MDX Quick Start Workshop

Contents

IMPORTANT: Before the class

Prepare the ASOSamp.Sample database
Estimated time: 20 minutes

Requirements:

- Client computer with Essbase Administration Services (V9 or higher)
- Access to an Essbase Server from the above client machine (V9 or higher)
- ASOSamp.Sample installed on the Essbase server (with data loaded)
- Read Access to ASOSamp.Sample

Setup

Set up is easy and we are here to help. It should take no more than 20 minutes. Please complete the setup before the class. Due to the short class duration we won't have time for setup issues during the class.

High level instructions are below. If you need more detailed insutructions or additional help
www.mtgny.com/MDXQuickStart

1. Verify that the ASOSamp.Sample database is installed

- The exercises use ASOSamp.Sample database which is usually automatically created when Essbase is installed.
- If ASOSamp.Sample database is not available on your system please check with your administrator. MTG can send you a copy and give you installation instructions.

2. Verify that the data is loaded

- The data file **dataload.txt** should be loaded using the **dataload.rul** rule file.
- The data file and rule file are both located in the ASOSamp.Sample database directory.

3. Add these members to the Measures dimension under Ratios

- Price Paid per Unit
- Trans Pct of Parent
- Trans Pct of Region
- Trans Pct of Parent Geo x Prod
- Trans Pct of Region x Prod Fam
- Change in units from prior period
- Change in units from 2 periods earlier
- Change in units from previous year

4. Add these members names to the Years dimension

- Year to Date
- Quarter to Date

Done

MDX Exercises

Notes:
1. All exercises use the ASOSamp.Sample database provided with your Essbase software
2. Unless specified the data is generation 1 for missing dimensions

Exercise 1: Basic MDX Queries

Using the Admin Console MDX Editor ASOSamp.Sample database, return the following reports.

(Jan)
7498269.25

Axis-1	(Jan)
(Items per Package)	42228

Axis-1	(Jan)	(Feb)	(Mar)	(Qtr1)
(Items per Package)	42228	20841	31434	94503
(No. of Packages)	44500	22038	33505	100043

All data Is North East

Axis-1	(Jan)	(Feb)	(Mar)	(Qtr1)
(Items per Package)	23967	11755	17804	53526
(No. of Packages)	25097	12420	19030	56547

Exercise 2: Tuples and Sets

Using the Admin Console MDX Editor ASOSamp.Sample database, return the following reports.

All data Is North East

Axis-1	(Previous Year, Qtr4)	(Current Year, Qtr1)
(Items per Package)	65751	53526
(No. of Packages)	68192	56547

All data Is North East, Online

Axis-1	(Previous Year, Qtr4)	(Current Year, Qtr1)
(Items per Package)	12940	10627
(No. of Packages)	13485	11301

Exercise 3: Useful Properties and Functions

3.1

Axis-1	(Teens)	(Adults)	(Senior)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	3815627.75	12322232	5487260.75
(South)	2816626.5	9470542.25	4108250
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 1 members
Rows	Children of geography

3.2

Axis-1	(Teens)	(Adults)	(Senior)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	3815627.75	12322232	5487260.75
(South)	2816626.5	9470542.25	4108250
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 2 members
Rows	Children of geography

Exercise 4: Hierarchical References

NOTE: some reports are truncated due to size

4.1

Axis-1	(Jan)	(Feb)	(Mar)
(Geography)	7498269.25	3543554	5625366.5

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Geography (gen 1)

4.2

Axis-1	(Jan)	(Feb)	(Mar)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(South)	3289067.25	1515653.25	2360549.5
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Children of Geography

4.3

Axis-1	(Jan)	(Feb)	(Mar)
(North East)	4209202	2027900.75	3264817
(CONNECTICUT)	280095.5	115321.25	175459
(ANDOVER - CT)	#Missing	#Missing	#Missing
(06232)	#Missing	#Missing	#Missing
(ASHFORD - CT)	3942.75	460.5	7100
(06278)	3942.75	460.5	7100
(AVON - CT)	1488	1241.5	3657
(06001)	1488	1241.5	3657
(BALLOUVILLE - CT)	1699.25	1463	2302.5
(06233)	1699.25	1463	2302.5
(BISHOPS CORNER - CT)	2963.5	2001	1576.5
(06137)	2963.5	2001	1576.5
(BRANFORD - CT)	5796.5	1411	1403.5
(06405)	5796.5	1411	1403.5
(BRIDGEPORT - CT)	11221	6698.5	11394.25
(06601)	#Missing	#Missing	#Missing
(06604)	3032.5	2950.25	4252.25
(06605)	2399.25	1209.25	2907
(06608)	5789.25	2539	4235
(BRIDGEWATER - CT)	#Missing	#Missing	#Missing

…Truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Descendants of North East

4.4

Axis-1	(Jan)	(Feb)	(Mar)
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5
(NEW JERSEY)	374109	161985.75	292829.25
(NEW YORK)	1198388.75	594100.5	1035128
(PENNSYLVANIA)	1284926	624394.75	902230.75
(RHODE ISLAND)	53299.25	20455	63535.5

… Truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 2 layers down from Geography

4.5

Axis-1	(Jan)	(Feb)	(Mar)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(South)	3289067.25	1515653.25	2360549.5
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 1 layer down from Geography

4.6

Axis-1	(Jan)	(Feb)	(Mar)
(Geography)	7498269.25	3543554	5625366.5
(Central)	#Missing	#Missing	#Missing
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 2 layers down from Geography and higher

4.7

Axis-1	(Jan)	(Feb)	(Mar)
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5
(NEW JERSEY)	374109	161985.75	292829.25
(NEW YORK)	1100000.75	504100.5	1025100

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members of the Geography dimension at the State generation. State is a generation name.

4.8

Axis-1	(Jan)	(Feb)	(Mar)
(ANDOVER - CT)	#Missing	#Missing	#Missing
(06232)	#Missing	#Missing	#Missing
(ASHFORD - CT)	3942.75	460.5	7100
(06278)	3942.75	460.5	7100
(AVON - CT)	1488	1241.5	3657
(06001)	1488	1241.5	3657
(BALLOUVILLE - CT)	1699.25	1463	2302.5
(06233)	1699.25	1463	2302.5
(BISHOPS CORNER - CT)	2963.5	2001	1576.5
(06137)	2963.5	2001	1576.5
(BRANFORD - CT)	5796.5	1411	1403.5
(06405)	5796.5	1411	1403.5
(BRIDGEPORT - CT)	11221	6698.5	11394.25
(06601)	#Missing	#Missing	#Missing
(06604)	3032.5	2950.25	4252.25
(06605)	2399.25	1209.25	2907
(06608)	5789.25	2539	4235
(BRIDGEWATER - CT)	#Missing	#Missing	#Missing
(06752)	#Missing	#Missing	#Missing
(CANTON - CT)	#Missing	#Missing	#Missing
(06019)	#Missing	#Missing	#Missing
(CLINTON - CT)	3257.75	3800	1291
(06413)	3257.75	3800	1291

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Descendants of North East , 2 or more layers down

4.9

Axis-1	(1 To 13 Years)	(14 To 19 Years)	(20 To 25 Years)	(26 To 30 Years)	(31 To 35 Years)	(36 To 45 Years)	(46 To 54 Years)	(55 To 64 Years)	(65+ Years)
(Central)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(North East)	2779136.75	1036491	2910199	2895101.25	2157849.75	2972812.25	1386269.75	3205426.75	2281834
(South)	2051927.25	764699.25	2274995	1997427.25	1746264.25	2393507.75	1058348	2412024	1696226
(South West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 0 members
Rows	Children of Geography

4.10

Axis-1	(Jan)	(Feb)	(Mar)
(NEW YORK)	1198388.75	594100.5	1035128

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	The State that contains NEW YORK – NY. State is a generation name

4.11

Axis-1	(Jan)	(Feb)	(Mar)
(ALTOONA - PA)	3285.25	1176.25	1833

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	They City that contains zip code 16601. Zip is a generation name.

Exercise 5: Cross Join

Axis-1	(Jan, Current Year)	(Jan, Previous Year)	(Feb, Current Year)	(Feb, Previous Year)	(Mar, Current Year)	(Mar, Previous Year)
(Original Price)	7498269.25	5627300.25	3543554	5697818	5625366.5	5742783.25
(Price Paid)	7477902.71	5611660.54	3485260.32	5612319.26	5607999.1	5726100.57
(Returns)	279484.66	54050.25	42012.7	72724.5	45537.43	75016.1
(Items per Package)	42228	31643	20841	31788	31434	31162
(No. of Packages)	44500	33160	22038	33866	33505	33133
(Avg Units/Transaction)	0.948943820224719	0.954252110977081	0.945684726381704	0.938640524419772	0.938188330099985	0.940512480004829
(% of Total)	0.193512756621833	0.0777918013634679	0.0958344748411673	0.0794480441789868	0.145699885631787	0.0777284606325628

Member Formulas

Note: In the spreadsheet displays missing dimensions are generation 1 unless otherwise specified.

Exercise 6: Hierarchical References

6.1 Hierarchical References in member formulae

Create the member formula for:

Price Paid per Unit = Price Paid / Units

	A	B	C	D
1		Price Paid	Units	Price Paid per Unit
2	Central	~	~	~
3	Mid West	~	~	~
4	North East	21477387.79	123442	173.9876848
5	South	16288276.97	94356	172.625768
6	South West	~	~	~
7	West	~	~	~
8	Geography	37765664.76	217798	173.3976655

6.2 Parents and Generations

Create the member formulas for:

Trans Pct of Parent = Transactions / Transactions in the parent on the geography dimension
Trans Pct of Region = Transactions / Transaction in the Region generation 2 of the geography dimension

View the data for the North East

	A	B	C	D
1		Transactions	Trans Pct of Parent	Trans Pct of Region
2	CT	7657	0.0589	0.0589
3	MA	13717	0.1054	0.1054
4	ME	9412	0.0723	0.0723
5	NH	3186	0.0245	0.0245
6	NJ	11037	0.0848	0.0848
7	NY	38976	0.2996	0.2996
8	PA	38368	0.2949	0.2949
9	RI	1912	0.0147	0.0147
10	VT	5838	0.0449	0.0449
11	North East	130103	0.5658	1.0000
12	Geography	229959	~	~

6.3 Parents and Generations on two dimensions

Create the member formula for:

Trans Pct of Parent Geo x Prod	Transactions/ Transactions at the parent level on products and Geography
Trans Pct of Region x Prod Fam	Transactions/ Transactions at generation 2 products and generation 2 geography

	A	B	C	D	E	F	G
1			CT	MA	ME	North East	Geography
2	Digital Cameras/Camcorders	Transactions	731	1,457	929	13,223	23,311
3	Digital Cameras/Camcorders	Trans Pct of Parent Geo x Prod	0.0071	0.0142	0.0091	0.0730	~
4	Digital Cameras/Camcorders	Trans Pct of Region x Prod Fam	0.0056	0.0112	0.0071	0.1016	~
5	Personal Electronics	Transactions	5,978	10,776	7,408	102,517	181,180
6	Personal Electronics	Trans Pct of Parent Geo x Prod	0.0459	0.0828	0.0569	0.4458	~
7	Personal Electronics	Trans Pct of Region x Prod Fam	0.0459	0.0828	0.0569	0.7880	~
8	All Merchandise	Transactions	7,657	13,717	9,412	130,103	229,959
9	All Merchandise	Trans Pct of Parent Geo x Prod	0.0589	0.1054	0.0723	0.5658	~
10	All Merchandise	Trans Pct of Region x Prod Fam	0.0589	0.1054	0.0723	1.0000	~
11							

Exercise 7: Leads, Lags and Period to Date

7.1 Leads and Lags

Create the member formulas for:

- Change in units from prior period
- Change in units from 2 periods earlier

	A	B	C	D
1		Units	Units Change	Units Change 2
2	Jan	42228	42228	42228
3	Feb	20841	-21387	20841
4	Mar	31434	10593	-10794
5	Apr	21402	-10032	561
6	May	41946	20544	10512
7	Jun	31449	-10497	10047
8	Jul	28498	-2951	-13448
9	Aug	~	-28498	-31449
10	Sep	~	~	-28498
11	Oct	~	~	~
12	Nov	~	~	~

7.2 More Leads and Lags

Create the member formulas for:

- Change in units from previous year.

Note: Consider only Current Year and Previous Year for this exercise.

	A	B	C	D
1		Curr Year	Prev Year	Prev Year
2		Units	Units	Units v Prior year
3	Jan	42228	31643	-10585
4	Feb	20841	31788	10947
5	Mar	31434	31162	-272
6	Apr	21402	38769	17367
7	May	41946	38000	-3946
8	Jun	31449	38567	7118
9	Jul	28498	38573	10075
10	Aug ~		38325	38325
11	Sep ~		38147	38147
12	Oct ~		38539	38539
13	Nov ~		38053	38053
14	Dec ~		38305	38305

7.3 Period to Date

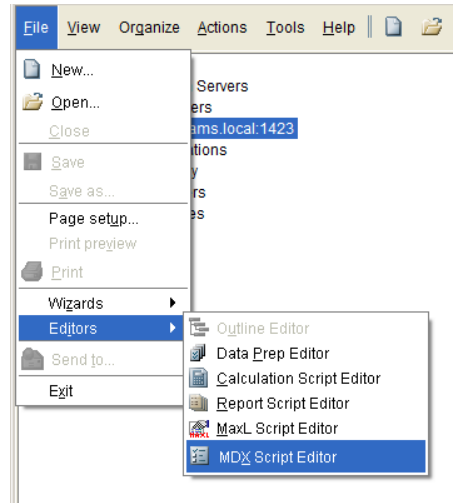Create the member formulas for:

- Year To Date
- Quarter to Date

	A	B	C	D
1		Curr Year	Year to Date	Quarter to Date
2	Jan	42,228	42,228	42,228
3	Feb	20,841	63,069	63,069
4	Mar	31,434	94,503	94,503
5	Apr	21,402	115,905	21,402
6	May	41,946	157,851	63,348
7	Jun	31,449	189,300	94,797
8	Jul	28,498	217,798	28,498
9	Aug ~		217,798	28,498
10	Sep ~		217,798	28,498
11	Oct ~		217,798	~
12	Nov ~		217,798	~
13	Dec ~		217,798	~

Exercise Solutions

Starting the EAS MDX Editor

From the Admin Console (EAS)
- Select a database (ASOSamp.Sample)
- select File | Editors | MDX Script Editor

Exercise 1: Basic MDX Queries

Using the Admin Console MDX Editor ASOSamp.Sample database, return the following reports.

Unless specified the data is generation 1 for missing dimensions.

(Jan) 7498269.25	SELECT {[Jan]} ON COLUMNS FROM [ASOSAMP].[SAMPLE]
Axis-1 (Jan) (Items per Package) 42228	SELECT {[Jan]} ON COLUMNS, {[Items per Package]} ON ROWS FROM [ASOSAMP].[SAMPLE]
Axis-1 (Jan) (Feb) (Mar) (Qtr1) (Items per Package) 42228 20841 31434 94503 (No. of Packages) 44500 22038 33505 100043	SELECT {[Jan],[Feb],[Mar],[Qtr1]} ON COLUMNS, { [Items per Package], [No. of Packages]} ON ROWS FROM [ASOSAMP].[SAMPLE]
All data Is North East Axis-1 (Jan) (Feb) (Mar) (Qtr1) (Items per Package) 23967 11755 17804 53526 (No. of Packages) 25097 12420 19030 56547	SELECT {[Jan],[Feb],[Mar],[Qtr1]} ON COLUMNS, { [Items per Package], [No. of Packages]} ON ROWS FROM [ASOSAMP].[SAMPLE] WHERE ([North East])

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Exercise 2: Tuples and Sets

Using the Admin Console MDX Editor ASOSamp.Sample database, return the following reports.

Unless specified the data is generation 1 for missing dimensions.

All data Is North East	SELECT {([Previous Year],[Qtr4]), ([Current Year],[Qtr1])} ON COLUMNS, { [Items per Package], [No. of Packages]} ON ROWS FROM [ASOSAMP].[SAMPLE] WHERE ([North East])

Axis-1	(Previous Year, Qtr4)	(Current Year, Qtr1)
(Items per Package)	65751	53526
(No. of Packages)	68192	56547

All data Is North East, Online	SELECT {([Previous Year],[Qtr4]), ([Current Year],[Qtr1])} ON COLUMNS, { [Items per Package], [No. of Packages]} ON ROWS FROM [ASOSAMP].[SAMPLE] WHERE ([North East],[Online])

Axis-1	(Previous Year, Qtr4)	(Current Year, Qtr1)
(Items per Package)	12940	10627
(No. of Packages)	13485	11301

Exercise 3: Useful Properties and Functions

3.1

Axis-1	(Teens)	(Adults)	(Senior)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	3815627.75	12322232	5487260.75
(South)	2816626.5	9470542.25	4108250
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 1 members
Rows	Children of geography

SELECT { [Age].levels(1).members} ON COLUMNS,
{[Geography].children} ON ROWS
FROM [ASOSAMP].[SAMPLE]

3.2

Axis-1	(Teens)	(Adults)	(Senior)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	3815627.75	12322232	5487260.75
(South)	2816626.5	9470542.25	4108250
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 2 members
Rows	Children of geography

SELECT { [Age].generations(2).members} ON COLUMNS,
{[Geography].children} ON ROWS
FROM [ASOSAMP].[SAMPLE]

Exercise 4: Hierarchical References

NOTE: some reports are truncated due to size

4.1

Axis-1	(Jan)	(Feb)	(Mar)
(Geography)	7498269.25	3543554	5625366.5

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Geography (gen 1)

SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ [Geography]} ON ROWS
FROM [ASOSAMP].[SAMPLE];

4.2

Axis-1	(Jan)	(Feb)	(Mar)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(South)	3289067.25	1515653.25	2360549.5
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Children of Geography

SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ [Geography].children} ON ROWS
FROM [ASOSAMP].[SAMPLE]

4.3

Axis-1	(Jan)	(Feb)	(Mar)
(North East)	4209202	2027900.75	3264817
(CONNECTICUT)	280095.5	115321.25	175459
(ANDOVER - CT)	#Missing	#Missing	#Missing
(06232)	#Missing	#Missing	#Missing
(ASHFORD - CT)	3942.75	460.5	7100
(06278)	3942.75	460.5	7100
(AVON - CT)	1488	1241.5	3657
(06001)	1488	1241.5	3657
(BALLOUVILLE - CT)	1699.25	1463	2302.5
(06233)	1699.25	1463	2302.5
(BISHOPS CORNER - CT)	2963.5	2001	1576.5
(06137)	2963.5	2001	1576.5
(BRANFORD - CT)	5796.5	1411	1403.5
(06405)	5796.5	1411	1403.5
(BRIDGEPORT - CT)	11221	6698.5	11394.25
(06601)	#Missing	#Missing	#Missing
(06604)	3032.5	2950.25	4252.25
(06605)	2399.25	1209.25	2907
(06608)	5789.25	2539	4235
(BRIDGEWATER - CT)	#Missing	#Missing	#Missing

…Truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Descendants of North East

SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ Descendants([North East])} ON ROWS
FROM [ASOSAMP].[SAMPLE]

4.4

Axis-1	(Jan)	(Feb)	(Mar)
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5
(NEW JERSEY)	374109	161985.75	292829.25
(NEW YORK)	1198388.75	594100.5	1035128
(PENNSYLVANIA)	1284926	624394.75	902230.75
(RHODE ISLAND)	53299.25	20455	63535.5

… Truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 2 layers down from Geography

SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ Descendants ([Geography], 2)} ON ROWS
FROM [ASOSAMP].[SAMPLE]

4.5

Axis-1	(Jan)	(Feb)	(Mar)
(Central)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(South)	3289067.25	1515653.25	2360549.5
(South West)	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 1 layer down from Geography

SELECT {Jan, Feb, Mar} ON COLUMNS,
{Descendants ([Geography],1) } ON ROWS
From [ASOSamp.Sample]

4.6

Axis-1	(Jan)	(Feb)	(Mar)
(Geography)	7498269.25	3543554	5625366.5
(Central)	#Missing	#Missing	#Missing
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(North East)	4209202	2027900.75	3264817
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members 2 layers down from Geography and higher

SELECT {Jan, Feb, Mar} ON COLUMNS,
{Descendants ([Geography], 2, SELF_AND_BEFORE) } ON ROWS
From [ASOSamp.Sample]

4.7

Axis-1	(Jan)	(Feb)	(Mar)
(COLORADO)	#Missing	#Missing	#Missing
(KANSAS)	#Missing	#Missing	#Missing
(MONTANA)	#Missing	#Missing	#Missing
(NORTH DAKOTA)	#Missing	#Missing	#Missing
(NEBRASKA)	#Missing	#Missing	#Missing
(SOUTH DAKOTA)	#Missing	#Missing	#Missing
(WYOMING)	#Missing	#Missing	#Missing
(IOWA)	#Missing	#Missing	#Missing
(ILLINOIS)	#Missing	#Missing	#Missing
(INDIANA)	#Missing	#Missing	#Missing
(MICHIGAN)	#Missing	#Missing	#Missing
(MINNESOTA)	#Missing	#Missing	#Missing
(MISSOURI)	#Missing	#Missing	#Missing
(OHIO)	#Missing	#Missing	#Missing
(WISCONSIN)	#Missing	#Missing	#Missing
(CONNECTICUT)	280095.5	115321.25	175459
(MASSACHUSETTS)	462811	227990.75	348816
(MAINE)	286647.25	132405.25	228217
(NEW HAMPSHIRE)	97941.25	55236	67439.5
(NEW JERSEY)	374109	161985.75	292829.25
(NEW YORK)	1108288.75	584189.5	1025109

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Members of the Geography dimension at the State generation. State is a generation name.

SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ Descendants ([Geography], State)} ON ROWS
FROM [ASOSAMP].[SAMPLE]

4.8

Axis-1	(Jan)	(Feb)	(Mar)
(ANDOVER - CT)	#Missing	#Missing	#Missing
(06232)	#Missing	#Missing	#Missing
(ASHFORD - CT)	3942.75	460.5	7100
(06278)	3942.75	460.5	7100
(AVON - CT)	1488	1241.5	3657
(06001)	1488	1241.5	3657
(BALLOUVILLE - CT)	1699.25	1463	2302.5
(06233)	1699.25	1463	2302.5
(BISHOPS CORNER - CT)	2963.5	2001	1576.5
(06137)	2963.5	2001	1576.5
(BRANFORD - CT)	5796.5	1411	1403.5
(06405)	5796.5	1411	1403.5
(BRIDGEPORT - CT)	11221	6698.5	11394.25
(06601)	#Missing	#Missing	#Missing
(06604)	3032.5	2950.25	4252.25
(06605)	2399.25	1209.25	2907
(06608)	5789.25	2539	4235
(BRIDGEWATER - CT)	#Missing	#Missing	#Missing
(06752)	#Missing	#Missing	#Missing
(CANTON - CT)	#Missing	#Missing	#Missing
(06019)	#Missing	#Missing	#Missing
(CLINTON - CT)	3257.75	3800	1291

…truncated

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	Descendants of North East , 2 or more layers down

```
SELECT {[Jan],[Feb],[Mar]} ON COLUMNS,
{ Descendants ( [North East], 2, SELF_AND_AFTER)} ON ROWS
FROM [ASOSAMP].[SAMPLE]
```

4.9

Axis-1	(1 To 13 Years)	(14 To 19 Years)	(20 To 25 Years)	(26 To 30 Years)	(31 To 35 Years)	(36 To 45 Years)	(46 To 54 Years)	(55 To 64 Years)	(65+ Years)
(Central)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(Mid West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(North East)	2779136.75	1036491	2910199	2895101.25	2157849.75	2972812.25	1386269.75	3205426.75	2281834
(South)	2051927.25	764699.25	2274995	1997427.25	1746264.25	2393507.75	1058348	2412024	1696226
(South West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing
(West)	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing	#Missing

App. Database	ASOSamp.Sample
Columns	Age dimension level 0 members
Rows	Children of Geography

```
SELECT { [Age].levels(0).members} ON COLUMNS,
{[Geography].children} ON ROWS
FROM [ASOSAMP].[SAMPLE]
```

4.10

Axis-1	(Jan)	(Feb)	(Mar)
(NEW YORK)	1198388.75	594100.5	1035128

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	The State that contains NEW YORK – NY. State is a generation name

SELECT { [Jan],[Feb],[Mar]} ON COLUMNS,
{ Ancestor ([NEW YORK - NY], State)} ON ROWS
FROM [ASOSAMP].[SAMPLE]

4.11

Axis-1	(Jan)	(Feb)	(Mar)
(ALTOONA - PA)	3285.25	1176.25	1833

App. Database	ASOSamp.Sample
Columns	Jan, Feb, Mar
Rows	They City that contains zip code 16601. Zip is a generation name.

SELECT { [Jan],[Feb],[Mar]} ON COLUMNS,
{ Ancestor ([16601],City)} ON ROWS
FROM [ASOSAMP].[SAMPLE]

Exercise 5: Cross Join

SELECT
Crossjoin({[Jan],[Feb],[Mar]}, {[Curr Year],[Prev Year]}) ON COLUMNS,
{[Measures].Levels(0).members} ON ROWS
FROM [ASOSamp].[Sample]

Axis-1	(Jan, Current Year)	(Jan, Previous Year)	(Feb, Current Year)	(Feb, Previous Year)	(Mar, Current Year)	(Mar, Previous Year)
(Original Price)	7498269.25	5627300.25	3543554	5697818	5625366.5	5742783.25
(Price Paid)	7477902.71	5611660.54	3485260.32	5612319.26	5607999.1	5726100.57
(Returns)	279484.66	54050.25	42012.7	72724.5	45537.43	75016.1
(Items per Package)	42228	31643	20841	31788	31434	31162
(No. of Packages)	44500	33160	22038	33866	33505	33133
(Avg Units/Transaction)	0.948943820224719	0.954252110977081	0.945684726381704	0.938640524419772	0.938188330099985	0.940512480004829
(% of Total)	0.193512756621833	0.0777918013634679	0.0958344748411673	0.0794480441789868	0.145699885631787	0.0777284606325628

Member Formulas

Note: In the spreadsheet displays missing dimensions are generation 1 unless otherwise specified.

Exercise 6: Hierarchical References

6.1 Hierarchical References in member formulae

Create a new member and calculation for:

Price Paid per Unit = Price Paid / Units

	A	B	C	D
1		Price Paid	Units	Price Paid per Unit
2	Central	~	~	~
3	Mid West	~	~	~
4	North East	21477387.79	123442	173.9876848
5	South	16288276.97	94356	172.625768
6	South West	~	~	~
7	West	~	~	~
8	Geography	37765664.76	217798	173.3976655

[Price Paid]/ [Units]

6.2 Parents and Generations

Create calculations for:

Trans Pct of Parent = Transactions / Transactions in the parent on the geography dimension
Trans Pct of Region = Transactions / Transaction in the Region generation 2 of the geography dimension

View the data for the North East

	A	B	C	D
1		Transactions	Trans Pct of Parent	Trans Pct of Region
2	CT	7657	0.0589	0.0589
3	MA	13717	0.1054	0.1054
4	ME	9412	0.0723	0.0723
5	NH	3186	0.0245	0.0245
6	NJ	11037	0.0848	0.0848
7	NY	38976	0.2996	0.2996
8	PA	38368	0.2949	0.2949
9	RI	1912	0.0147	0.0147
10	VT	5838	0.0449	0.0449
11	North East	130103	0.5658	1.0000
12	Geography	229959	~	~

Trans Pct of Parent

[Transactions] /
([Transactions],[Geography].CurrentMember.Parent)
View the data for the North East

Trans Pct of Region

[Transactions]/
([Transactions], Ancestor ([Geography].CurrentMember, [Geography].Generations(2)))

6.3 Parents and Generations on two dimensions

Create calculations for:

Trans Pct of Parent Geo x Prod	Transactions/ Transactions at the parent level on products and Geography
Trans Pct of Region x Prod Fam	Transactions/ Transactions at generation 2 products and generation 2 geography

	A	B	C	D	E	F	G
1			CT	MA	ME	North East	Geography
2	Digital Cameras/Camcorders	Transactions	731	1,457	929	13,223	23,311
3	Digital Cameras/Camcorders	Trans Pct of Parent Geo x Prod	0.0071	0.0142	0.0091	0.0730	~
4	Digital Cameras/Camcorders	Trans Pct of Region x Prod Fam	0.0056	0.0112	0.0071	0.1016	~
5	Personal Electronics	Transactions	5,978	10,776	7,408	102,517	181,180
6	Personal Electronics	Trans Pct of Parent Geo x Prod	0.0459	0.0828	0.0569	0.4458	~
7	Personal Electronics	Trans Pct of Region x Prod Fam	0.0459	0.0828	0.0569	0.7880	~
8	All Merchandise	Transactions	7,657	13,717	9,412	130,103	229,959
9	All Merchandise	Trans Pct of Parent Geo x Prod	0.0589	0.1054	0.0723	0.5658	~
10	All Merchandise	Trans Pct of Region x Prod Fam	0.0589	0.1054	0.0723	1.0000	~
11							

Trans Pct of Parent Geo x Prod

 [Transactions]/
([Transactions],
[Geography].CurrentMember.Parent,
[Products].CurrentMember.Parent)

Trans Pct of Region x Prod Fam

 [Transactions]/
([Transactions],
Ancestor ([Geography].CurrentMember, [Geography].Generations(2)),
Ancestor ([Products].CurrentMember, [Products].Generations(2)))

Exercise 7: Leads, Lags andPeriod to Date

7.1 Leads and Lags

Use the ASOSamp.Sample database. Create member formulae on the Measures dimension to calculate:

- Change in units from prior period
- Change in units from 2 periods earlier

	Units	Units Change	Units Change 2
Jan	42228	42228	42228
Feb	20841	-21387	20841
Mar	31434	10593	-10794
Apr	21402	-10032	561
May	41946	20544	10512
Jun	31449	-10497	10047
Jul	28498	-2951	-13448
Aug	~	-28498	-31449
Sep	~	~	-28498
Oct	~	~	~
Nov	~	~	~

Units Change

[Units]
- ([Units],[Time].CurrentMember.PrevMember)

Units Change 2

[Units]
- (Units,[Time].CurrentMember.Lag(2))

7.2 More Leads and Lags

Change in units from the previous year. Note: Consider only Current Year and Previous Year for this exercise.

	A	B	C	D
		Curr Year	Prev Year	Prev Year
1				
2		Units	Units	Units v Prior year
3	Jan	42228	31643	-10585
4	Feb	20841	31788	10947
5	Mar	31434	31162	-272
6	Apr	21402	38769	17367
7	May	41946	38000	-3946
8	Jun	31449	38567	7118
9	Jul	28498	38573	10075
10	Aug	~	38325	38325
11	Sep	~	38147	38147
12	Oct	~	38539	38539
13	Nov	~	38053	38053
14	Dec	~	38305	38305

Units v Prior Year

[Units] - ([Units],[Years].CurrentMember.PrevMember)

7.3 Period to Date

Using the ASOSamp.Sample database, on the Years Dimensions create members and calculations for:

- Year To Date
- Quarter to Date

	A	B	C	D
1		Curr Year	Year to Date	Quarter to Date
2	Jan	42,228	42,228	42,228
3	Feb	20,841	63,069	63,069
4	Mar	31,434	94,503	94,503
5	Apr	21,402	115,905	21,402
6	May	41,946	157,851	63,348
7	Jun	31,449	189,300	94,797
8	Jul	28,498	217,798	28,498
9	Aug	~	217,798	28,498
10	Sep	~	217,798	28,498
11	Oct	~	217,798	~
12	Nov	~	217,798	~
13	Dec	~	217,798	~

Year To Date

Sum(
{PeriodsToDate ([Time].Generations(2),[Time].CurrentMember)}
)

Quarter to Date

Sum(
{PeriodsToDate ([Time].Generations(4),[Time].CurrentMember)}
)

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