
Before you begin: Log in to your Education sandbox

You have a shared sandbox environment to learn about, use, and experiment with MicroStrategy Web.

- 1 In your browser, navigate to **education.microstrategy.com/MicroStrategy/servlet/mstrWeb**.
- 2 Log in to the sandbox with your **MicroStrategy Account** credentials.
- 3 The MicroStrategy Landing page opens. Click the **MicroStrategy Tutorial** project.
- 4 Click **Go to MicroStrategy Web**.

The Shared Reports folder of the MicroStrategy Tutorial project opens.

In the sandbox environment, you cannot save items in the Shared Reports folder.

Exercise: Create a smart compound metric to accurately calculate profit margin

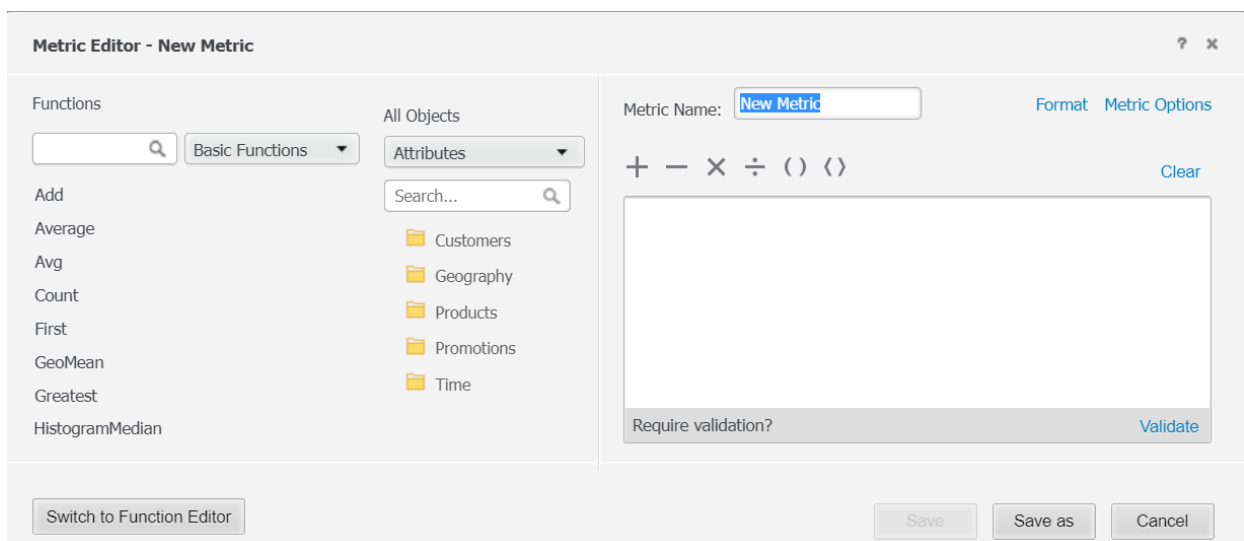
In addition to item cost and revenue, you also want to analyze item profit margin. Your project contains cost and revenue information, but not profit margin. To ensure that the totals for the profit margin metric calculate accurately, you explore creating a smart metric.

Create a compound metric named Profit Margin, using the Revenue and Cost metrics. Then create a copy of the compound metric that uses smart totals, and compare the subtotals of each metric on a report.

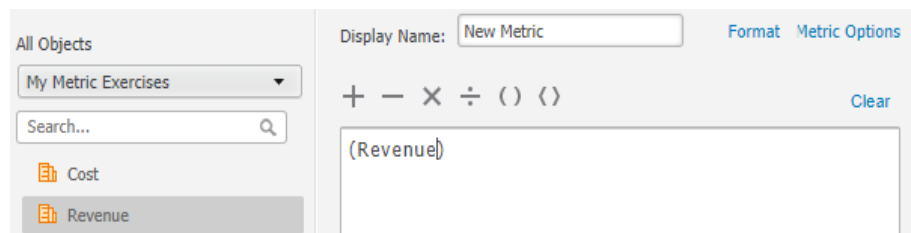
Create the Profit Margin compound metric

Define the Profit Margin metric as $(\text{Revenue} - \text{Cost}) / \text{Revenue}$.

- 1 Access your Education sandbox. For a reminder on how to do this, see *Exercise: Access your Education sandbox*.
 - 2 On the My Reports folder page, click **Create** and select **New Metric**.
 - 3 In the Metric Editor, click **Switch to Formula Editor** (in the bottom left of the window). The Formula Editor opens, as shown below:
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- 4 Click the parenthesis **()** above the metric definition area on the right to add them to the metric definition.
- 5 Add the Revenue metric to the metric formula. In the **All Objects** drop-down list, select **Metrics**. Expand the **Sales Metrics** folder, then double-click the **Revenue** metric to add it to the metric formula.



The Revenue metric is defined as the sum of the Revenue fact.

- 6 In the metric definition area, keep the cursor at the end of Revenue but inside the parenthesis (as shown above). Click the **Subtraction** icon **-**.

(Revenue-)

- 7 In the All Objects area, double-click the **Cost** metric to add it to the formula.

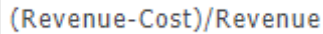
(Revenue-Cost)

The Cost metric is defined as the sum of the Cost fact.

- 8 In the metric definition area, move the cursor to the far right of the metric definition (outside the parenthesis) then click the **Division** icon **÷**.

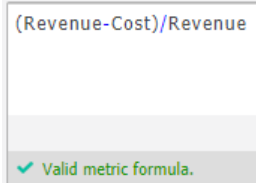


- 9 In the All Objects area, double-click the **Revenue** metric. The following formula displays in the metric definition area:



- 10 Click **Validate** below the metric definition.

If a green check mark displays at the bottom of the definition pane, you defined the metric formula correctly. Otherwise, review the formula and try again.



Format the metric values

- 11 Click **Format**.
- 12 Select **Metric Values** from the drop-down list.
- 13 Under **Category**, select **Percentage**.
- 14 Set **Decimal Places** to **2**, then click **OK**.
- 15 Save the metric in the **My Reports** folder as **Profit Margin**.

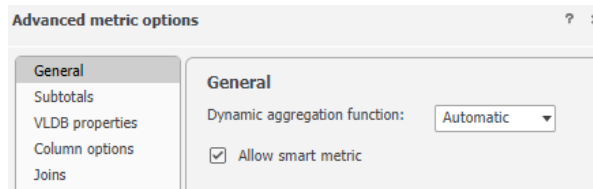
The MicroStrategy Tutorial project already contains another Profit Margin metric, but it is saved in a different folder.

Create the Smart Profit Margin compound metric

Edit the Profit Margin metric to allow smart totals, then save the metric with a different name.

- 1 On the My Reports folder page, click the **Profit Margin** metric to edit it.
- 2 In the Metric Editor, click **Metric Options** at the top right.
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- 3 Select **Allow Smart Metric** then click **OK**.



- 4 Click **Save As**.
- 5 Save the metric in the **My Reports** folder as **Smart Profit Margin**.

Add the compound metrics to a report

- 1 On the My Reports folder page, click **Create**, point to **New Report**, then select **Blank Report**.
- 2 In the All Objects pane on the left, click **Attributes** and then click the **Products** folder.
- 3 Double-click **Category** and then **Item** to add them to the rows of the report.
- 4 In the All Objects pane, expand the **Metrics** folder and then the **Sales Metrics** folder.
- 5 Double-click **Revenue** and then **Cost** to add them to the columns of the report.
- 6 In the All Objects pane, select **My Personal Objects** from the drop-down list.
- 7 Expand the **My Objects** folder.
- 8 Double-click **Profit Margin** and then **Smart Profit Margin** to add them to the columns.

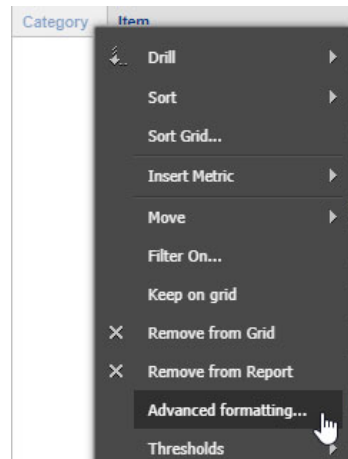
Category	Item	Metrics	Revenue	Cost	Profit Margin	Smart Profit Margin
<Category>	<Item>		<Revenue>	<Cost>	<Profit Margin>	<Smart Profit Margin>

- 9 **Run** the report.

Format the Category values

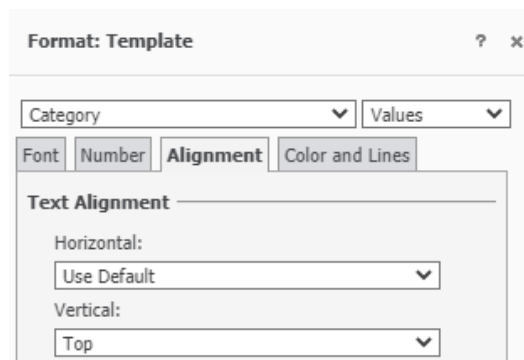
Display the Category values at the top of the row so that you can view them easier.

10 Right-click the **Category** header and select **Advanced Formatting**.



11 In the Format: Template window, click the **Alignment** tab.

12 In the Text Alignment area, from the **Vertical** drop-down list, select **Top** and then click **OK**.




Notice that you are formatting the values for Category, not the header.

The first few rows look like the following. Notice that the two profit margin metrics calculate the same values for each row.

Category	Item	Revenue	Cost	Profit Margin	Smart Profit Margin
Books	100 Places to Go While Still Young at Heart	\$67,992.60	\$50,216.19	26.14%	26.14%
	Art As Experience	\$23,733.05	\$18,247.74	23.11%	23.11%
	The Painted Word	\$22,323.30	\$19,697.86	11.76%	11.76%
	Hirschfeld on Line	\$50,442.00	\$38,153.05	24.36%	24.36%
	Adirondack Style	\$39,101.40	\$29,093.88	25.59%	25.59%
	Architecture : Form, Space, & Order	\$41,378.40	\$31,302.96	24.35%	24.35%
	50 Favorite Rooms	\$26,502.30	\$20,253.47	23.58%	23.58%
	500 Best Vacation Home Plans	\$17,728.80	\$14,049.36	20.75%	20.75%
	Blue & White Living	\$24,668.60	\$19,020.04	22.90%	22.90%
	Ways of Seeing	\$23,776.50	\$18,280.60	23.11%	23.11%
	Gonzo, the Art	\$41,469.40	\$32,975.94	20.48%	20.48%
	Cabin Fever : Rustic Style Comes Home	\$17,570.80	\$13,944.61	20.64%	20.64%

Display subtotals

13 From the **Data** menu, select **Show Totals**.

14 Display the last page of the report by clicking the Last icon  at the top of the window. Scroll down to the end of the report to display the music subtotals and the report's grand totals.

- Notice that the totals for the Profit Margin metric (the third metric displayed) are high, at 501.13% and 4514.57%. It is displaying a sum of all the metric values. In other words, the metric is calculated for each row of the report and then rolled up to the correct level (category or grand total).
- The totals for the Smart Profit Margin metric (the last metric displayed) are more reasonable, at 4.62% and 15.11%. This is the result of smart metrics calculating subtotals on individual elements of the compound metric. The smart metric adds all the revenue values together, adds all the cost values together, subtracts the cost sum from the revenue sum, and divides that by the revenue sum.

98 Degrees & Rising	\$38,379.25	\$34,720.26	9.53%	9.53%
Aretha Franklin's 30 Greatest Hits	\$31,608.90	\$26,403.02	16.47%	16.47%
Never Say Never	\$32,228.25	\$27,521.79	14.60%	14.60%
Total	\$3,893,367.40	\$3,713,323.40	501.13%	4.62%
Total	\$35,023,708.15	\$29,730,084.52	4514.57%	15.11%

15 You want only the correct totals to display. Remove the Profit Margin metric from the report. Right-click the Profit Margin metric (in either the Report Objects pane or the column header in the report) and select **Remove from Report**.

16 Save the report in the **My Reports** folder as **Compound Metric-Profit Margin with Subtotals**.
