%					
17									
18									
19									
20	Total	\$1,857.00		104.30%					
21									

Change Part Round to Dollar
\$77.00 =ROUND(D7,0)

Term:	Formula:
Begin	End Part - Change Part
Begin	End Part/Rate
Begin	Change Part/ROC
End Part	Begin * Rate
End Part	Begin * (1 + ROC)
End Part	Begin + Change Part
Rate	End Part/Begin
Rate	1 + ROC
Change Part	End Part - Begin
Change Part	Begin * ROC
ROC	(End Part - Begin)/Begin
ROC	End Part/Begin- 1
ROC	Rate - 1

	A	B	C	D
1	Markdown			
2	Original price of the Lego set	\$10.50	Begin	
3	Markdown	-10%	ROC	
4	Reduced Price	\$9.45	End = Beg *(1+ROC)	=B2*(1+B3)
5				
6	Check:	90%	Rate = 1 + ROC	=1+B3
7	Check:	\$10.50	Begin = End Part / Rate	=B4/B6
8				
9	Markup			
10	Original price for generator before Seattle Wind Storm	\$600.00		
11	Markup	20%		
12	New Price	\$720.00	End = Beg *(1+ROC)	=B10*(1+B11)
13				
14	Check:	\$120.00	Amount of Change	=B10*B11
15	Check:	\$600.00	Begin = Change Part/ROC	=B14/B11
16				

	A	B	C	D	E	F	G	H
1	The Nightly News reported that the GE Company has sales this year that were 87.5% of last year's sales.							
2	If last year's sales were \$5,350,500,000, what were this year's sales? What was the Rate of Change?							
3								
4								
5								
6	Terms:	Description	Formula	Amount				
7	Begin	Last Year's Sales		\$5,350,500,000.00				
8	End Part	This Year's Sales	Rate * Begin	\$4,681,687,500.00	=D7*D9			
9	Rate	What you multiply Begin by to Get End (How Many Pennies This Year for Every \$1 Last Year)		87.50%				
10	Change Part	\$ amount that Sales dropped from Last Year	End Part - Begin	-\$668,812,500.00				
11	Rate of Change (ROC)	% that Sales dropped from Last Year	Rate - 1	-12.50%	=D9-1			
12								
13		Change Part = ROC * Begin	Check:	-\$668,812,500.00	=D11*D7			
14		ROC = Change Part/ Begin	Check:	-0.125	=D13/D7			
15								
16	Begin	Change Part	Begin	Rate of Change (ROC)				
17	\$5,350,500,000.00	-\$668,812,500.00	100.00%	-12.50%				
18		End Part		Rate				
19		\$4,681,687,500.00		87.50%				
20								
21								
22								
23	Total	\$4,681,687,500.00		87.50%				
24								

	A	B	C	D	E	F	G	H
1	Company Name	Stock Symbol	3/1/2007 Price	2/5/2018 Current Price	Rate of Change or % Over Period		Check	End Part $/(1 + \text{ROC})$
2	Amazom.com	AMZN	38.85	1390.00	3477.86%		1390	
3	McDonald's	MCD	44.10	163.85	271.54%		163.85	
4	Merck	MRK	43.99	56.40	28.21%		56.4	
5	Citigroup	C	51.08	73.27	43.44%		73.27	
6	Microsoft	MSFT	28.09	88.00	213.28%		88	
7	Bank of America	BAC	50.38	30.26	-39.94%		30.26	
8	Wal-Mart	WMT	47.89	100.09	109.00%		100.09	
9								
10	Company Name	Stock Symbol	1/31/2018 Price	2/5/2018 Current Price	Rate of Change or % Over Period		Check	
11	Amazom.com	AMZN	1450.89	1390.00	-4.20%		1390	
12	McDonald's	MCD	171.14	163.85	-4.26%		163.85	
13	Merck	MRK	59.25	56.40	-4.81%		56.4	
14	Citigroup	C	78.16	73.27	-6.26%		73.27	
15	Microsoft	MSFT	95.01	88.00	-7.38%		88	
16	Bank of America	BAC	32.00	30.26	-5.44%		30.26	
17	Wal-Mart	WMT	106.60	100.09	-6.11%		100.09	
18								