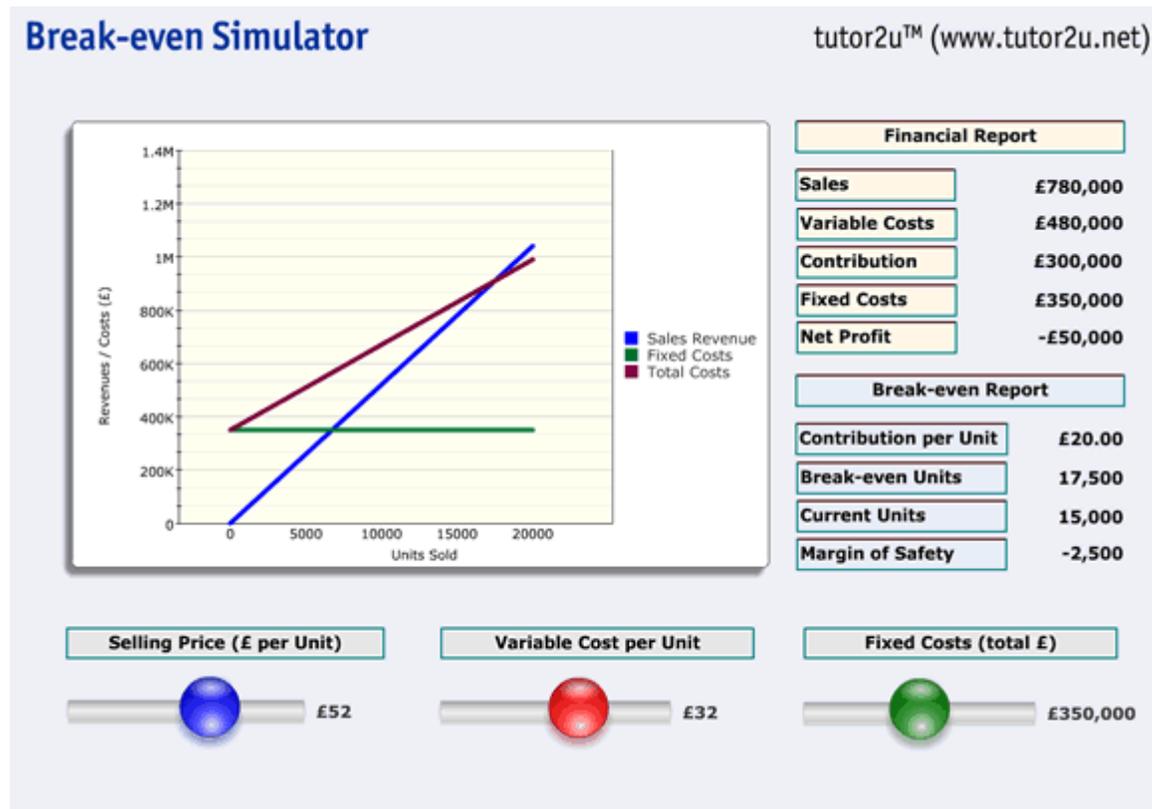


## Interactive Business Simulations

### Finance: Breakeven Analysis



Note: this interactive simulator is designed to be viewed using an up-to-date internet browser. Users must also have Macromedia Flash Player Version 6 or 7 installed

## Introduction

This worksheet will help you develop your understanding of the different kinds of costs incurred by a business and how contribution and breakeven analysis can help a business.

## Key terms used in this worksheet

Contribution per unit – selling price – variable cost

Break even output – the amount of output when revenue equals costs (zero profit or loss)

Margin of safety – the difference between expected sales and break even level of sales

## Supporting notes

Each sale made **contributes** an amount to covering the fixed costs the business has to pay for that time period.

For example, a business may have fixed costs of £1,000 for the month. If the selling price is £5 and the variable cost is £3, then each sale contributes £2 towards paying for that fixed cost. If no sales were made then the business would still have to pay the fixed costs.

The break-even output can be calculated by using contribution per unit:

$$\text{Total fixed costs divided by contribution per unit}$$

Example from above: £1,000 divided by £2 = 500 units of sales

Any sales over and above the break even output means a contribution to the profit.

Total contribution is the contribution per unit x the total sales.

## Using the Simulator

You should now launch the interactive business simulator in your Internet browser:

[http://www.tutor2u.net/assets/simulations/breakeven\\_simulator\\_1.swf](http://www.tutor2u.net/assets/simulations/breakeven_simulator_1.swf)

Using the interactive simulator, answer the questions posed on the following page (you might want to print the question page off and have it handy).

The last page in this document includes answers to the questions set.

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### Self Study Questions

Question	Your Answer
<p>The following questions relate to the initial data presented when the simulator first loads in your browser. To reset the simulator to this data, simply place your mouse anywhere on the screen and then click "Play" and then "Rewind"</p>	
<p>What is the net profit being earned by the business?</p>	
<p>From the breakeven report (right hand side), what is the current level of sales units achieved by the business? How does this level of output compare with the break-even level?</p>	
<p>Looking at the Breakeven Report, how is the "Contribution per Unit" calculated?</p>	
<p>Looking at the Breakeven Report, what is meant by the term "Margin of Safety"?</p>	
<p>List three kinds of costs that would be included in "Variable Costs"</p>	
<p>The following questions ask you to make changes to the variables in the simulator. To reset the simulator to starting data, simply place your mouse anywhere on the screen and then click "Play" and then "Rewind"</p>	
<p>What is the effect on sales and net profit of increasing the selling price from £50 to £55?</p>	
<p>The Board decide to increase marketing spending on its product and to increase the selling price to £60 per unit. As a result fixed costs rise to £400,000. What is the effect on Sales, Contribution and Net Profit?</p>	
<p>If SP and VC are £50 and £30 respectively, what is the effect on the breakeven sales volume if fixed costs could be reduced by £50,000 to £300,000?</p>	

<b>Question</b>	<b>Your Answer</b>
All other things remaining equal, what happens to the breakeven level of output as fixed costs rise?	
A raw material supplier increases his prices. The VC per unit increases to £36. The business is not able to pass on the price increase to customers. By how much must fixed costs fall in order for the business to breakeven?	
Changing the three main variables as you wish, what is the maximum net profit that the business can achieve at 15,000 units sold and what is the margin of safety using these values?	

## Premium Buggies Limited – Self Study Answers

Question	Suggested Answer
The following questions relate to the initial data presented when the simulator first loads in your browser. To reset the simulator to this data, simply place your mouse anywhere on the screen and then click “Play” and then “Rewind”	
What is the net profit being earned by the business	The business is making a net LOSS of £50,000. Contribution is £300,000, but fixed costs are higher than this (£350,000). So the business is loss-making
From the Breakeven report (right hand side), what is the current level of sales units achieved by the business? How does this level of output compare with the break-even level?	The current level of output is 15,000 units The breakeven output (when the selling price is £50 per unit, variable costs are £30 per unit and fixed costs are £350,000) is 17,500 units So the business is operating below its breakeven level (the result is a net loss)
Looking at the Breakeven Report, how is the “Contribution per Unit” calculated?	Contribution per Unit = Selling Price per Unit less Variable Cost per Unit On loading, this calculation is £50 (SP) - £30 (VC) = £20 per unit
Looking at the Breakeven Report, what is meant by the term “Margin of Safety”?	Margin of safety is the difference between actual sales units and break even level of sales units. So on loading, the business is 2,500 units short of breakeven
List three kinds of costs that would be included in “Variable Costs”	Raw materials Bought-in components Direct labour wages
The following questions ask you to make changes to the variables in the simulator. To reset the simulator to starting data, simply place your mouse anywhere on the screen and then click “Play” and then “Rewind”	
What is the effect on sales and net profit of increasing the selling price from £50 to £55?	Sales increase to £850,000 Contribution increases to £375,000 Net profit becomes £25,000 [note: this assumes that the business is able to still sell 15,000 units at the higher price; it is possible that some customers will refuse to buy if the price goes up]
The Board decide to increase marketing spending on its product and to increase the selling price to	Sales: £900,000 Contribution: £450,000

Question	Suggested Answer
£60 per unit. As a result fixed costs rise to £400,000. What is the effect on Sales, Contribution and Net Profit?	Net Profit: £50,000
If SP and VC are £50 and £30 respectively, what is the effect on the breakeven sales volume if fixed costs could be reduced by £50,000 to £300,000?	<p>The contribution per unit (SP – VC) would remain at £20 per unit</p> <p>So the breakeven level would be £300,000 / £20</p> <p>I.e. 15,000</p> <p>Try this on the simulator to check the answer</p>
All other things remaining equal, what happens to the breakeven level of output as fixed costs rise?	<p>As fixed costs rise, the breakeven level of output rises.</p> <p>Try moving the fixed cost button from left to right and watch the fixed costs and total costs line.</p>
A raw material supplier increases his prices. The VC per unit increases to £36. The business is not able to pass on the price increase to customers. By how much must fixed costs fall in order for the business to breakeven?	<p>The increase in VC per unit to £36 means that the contribution per unit is £14 (SP £50 less VC £36).</p> <p>Sales units are 15,000</p> <p>Therefore total contribution is £210,000 (£14 times 15,000 units)</p> <p>Breakeven occurs when contribution = fixed costs</p> <p>Fixed costs therefore need to fall to £210,000, a decrease of £140,000</p>
Changing the three main variables as you wish, what is the maximum net profit that the business can achieve at 15,000 units sold and what is the margin of safety using these values?	<p>Profit is maximised when sales revenue is maximised and costs are minimised.</p> <p>So the optimal values for the three variables in the simulator are:</p> <p>Selling price per unit - £60 (sales of £900,000)</p> <p>Variable costs per unit - £20 (variable costs of £300,000)</p> <p>Fixed costs - £200,000</p> <p>This results in a maximum net profit of 400,000</p> <p>The margin of safety is: 10,000 units</p>