



Un blog de marketing

Marketing Math Formulas and Exercises

Basic Retailing Formula

Cost of Goods + Markup = **Retail Price**

Retail Price - Cost of Goods = **Markup**

Retail Price - Markup = **Cost of Goods**

Markup

This is a percentage added to the cost of an item to get the retail selling price.

Markup \$ = Retail Price - Cost

Markup % = (Retail Price - Cost) ÷ Cost(\$)

Margin

This is the amount of gross profit a business earns when an item is sold.

Margin \$ = Retail Price - Cost

Margin % = (Retail Price - Cost) ÷ Retail Price (\$)

Break-Even Point

This is the point in your retail business where sales equal expenses. There is no profit and no loss.

Break-Even (in \$) = Fixed Costs ÷ Contribution margin ratio

Contribution margin ratio = ((Total sales – Total Costs) ÷ (Total sales)) x 100

Break-Even (Units) = Fixed Costs ÷ Contribution margin

Contribution margin per unit = Retail Selling Price per unit – Variable Costs per Unit

Break-Even recalculated with targeted profits

Dollars to be sold: Fixed costs + Targeted Profit ÷ Contribution margin ratio

Units to be sold: Fixed costs + Targeted Profit ÷ Contribution margin

Exercises

Variable Expenses. At Oil Change Co. the following items have been identified as variable expenses. Next to each item is the variable expense per car or per oil change:

Motor oil	\$ 5.00
Oil filter	3.00
Grease, washer fluid	0.50
Supplies	0.20
Disposal service	<u>0.30</u>
Total variable expenses <i>per car</i>	<u>\$ 9.00</u>

Fixed Expenses. Fixed expenses do not increase when sales increase. Fixed expenses do not decrease when sales decrease. In other words, fixed expenses such as rent will not change when sales increase or decrease.

At Oil Change Co. the following items have been identified as fixed expenses. The amount shown is the fixed expense per week:

Labor including payroll taxes and benefits	\$ 1,200
Rent and utilities for the building it uses	700
Depreciation, office and professional, training, other	<u>500</u>
Total fixed expenses <i>per week</i>	<u>\$ 2,400</u>

Revenues or Sales. Revenues (or sales) at Oil Change Co. are the amounts earned from servicing cars. Oil Change Co. charges one flat fee of \$24 for performing the oil change service. At the present time no other service is provided and the \$24 fee is the same for all automobiles regardless of engine size.

Contribution margin. At Oil Change Co. the contribution margin per car (or per oil change) is computed as follows:

Contribution Margin per car =	Revenues per car	-	Variable Expenses per car
Contribution Margin per car =	\$24	-	\$9
Contribution Margin per car =	\$15		

Break-even Point In Units. The break-even point in units for Oil Change Co. is the number of cars it needs to service in order to cover the company's fixed and variable expenses. The break-even point formula is to divide the total amount of fixed costs by the contribution margin per car:

Break-even Point in Cars per Week =	Fixed Expenses per week	÷	Contribution Margin per car
Break-even Point in Cars per Week =	\$2,400 per week	÷	\$15 per Car
Break-even Point in Cars per Week =	160 Cars per Week		

It's always a good idea to check your calculations.

The following schedule confirms that the break-even point is 160 cars per week:

Oil Change Co. Projected Net Income For a Week	
Sales (160 cars serviced at \$24 per car)	\$ 3,840
Variable Expenses (160 cars at \$9 per car)	<u>- 1,440</u>
Contribution Margin	2,400
Fixed Expenses	<u>- 2,400</u>
Net Income	<u>\$ 0</u>

Break-even Point In Sales Dollars

One can determine the break-even point in sales dollars (instead of units) by dividing the company's total fixed expenses by the contribution margin ratio. The contribution margin ratio is the contribution margin divided by sales (revenues). The ratio can be calculated using company totals or per unit amounts. We will compute the contribution margin ratio for the Oil Change Co. by using its per unit amounts:

Revenues or sales per car	\$24
Variable expenses per car	<u>- 9</u>
Contribution margin per car	<u>\$15</u>

Contribution Margin Ratio	=	Contribution Margin	÷	Revenues or Sales
Contribution Margin Ratio	=	\$15	÷	\$24
Contribution Margin Ratio	=	62.5%		

The break-even point in sales dollars for Oil Change Co. is:

Break-even Point in Sales \$	=	Total Fixed Expenses	÷	Contribution Margin Ratio
Break-even Point in Sales \$	=	\$2,400 per week	÷	62.5%
Break-even Point in Sales \$	=	\$3,840 per week		

Desired Profit In Units. Let's say that the owner of Oil Change Co. needs to earn a profit of \$1,200 per week rather than merely breaking even. You can consider the owner's required profit of \$1,200 per week as another fixed expense. In other words the fixed expenses will now be \$3,600 per week (the \$2,400 listed earlier plus the required \$1,200 for the owner). The new point needed to earn \$1,200 per week is shown by the following break-even formula:

Break-even Point in Cars per Week	=	Fixed Expenses per week	÷	Contribution Margin per car
Break-even Point in Cars per Week	=	\$3,600 per week	÷	\$15 per Car
Break-even Point in Cars per Week	=	240 Cars per Week		

Always check your calculations:

Oil Change Co. Projected Net Income For a Week	
Sales (240 cars serviced at \$24 per car)	\$ 5,760
Variable expenses (240 cars at \$9 per car)	<u>- 2,160</u>
Contribution margin	3,600
Fixed expenses	<u>- 2,400</u>
Net income	<u>\$ 1,200</u>

Desired Profit In Sales Dollars. Let's assume a company needs to cover \$2,400 of fixed expenses each week plus earn \$1,200 of profit each week. In essence the company needs to cover the equivalent of \$3,600 of fixed expenses each week. Presently the company has annual sales of \$100,000 and its variable expenses amount to \$37,500 per year. These two facts result in a contribution margin ratio of 62.5%:

Sales	\$100,000
Variable expenses	<u>- 37,500</u>
Contribution margin	<u>\$ 62,500</u>

$$\begin{aligned} \text{Contribution Margin Ratio} &= \text{Contribution Margin} \div \text{Sales} \\ \text{Contribution Margin Ratio} &= \quad \quad \quad \$62,500 \quad \div \quad \$100,000 \end{aligned}$$

$$\text{Contribution Margin Ratio} = 62.5\%$$

The amount of sales necessary to give the owner a profit of \$1,200 per week is determined by this break-even point formula:

$$\begin{aligned} \text{Break-even Point in Sales \$ per week} &= \text{Fixed Expenses per week} \div \text{Contribution Margin Ratio} \\ \text{Break-even Point in Sales \$ per week} &= \$3,600 \text{ per week} \div 62.5\% \\ \text{Break-even Point in Sales \$ per week} &= \mathbf{\$5,760 \text{ per week}} \end{aligned}$$

To verify that this answer is reasonable, we prepared the following schedule:

	<u>Per Week</u>	<u>52 Weeks</u>
Sales	\$ 5,760	\$ 299,520
Variable expenses (37.5%)	<u>- 2,160</u>	<u>- 112,320</u>
Contribution margin	3,600	187,200
Fixed expenses	<u>- 2,400</u>	<u>- 124,800</u>
Profit	<u>\$ 1,200</u>	<u>\$ 62,400</u>

As you can see, for the owner to have a profit of \$1,200 per week or \$62,400 per year, the company's annual sales must triple. Presently the annual sales are \$100,000 but the sales need to be \$299,520 per year in order for the annual profit to be \$62,400.