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The big picture

The fast-food delivery market in China has grown substantially in recent years, as it has in other places around the world. As of 2022, two companies dominate this market in China: Meituan and Ele.me.

Meituan and Ele.me have increased their sales revenues by increasing the fees they charge to restaurants for delivering their food. However, these rising fees have increased costs for the restaurants, many of which are struggling to recover from the loss of business caused by the COVID-19 pandemic.

In response, the Chinese government has announced that these food delivery platforms must reduce the fees they charge to restaurants. This should help the restaurants reduce their costs, thus increasing their profits and aiding their recovery from the pandemic. This government decision will negatively impact the revenues and profits of both Meituan and Ele.me.

Overview (/study/ap hl/sid-351-cid-762729/o

Figure 1. Food delivery companies have had to reduce the fees they charge to restaurants for the service.

Credit: ViewStock, Getty Images

This topic will explore business costs and revenues and will help you to understand how these fundamental concepts relate to profit. Profit is the money left over from revenue once the cost of production has been subtracted:

$$\text{Profit} = \text{revenue} - \text{cost}$$

It is essential that businesses keep track of their revenue and cost if they are to have a hope of making a profit. Even not-for-profit enterprises need to do this, so they can meet their social objectives and avoid going out of business.

Concept

Creativity

Creativity is the process of generating new ideas and considering existing ideas from new perspectives. It is an important element of business success. Businesses need to be creative to find ways to reduce unnecessary costs or find new ways of earning revenue. These new ideas will allow businesses to earn profits that will sustain their work in the long term.

Learning objectives from the IBDP Business Management guide with assessment objective level:

- **Distinguish** between fixed costs, variable costs, direct costs and indirect costs, using examples (AO2)
- **Explain** the difference between total revenue and revenue streams, using examples (AO2)
- **Prepare** a decision tree and recommend a course of action for a business based on the results (AO4, AO3)

Student view

3. Finance and accounts / 3.3 Costs and revenues

Overview (/study/app/business-hl/sid-351-cid-762729/o

Types of costs

Types of cost Types of cost

Anything a business spends money on is a cost. There are endless things that businesses need to buy in order to produce goods and services. These range from large capital expenditures, such as buying land for a new factory, to everyday expenditures, such as purchasing fuel for delivery vehicles. These everyday expenditures are known as revenue expenditures.

Figure 1. Anything that a business spends money on is defined as a cost; a cost for this business would be the rice needed to make these rice noodles.

Credit: Longhua Liao, Getty Images

Generally speaking, businesses work to reduce their costs of production. Lower costs can lead to higher profits for the business, helping to sustain the activities of the business over time. It is important to understand, however, that for-profit social enterprises and non-profit social enterprises may differ from for-profit commercial enterprises with regard to their approach to costs. Social enterprises may distribute value to a wider range of stakeholders by paying workers a living or generous wage, by paying suppliers fairly for resources (rather than using their power to force lower prices for resources), and by finding ways to foster healthy social ecosystems around themselves through generative/regenerative activities (Section 1.5.6 (/study/app/business-hl/sid-351-cid-762729/book/generativeregenerative-business-id-36546/)). All of these practices may involve higher costs for social enterprises.

Student view

This section will classify business costs into simple groups. Classifying costs can help businesses identify and track costs more easily, which should help reduce them. Costs can be classified into two broad sets of categories:

- fixed costs and variable costs
- direct costs and indirect costs/overheads

Fixed and variable costs

Figure 2. A coffee shop has both fixed and variable costs.

Credit: Yagi-Studio, Getty Images

The first method of classifying costs simply asks the question: 'Does the cost increase directly with production?' If the answer is yes, then the cost is a variable cost. If the answer is no, then the cost is a fixed cost.

The example of a simple coffee shop is used below to explore the differences between fixed and variable costs.

Variable costs

As mentioned above, variable costs vary directly with production. If a coffee shop sells one more cup of coffee, which costs will increase? Well, to start with, all of the things that go into the drink. So variable costs will include the coffee beans, the milk and any sugar or additional flavourings. But that is not all. If the shop sells one more cup of coffee, it will also have to buy one more paper cup. So packaging is also a variable cost.

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Figure 3. Types of variable costs.

More information for figure 3

The image is divided into four sections, each depicting a type of variable cost related to a coffee shop. The top-left section shows ingredients including milk, a bag of coffee beans, and a bowl of sugar as examples of ingredients. The top-right section illustrates packaging, displaying several coffee cups, lids, and saucers. The bottom-left section features an illustration of piece-rate wages or commission, depicting a person in an apron handing a cup of coffee to a customer. The bottom-right section shows delivery, with an individual in a cap and apron carrying a tray of coffee cups, indicating the role of delivery in variable costs for a business.

[Generated by AI]

The types of variable costs will depend on the business, but will normally include things such as:

- materials
- packaging
- delivery
- piece-rate wages and sales commission (Subtopic 2.4 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39054/))
- cleaning (hotels, for example)

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

The fact that variable costs are defined as varying *directly* with production should not be overlooked. A variable cost is defined by its cause-and-effect relationship with output. Some students make the mistake of classifying advertising as a variable cost, arguing that if advertising increases then so does output. This is incorrect because the relationship is the wrong way around. When there is an increase in advertising costs, there is no guarantee that demand and therefore output will rise. To be a truly variable cost, an increase in output must lead to increased costs of production for the business. So, if there is no production, the variable costs must be zero.

Sometimes, but not always, payments to workers are considered variable costs too. For example, some workers are paid piece-rate wages, which are wages that vary depending on the amount the employee produces. Other employees may be paid commission. Commission is when sales employees are paid a small amount, often a percentage, for every item they sell. For example, employees in a clothing store may receive an additional payment every time they sell a customer an item of clothing.

Exam tip

It is important to make a distinction between the terms 'variable costs per unit' and 'total variable costs'. Variable costs per unit are the variable costs of making one product. Total variable costs are the sum of all variable costs for the entire output.

Graphing variable costs

Variable costs (VC) can be graphed using data on quantities of cups of coffee produced and the total variable costs at different quantities. For example, assume it costs $1 to make a single cup of coffee. The total variable costs can be calculated at different quantities, as shown in **Table 1**.

Table 1. Total variable costs at different levels of quantities produced (output).

Quantity of cups of coffee per month (output)	Total variable costs ($)
0	(0 x 1) = 0
500	(500 x 1) = 500
1000	(1000 x 1) = 1000

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Quantity of cups of coffee per month (output)	Total variable costs ($)
1500	(1500 x 1) = 1500
2000	(2000 x 1) = 2000
2500	(2500 x 1) = 2500
3000	(3000 x 1) = 3000

These values can be plotted in a graph (**Figure 4**) where the quantity of cups of coffee is represented in the *x*-axis and sales revenues are represented in the *y*-axis. As you can see, as quantity/output increases, the total variable cost of production (TVC) increases.

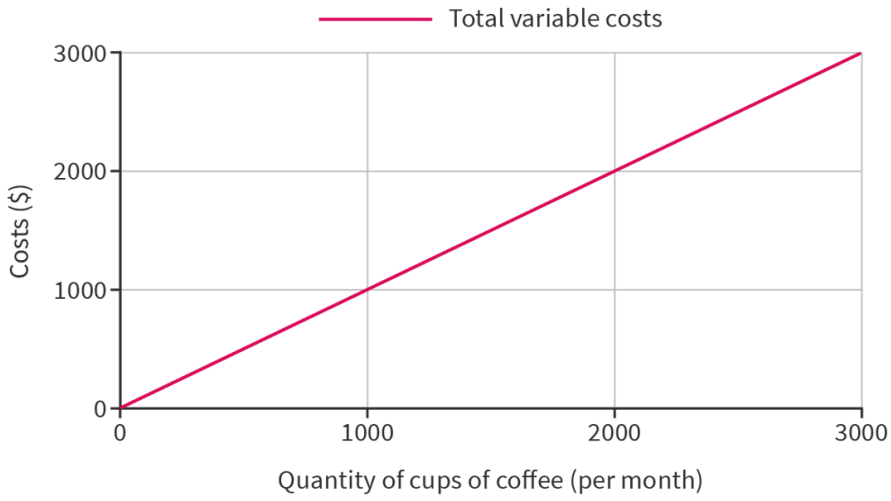

Figure 4. Total variable costs increase as the quantity of cups of coffee increases.

More information for figure 4

The line graph shows the relationship between the quantity of coffee cups produced per month and their associated total variable costs. The x-axis represents the quantity of coffee cups, ranging from 0 to 3,000. The y-axis indicates the costs in dollars, ranging from $0 to $3,000. A straight line indicates that as the quantity of coffee cups increases, total variable costs increase proportionally. The line suggests a direct and linear correlation between production quantity and cost, signifying that higher production levels lead to higher variable costs.

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Fixed costs

Fixed costs (FC) are those that stay the same at different levels of output. In the short term (the period during which it is difficult to change resources), there are items that need to be paid for no matter the level of output. These will not change quickly over time. For example, rental contracts for a physical space are usually for a set period of time, such as a year or more. This will stay the same, regardless of how much the business produces.

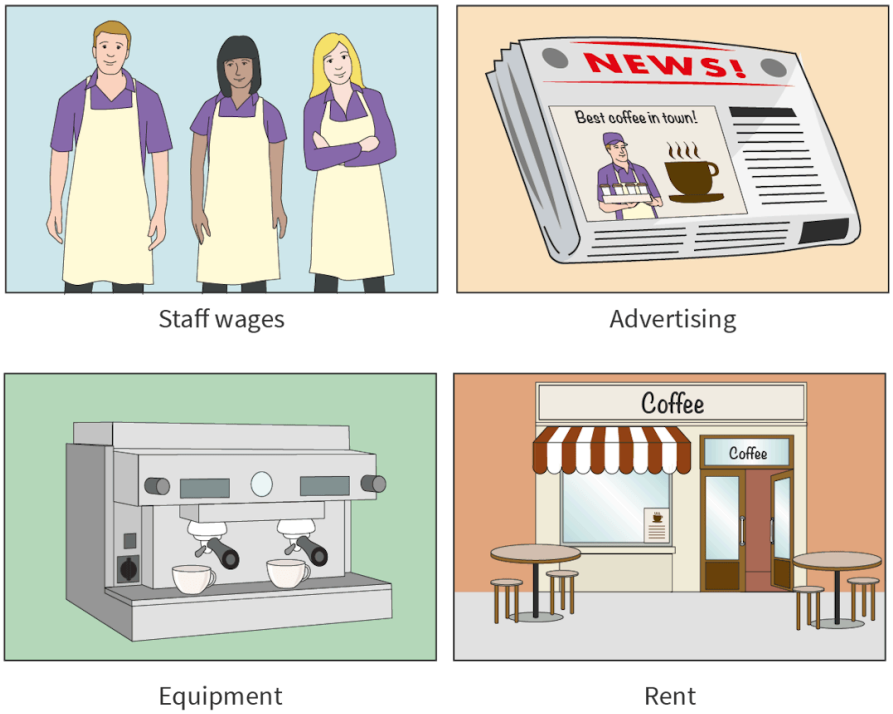

Figure 5. Types of fixed costs.

More information for figure 5

The image is an illustration divided into four sections, each depicting a type of fixed cost for a coffee shop.

1. **Staff Wages**: This section shows three staff members wearing aprons. They are smiling and standing upright, symbolizing the cost associated with staff wages.

2. **Advertising**: A depiction of a newspaper with the headline "NEWS!" and the caption "Best coffee in town!" suggests advertising costs. The newspaper also has an illustration of a person holding a tray with a steaming coffee cup.

3. **Equipment**: A detailed illustration of a coffee machine with two cups underneath the coffee spouts is shown, representing the cost of equipment essential for the coffee shop.

4. **Rent**: The final section illustrates the exterior of a coffee shop with a café setting, including a sign that reads "Coffee," tables, chairs, and a storefront. This represents rent costs.

Student view

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Overview (/study/app/hl/sid-351-cid-762729/o

Consider the coffee shop once more. The variable costs include all the things that go directly into a drink, as well as the packaging. But ingredients alone are not enough to make a hot cup of coffee. Other things are needed too, such as a coffee machine, a place where customers can sit and drink the coffee, and someone to make the coffee and receive the payment from the customers.

These are examples of fixed costs:

- salaries and wages of staff that are not dependent on output
- rent and mortgage payments
- machines and other capital equipment
- fixtures and fittings
- insurance

Exam tip

Whether employee payment is counted as fixed or variable depends on the payment methods.

As you learned in Subtopic 2.4 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39054/), salary and wages are two different types of financial rewards. Salary is a payment for work over a period of time that is not directly related to the number of hours put into the work. Salaries are usually for a year of work and are paid in 12 equal instalments. These are considered fixed costs.

A wage is also a payment for work, but is usually paid per hour, or per piece. Wage payments could be monthly, or they may be more irregular. Wages can be fixed or variable, depending on whether they are paid in relation to output.

Graphing fixed costs

Fixed costs can also be displayed in a graph. Using the example of the coffee shop again, assume that the salaries and wages of staff are $5500 per month, the rent is $1000 per month, and insurance, leasing of equipment, and other miscellaneous fixed costs are $500 per month.

Student view

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This means that the total fixed costs are $7000 per month. These fixed costs will be the same, regardless of whether the coffee shop produces zero cups of coffee or 3000 cups of coffee. The data in **Table 2** shows this. **Figure 6** shows a graph of both the fixed and variable costs.

Table 2. Fixed costs for the coffee shop.

Quantity of cups of coffee per month	Fixed costs ($)
0	7000
500	7000
1000	7000
1500	7000
2000	7000
2500	7000
3000	7000

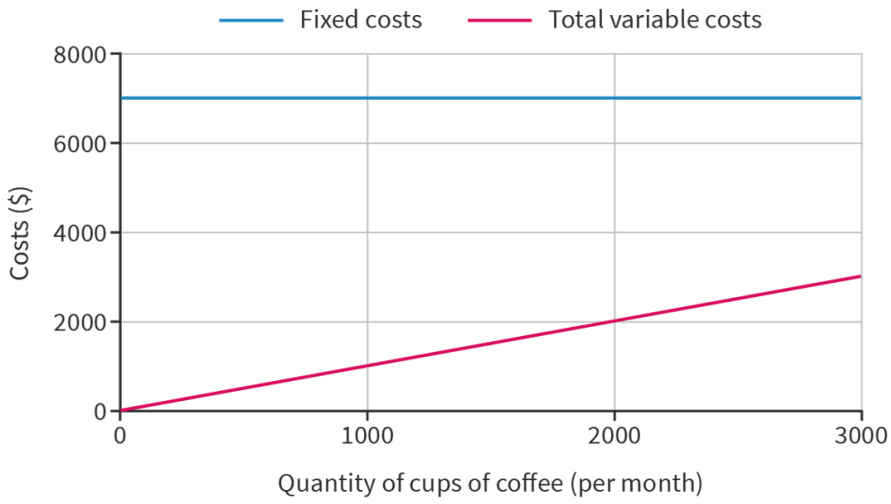

Figure 6. Fixed costs stay constant as the quantity of cups of coffee increases.

More information for figure 6

The graph is a line chart comparing fixed costs and total variable costs as the quantity of cups of coffee increases per month. The X-axis represents the quantity of cups of coffee, ranging from 0 to 3000. The Y-axis represents the costs in dollars, ranging from 0 to 8000.

The fixed costs are shown as a horizontal blue line, indicating these costs remain constant regardless of the quantity. The level of fixed costs is at 6000 dollars throughout the graph.

Student view

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In contrast, the total variable costs are depicted in red, starting at the origin (0,0) and rising linearly as the quantity of cups of coffee increases, illustrating the direct relationship between variable costs and quantity.

This graph illustrates that while fixed costs remain the same, total variable costs increase proportionally with the number of coffee cups produced.

[Generated by AI]

Figure 6 shows the fixed costs staying constant as the quantity/output of cups of coffee increases. You can see that this differs from total variable costs, which increase as quantity/output increases.

Exam tip

Remember to consider the same timeframe for both variable and fixed costs. The data above shows quantity and costs for one month. But the data could be expressed with other time periods. You will need to indicate the time frame in the graph title and axes.

Total costs

Total costs (TC) refer to all the variable costs and fixed costs that a business pays to produce its product.

For the coffee shop, variable costs per month and fixed costs per month can be put together. The addition of both costs will give the total costs per month, as shown in **Table 3**. **Figure 7** illustrates these costs in a graph, along with the variable and fixed costs.

Table 3. Total costs are the sum of fixed and variable costs.

Quantity of cups of coffee	Variable costs ($)	Fixed costs ($)	Total costs ($)
0	0	7000	7000
500	500	7000	7500

Student view

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Quantity of cups of coffee	Variable costs ($)	Fixed costs ($)	Total costs ($)
1000	1000	7000	8000
1500	1500	7000	8500
2000	2000	7000	9000
2500	2500	7000	9500
3000	3000	7000	10 000

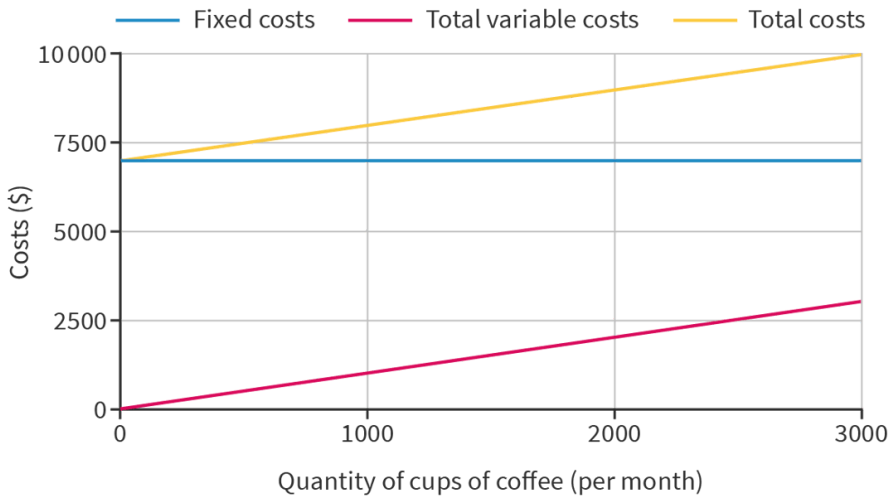

Figure 7. Total costs are the sum of variable costs and fixed costs.

More information for figure 7

The graph illustrates the relationship between costs and the quantity of coffee cups produced per month. The X-axis represents the 'Quantity of cups of coffee (per month)', ranging from 0 to 3000. The Y-axis shows 'Costs ($)', ranging from 0 to 10000.

There are three lines on the graph: 1. Fixed costs are represented by a blue horizontal line constant at $7500. 2. Total variable costs are illustrated by a pink line starting at the origin (0, 0) and rising linearly to approximately $2500 at 3000 cups. 3. Total costs are depicted by a yellow line starting at $7500 when production is 0 cups, increasing linearly to $10000 at 3000 cups.

The graph indicates that while fixed costs remain constant, total variable costs and total costs increase with the number of cups produced.

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Student view

Overview (/study/app/business-hl/sid-351-cid-762729/o

Exam tip

Fixed costs do not start at zero. This is because, even if a business produces no output, it will have to pay for rent, equipment and other fixed costs. Total costs include both fixed and variable costs. So the minimum total costs, at zero output, would start at the fixed cost line, as shown in **Figure 7**.

Activity

Below is a partly completed table of the fixed, variable and total costs of the Casual T-shirt Company at different quantities/output per month.

Output (T-shirts)	Fixed costs ($)	Variable costs ($) ($9 per T-shirt)	Total cos ($)
0			
500	5000		
1000		9000	
1500			
2000			23 000

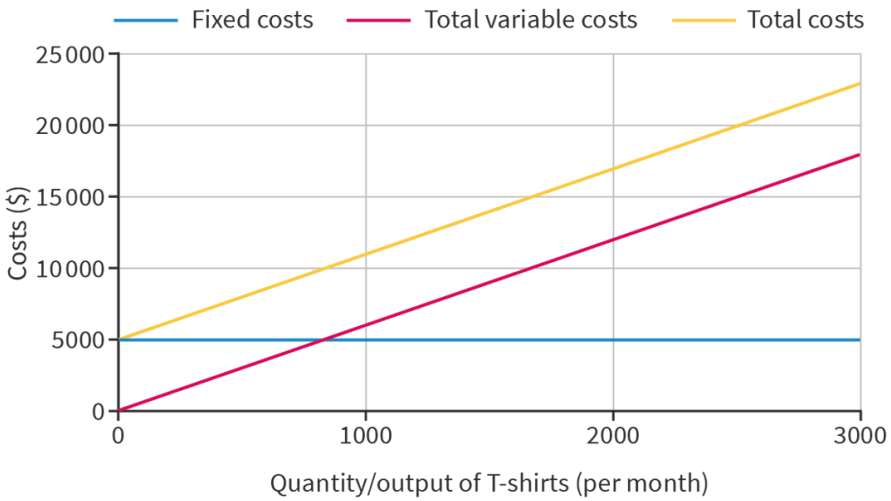
- Copy and complete the table, using the figures provided to work out the missing costs.
- Use the data in your completed table to draw a graph showing the relationships between the quantity/output of T-shirts and the fixed, variable and total costs of production.

Output (T-shirts)	Fixed costs ($)	Variable costs ($) ($9 per T-shirt)	T
0	5000	0	
500	5000	4500	

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Output (T-shirts)	Fixed costs ($)	Variable costs ($) ($9 per T-shirt)	T
1000	5000	9000	
1500	5000	13 500	
2000	5000	18 000	



Fixed, variable and total costs for the Casual T-shirt Company.

Semi-variable costs

Some costs could be seen as having both variable and fixed elements. Electricity is a good example. In the coffee shop example, a small amount of extra electricity would be needed to power the espresso machine and make an additional cup of coffee. This is obviously a variable cost. However, electricity will also be used to power the lights and keep the fridges cool, and these do not vary with output. If more customers come into a shop, they do not consume more light. This element of the electricity bill is therefore fixed. For this reason, electricity is classified as a semi-variable cost. Other examples of semi-variable costs include:

- mobile phone bills that incur a monthly fixed fee plus a charge for any additional units that are used
- production staff who are paid a basic salary plus a bonus for any additional output

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Figure 8. Some examples of semi-variable costs.

More information for figure 8

The image is split into two sections. On the left, there is an illustration of an Electricity Bill. The bill covers the period from 9th May 2022 to 9th June 2022. It includes the following details:

- Price per unit is $0.1425.
- Number of units is 1000.
- The consumption amount is $142.50.
- Standing charge is $33.00.
- Subtotal is $185.50.
- VAT at 5% costs $9.27.
- Total amount is $194.77.

On the right side, there is an illustration of a person using a telephone. The person is holding a phone to their ear and is standing in front of a tablet on a desk, dressed in a purple shirt and a white apron. Below this illustration, the text "Telephone calls" is visible.

[Generated by AI]

Direct and indirect costs

This method of classifying costs relates to the parts of the business that deal with budgets. Some costs relate directly to the sale of the goods, while some relate to other parts of the business. Complex businesses will have a huge number of costs. In order for these costs to be tracked, they need to be allocated to the correct department.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

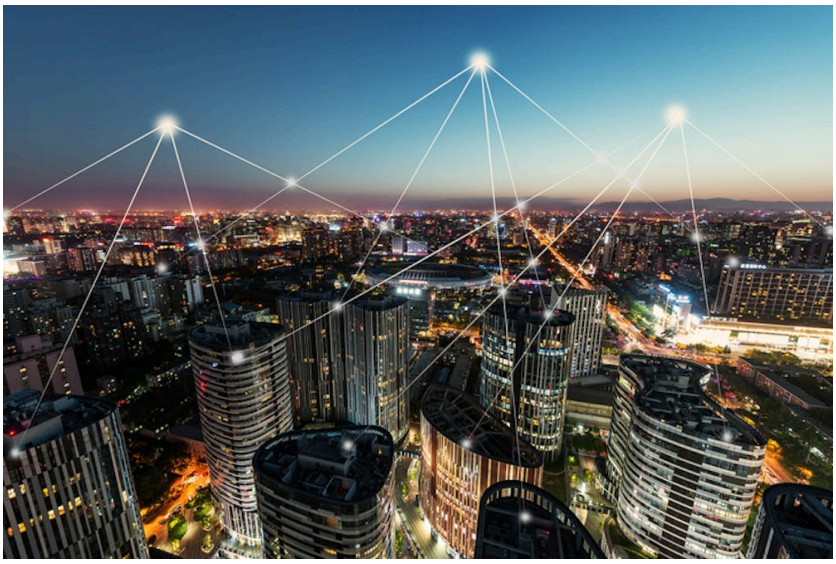


Figure 9. National chains have both direct and indirect costs.

Credit: AerialPerspective Images, Getty Images

Take the example of a nationwide clothing retailer that has branches in 15 different cities as well as a head office, which deals with things like marketing and operations. Each store will have direct costs associated with it. This will include the wages of people who work in that store, the goods they sell and the electricity to keep the shop lights on.

This is simple enough, but what about the wages of the marketing staff working at the head office? And the CEO's salary? How should they be allocated? As these relate to all stores and not just one, they are referred to as indirect costs/overheads. These costs are not directly related to sales of the goods in the 15 retail locations either.

Direct costs

Large companies may divide themselves into sections so they can keep track of what is being spent in the business. Each section will have a budget attached to it and must take care to stay within those allocated amounts.

Direct costs are those that can only be attributed to a single part of the business – that is, directly linked to the sale of the goods or the provision of the service. Examples include:

- staffing cost of employees in that particular section of the business
- utility costs of a single branch of a chain store
- material costs for a product line
- running costs of a single store to be allocated to the correct department

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Figure 10. Types of direct costs.

Indirect costs

Indirect costs are more difficult to allocate than direct costs. Using the example of the clothing retailer, all costs from the head office would be referred to as an indirect cost for the 15 retail branches. The activities carried out in the head office affect all the branches, so it makes sense to split the costs of the head office between the branches.

Indirect costs are different in different companies, but examples may include:

- nationwide advertising campaigns
- accountancy and auditors' fees
- salaries of the board of directors
- expenses of running a central human resources department
- ICT and infrastructure costs

Student view

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The head office.

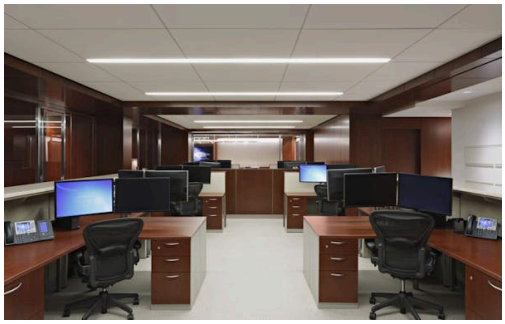
Credit: Liyao Xie, Getty Images

National advertising campaign.

Credit: Jorge Juan Perez / EyeEm, Getty Images

Board members' salaries.

Credit: AzmanL, Getty Images



ICT and infrastructure costs.

Credit: Tom Sibley, Getty Images

Figure 11. Types of indirect costs.

Theory of Knowledge

Businesses such as call centres or restaurants often have a high rate of labour turnover (Subtopic 2.4 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39054/)). Any workers that leave need to be replaced using a recruitment and

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

selection process. This recruiting process and training of new employees will cost the business money.

This situation causes a great deal of uncertainty for a business. You might ask whether it is possible to really know all the costs of a business. How might a business deal with this lack of knowledge about important costs for its operations?

Case study

As a result of the COVID-19 pandemic, remote working has brought benefits to some employees, such as better work—life balance and a reduction in commuting time.

Companies have also benefited from remote working. Some have been able to reduce fixed costs, such as the renting of office space or the provision of coffees and snacks for employees. Others, such as Facebook/Meta and Stripe, have been able to cut costs by offering employees the ability to work remotely and thus relocate to less expensive areas, in exchange for a cut in pay.

Finally, some businesses have been able to hire workers from different regions. This wider labour supply can lead to lower costs for labour, both from salary payments and social security taxes.

1. Define fixed costs. [2 marks]
2. Explain how remote working can reduce fixed costs. [2 marks]

Question 1

Fixed costs are all costs that do not change with the level of output.

Define is an AO1 level command term, requiring the precise meaning of a term.

- One mark is given for a vague definition.
- Two marks are given for a complete definition.
- Definitions do not require application to the stimulus material.

Question 2

Fixed costs do not change with quantity/output. Businesses can reduce fixed costs by lowering expenses such as electricity, salaries and rent. The case study mentions that remote working has enabled businesses to reduce fixed costs by lowering costs of salaries. This has been achieved by allowing workers to work from lower cost geographical areas. Businesses have also reduced office space, resulting in lower rent.

Explain is an AO2 level command term, requiring a detailed account including reasons or causes. Explain *why* and explain *how*.

Student view

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- Other responses may be possible and, if appropriately explained and applied in context, may receive full marks.
- To achieve full marks, you must always include theory and application to the case study in your responses.

3 section questions

Question 1

Which of the following would be considered a variable cost for a private school?

1 The complimentary books that are given to each student ✓

2 School security

3 Staff salaries

4 School fees

Explanation

Variable costs change directly with output. In this case, educated students can be considered the output of the school. For every new student who attends the school, a new set of textbooks will have to be purchased. Therefore, these books can be considered a variable cost. Staff wages and new equipment are unlikely to vary exactly with the number of students enrolled at the school, whereas textbooks will relate directly. School fees are the source of the school's revenue.

Question 2

What can be considered a fixed cost for a hair salon?

1 Staff salaries ✓

2 Electricity

3 Shampoo

4 Discounts offered to return customers

Student view

Explanation

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Fixed costs do not vary directly with output. Staff are likely to be paid the same amount, no matter how many customers they serve. Electricity would be considered a semi-variable cost as it has elements of both fixed and variable cost contained within it. Shampoo and discounts offered also vary with the number of customers.

Question 3

What would be considered an indirect cost for a single store of a national fast-food retailer?

1 National advertising ✓

2 In-store equipment

3 The store manager's salary

4 Purchasing supplies

Explanation

Indirect costs are those not directly related to the sale of goods. National advertising would be paid for out of the budgets of all stores, not an individual store. This, therefore, has to be categorised as an indirect cost. Purchasing supplies, a store manager's salary, and in-store equipment are all used by individual stores as part of selling the store's goods.

Revenues and revenue streams

Total revenue and revenue streams Total revenue and revenue streams

Businesses should aim to at least cover their costs with the revenue they earn from selling their products. This is called breaking even and you will learn more about how this is calculated in Subtopic 5.5 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39338/). If a business cannot break even, or earn more revenue than its costs, it may become insolvent. So, for a business, revenues are just as important as costs of production.

Student view

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Figure 1. Revenue is the most important source of money for businesses.

Credit: Watchara Piriyaputtanapun, Getty Images

More information for figure 1

The image shows a person using a calculator positioned on a table next to a laptop. The laptop screen displays two charts. One appears to be a bar chart and the other possibly a line graph, which are not clearly visible but suggest some financial data or trends. The person is holding a pen and looking at some papers beside the laptop, indicating engagement in financial calculations or analysis.

[Generated by AI]

However, as with costs, it is important to note that the way social enterprises approach revenue may be different from the way commercial enterprises approach revenue. Revenues may be lower for social enterprises than for equivalent commercial enterprises. This is because social enterprises aim to maximise impact and may offer their goods and services at a lower, affordable price than commercial enterprises. This will make their socially or ecologically beneficial products more widely available to consumers.

Revenue

Revenue is the income that a business earns from selling goods and services. If a for-profit enterprise is going to survive, it needs to generate revenue.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Exam tip

Revenue is the amount of money generated by selling products or earning revenue through other means. Revenue should not be confused with profit. Profit is the amount of money left with the business after all costs have been deducted. Revenue in simple terms means how much money is coming into the business when goods or services are sold.

In a simple one-product business, revenue can be calculated using the following formula:

$$\text{Total revenue} = \text{price} \times \text{quantity}$$

Using the example of the coffee shop from Section 3.1.1 (/study/app/business-hl/sid-351-cid-762729/book/cap-and-rev-expenditure-id-39227/), assume that the business is able to sell its coffee for $4 per cup. The revenue earned at different levels of output is shown in **Table 1** and graphed in **Figure 2**.

Table 1. Revenue earned from different quantities (output) of cups of coffee sold.

Quantity of cups of coffee (output)	Sales revenue in one month ($) ($4 per cup of coffee sold)
0	(0 x 4) = 0
500	(500 x 4) = 2000
1000	(1000 x 4) = 4000
1500	(1500 x 4) = 6000
2000	(2000 x 4) = 8000
2500	(2500 x 4) = 10 000
3000	(3000 x 4) = 12 000

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

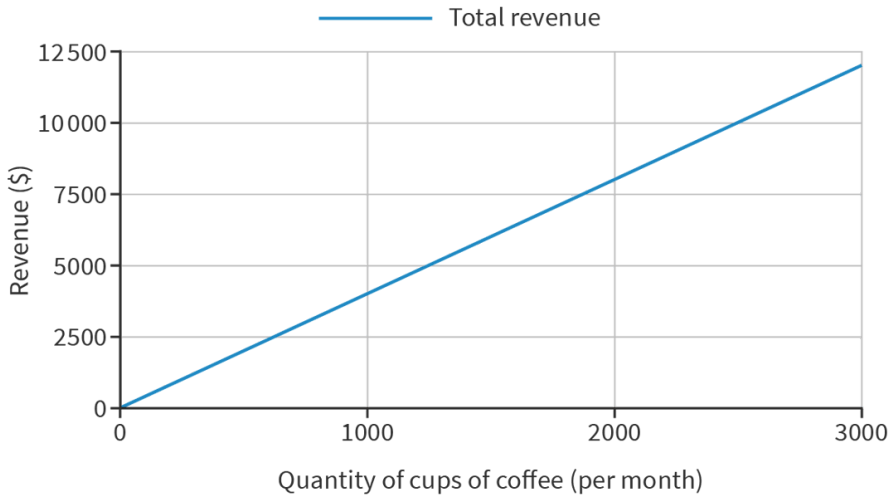

Figure 2. Revenue for a coffee shop with one coffee product.

More information for figure 2

The graph is a line chart illustrating the relationship between the quantity of coffee sold per month and the total revenue generated from these sales. The x-axis represents the 'Quantity of cups of coffee (per month)' ranging from 0 to 3000. The y-axis denotes 'Revenue ($)' with values ranging from 0 to 12500. There is a blue line labeled 'Total revenue' that increases linearly, indicating a direct relationship between the quantity sold and the revenue. As the quantity of coffee sold increases, the total revenue rises proportionately.

[Generated by AI]

Figure 3 shows total revenue graphed with the variable costs, fixed costs and total costs. Notice the point where total revenue and total costs intersect. This is known as the break-even point. You will learn more about the importance of this point in Subtopic 5.5 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39338/).

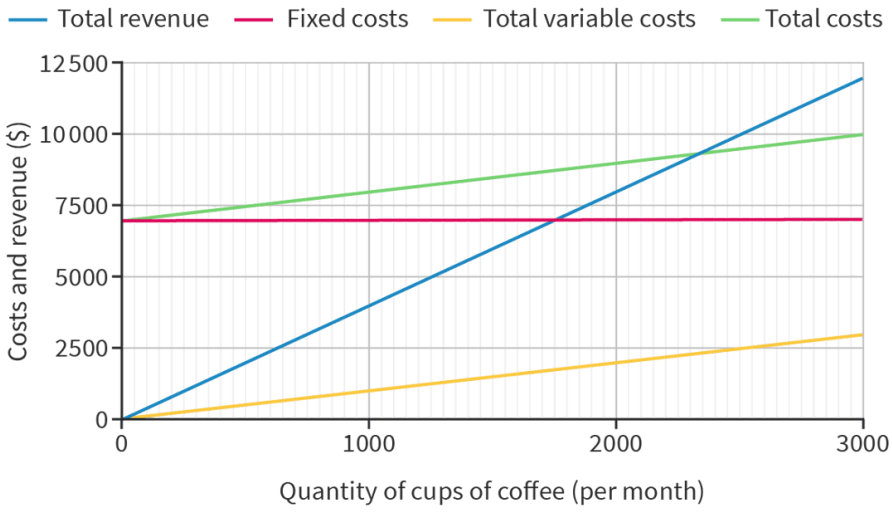

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Figure 3. Total revenue, fixed costs, variable costs and total costs for a coffee shop with one coffee product.

More information for figure 3

The line graph illustrates costs and revenue for a coffee shop with various lines labeled as total revenue, fixed costs, total variable costs, and total costs. The X-axis represents the quantity of cups of coffee sold per month, ranging from 0 to 3000, while the Y-axis shows costs and revenue in dollars, from 0 to 12,500. The total revenue line is blue, rising steadily from the origin to $12,500 at 3000 cups. Fixed costs are marked with a red line, remaining constant at approximately $7,500 across all quantities. Total variable costs, shown in yellow, increase gradually, starting from $0 and climbing to about $5,000 at 3000 cups. The total costs line, green, initially starts at the same level as fixed costs and rises to meet the level of total revenue at the break-even point, intersecting the total revenue line. This break-even point occurs around the quantity where total revenue and total costs intersect.

[Generated by AI]

Making connections

Variable costs, fixed costs, total costs and revenue will be used in Subtopic 5.5 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39338/) to calculate the break-even point of a business. The break-even point refers to the quantity of product that a business needs to sell in order to cover total costs with its revenue. You and your teacher may want to cover Subtopic 5.5 straight after this subtopic in order to be able to apply your understanding of costs and revenues to break-even analysis.

Revenue streams

The example used above assumes that the business is selling only one product. However, many businesses will sell more than one product, or perhaps different products and services. These are called different revenue streams.

A revenue stream is one specific way that a company generates income. To take the coffee shop example again, it is likely that the shop sells more than just cups of coffee. It might also offer tea, soft drinks, cakes, sandwiches or other food. Another example is a cinema. Cinemas do not only sell movie tickets. They have other revenue streams such as food and drink, or movie-related products. Larger, more complex businesses may have extra office space that they rent out, or may even earn interest income from loans to other businesses.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

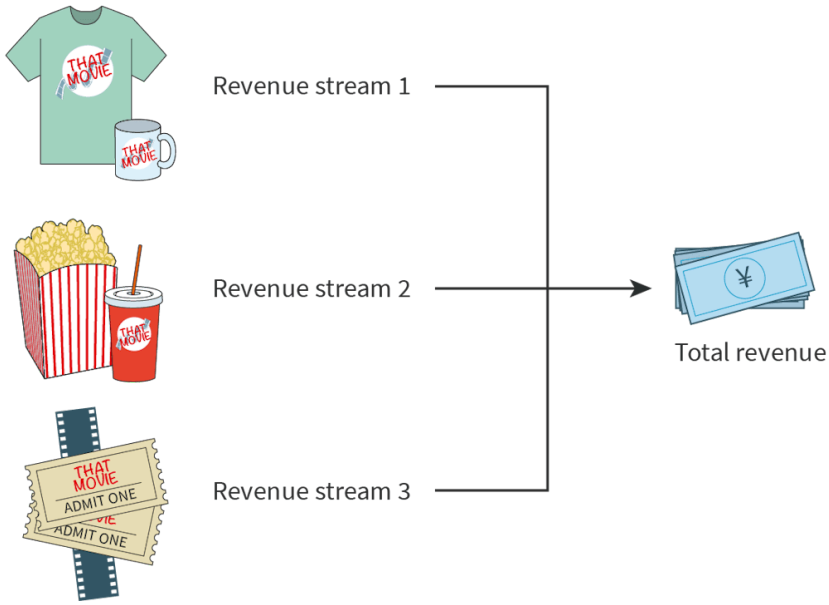

Figure 4. Total revenue and revenue streams for a cinema.

More information for figure 4

The diagram illustrates three revenue streams for a cinema contributing to total revenue. The first stream consists of merchandise, represented by a t-shirt and a mug with the logo "That Movie" on them. The second stream includes food and drinks, depicted by a popcorn box and a soda cup, both branded with "That Movie." The third stream represents ticket sales, shown as two cinema tickets also marked with "That Movie." All three streams converge into a final representation of bundled cash, symbolizing total revenue.

[Generated by AI]

When a business has multiple and diverse revenue streams, it becomes more resilient. Thus, when the revenue from one area declines, for example due to changes in the external environment (such as a pandemic), the business may still be earning revenue from other streams. Like a biodiverse ecosystem, a diverse set of revenue streams will make a business better able to withstand disruptions.

Activity

Go to a local business that you or your family regularly visit. See if you can identify more than one revenue stream for the business, perhaps taking some photographs if appropriate (you may need to ask the business for permission). Share with the class.

Student view

3 section questions

Overview (/study/ap hl/sid-351-cid-762729/o

Question 1

‘Income from selling goods and services’ defines which key term?

1 Revenue ✓

2 Revenue streams

3 Profit

4 Total costs

Explanation

Revenue is the total money generated by a company before costs are excluded. Profit is calculated after costs have been subtracted. Revenue streams are the many channels through which a business can generate revenue. Finally, total costs involve the company paying money, not receiving it in income.

Question 2

Which of the following would not be an example of a revenue stream for an airline?

1 Jet fuel ✓

2 Ticket sales

3 Inflight food and drink sales

4 Money from customer upgrades

Explanation

Jet fuel is an example of a cost. Upgrades and food and drink sales are both additional revenue streams and the airline will make its main revenue from ticket sales.

Question 3

In a simple one-product business, how is sales revenue calculated?

1 Selling price multiplied by output sold ✓

2 Sales minus variable costs

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

3 Fixed cost divided by sales revenues

4 Total output minus fixed costs

Explanation

In a simple one-product business, revenue can by calculated using the following formula:

$$\text{Total revenue} = \text{selling price} \times \text{output}$$

Terminology exercise

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/terminology-exercise-id-39303/print/) Assign

Check that you understand the terminology used in this subtopic by dragging the correct word into each space.

One of the most important business objectives of a for-profit enterprise is to make profit. Profit can be calculated as the difference between total costs and total .

Costs can be classified as costs – which are those costs that do not change with the level of output – and costs – which are those costs such as raw material expenses that do vary directly with output.

Also, costs refer to those costs which can be clearly identified with the production of one good or a production centre, while costs include expenses such as promotional expenditure or accounting and legal expenses that may be shared across goods or production centres.

Adding together the sales revenue and the other revenue streams of a business gives the revenue.

direct revenues fixed total variable indirect

Check

Student view

Tool: Decision tree

A decision tree, also called a probability tree, is a tool that helps businesses make decisions by putting an estimated value on various options. It is particularly useful when a business needs to choose between investment decisions.

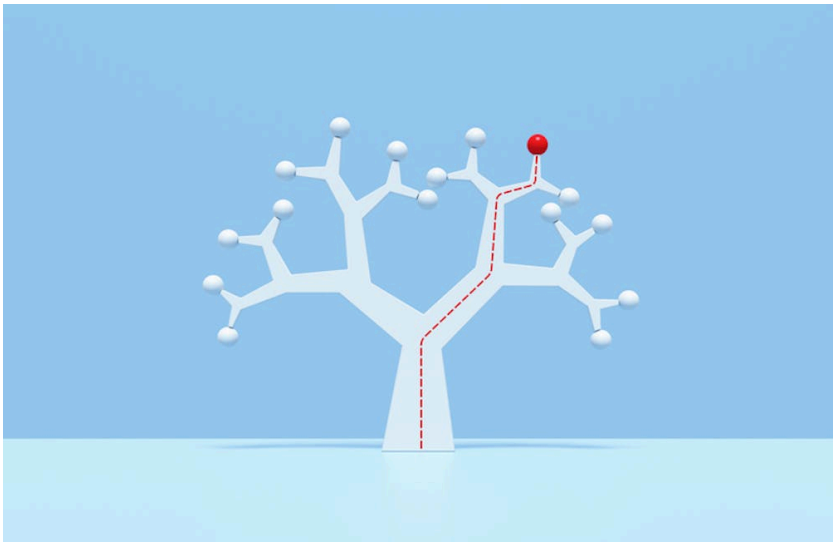

Figure 1. A decision tree enables a business to evaluate its alternatives.

Credit: Jorg Greuel, Getty Images

More information for figure 1

The image shows a stylized representation of a decision tree, typically used to evaluate business alternatives. It features a central trunk branching out into multiple smaller branches, each terminating in nodes. A particular path from the base to one of the upper nodes is highlighted in red, indicating a specific decision path. The background is a plain blue, emphasizing the white color of the tree structure. This diagram is a visual metaphor for decision-making processes, illustrating how different choices and their outcomes can be mapped. Although the tree appears abstract, it represents the branching nature of decision-making and the potential consequences of different paths.

[Generated by AI]

Overview (/study/ap hl/sid-351-cid-762729/o

A decision tree is a quantitative, forward-looking tool. Decision trees are designed to answer questions such as, 'Given a 60% chance that a company can succeed in a new market, should it pursue its plans to expand its factory?' Decision trees are drawings that use particular elements, as shown in **Figure 2**.

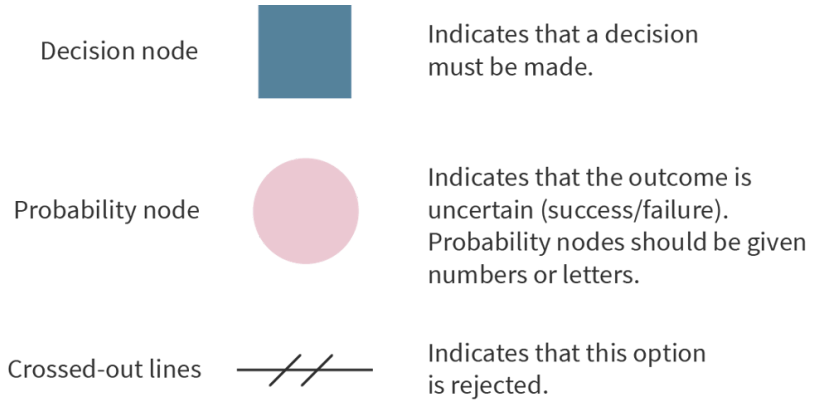

Figure 2. Elements of a decision tree.

More information for figure 2

The image is a diagram illustrating symbols used in decision trees. It contains three components:

1. A blue rectangle labeled "Decision node" with an explanation that it indicates a decision must be made.
2. A pink circle labeled "Probability node" with an explanation that it signifies an uncertain outcome (success or failure), and that these nodes should be labeled with numbers or letters.
3. Two crossed-out lines labeled "Crossed-out lines" with an explanation that it indicates this option is rejected.

[Generated by AI]

Exam tip

When drawing a decision tree in the exam, make sure you include a key that outlines the elements of the decision tree: the decision node, the probability node and the rejected options. It is usually not possible to earn full marks unless this key is included.

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/revenues-and-revenue-streams-id-39302/print/) Assign

Student view

When you construct a decision tree, you need to do two things. The first is to draw the decision tree; the second is to solve the decision tree. Drawing and solving a decision tree are explained in the following example.

Overview (/study/app/hl/sid-351-cid-762729/o

Drawing a decision tree

Imagine you run a business that manufactures machine components, and you decide to enter a new market. Based on research, the probability that the business will succeed in the new market is 60%, while the probability that it will not succeed in the new market is 40%. You need to decide whether or not to expand the factory. Such an expansion would enable you to meet possible new demand in the new market. Assume such an expansion to the factory would cost $10 million.

Start drawing a decision tree by representing your two options as separate lines extending to the right of the decision node (as shown in **Figure 3**). Option 1 is to expand the factory at a cost of $10 million. Option 2 is to leave the factory as it is and not to expand it. If the factory is not expanded, there will be no costs. The parentheses are used to indicate that these are negative numbers because they represent costs.

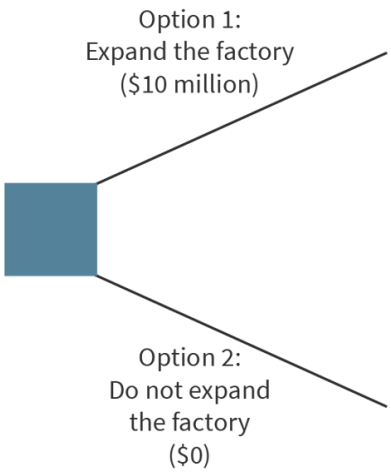

Figure 3. Drawing the first part of the decision tree to show the costs associated with the two options.

More information for figure 3

The image shows a decision tree representing two options from a decision node, depicted as a square. The first option extends to the right labeled "Option 1: Expand the factory ($10 million)", indicating the cost associated with expanding. The second option runs below the first, labeled "Option 2: Do not expand the factory ($0)", representing no cost if the factory remains unchanged. Each option extends as separate lines from the same decision node.

[Generated by AI]

Student view

Now that you have drawn your options, you need to add the probabilities of the two outcomes (success or failure in the new market). Start by adding probability nodes to the decision tree. These are shown by the two circles numbered 1 (for option 1) and 2 (for option 2) in **Figure 4**.

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The probabilities of the two outcomes should be written along the lines extending to the right of these probability nodes.

The chance of a particular outcome occurring is given a value. If the outcome is certain, the probability will be 1; if there is no chance of the outcome occurring, the probability will be zero. In practice, the values of the probabilities will be between 1 and zero. In this case, 0.6 equates to the 60% chance that the business is successful in entering the new market; 0.4 equates to the 40% chance that the business is not successful.

The probabilities that extend from each probability node always total 1 or 100%, because there is a 100% chance that something will happen. In this case, there will either be a success, or there will not be a success. Note that in this simple example there is only one uncertain event; this is why the probabilities extending from probability nodes 1 and 2 are the same. However, it could be that in more complex scenarios, with more options, the probabilities will be different for each option.

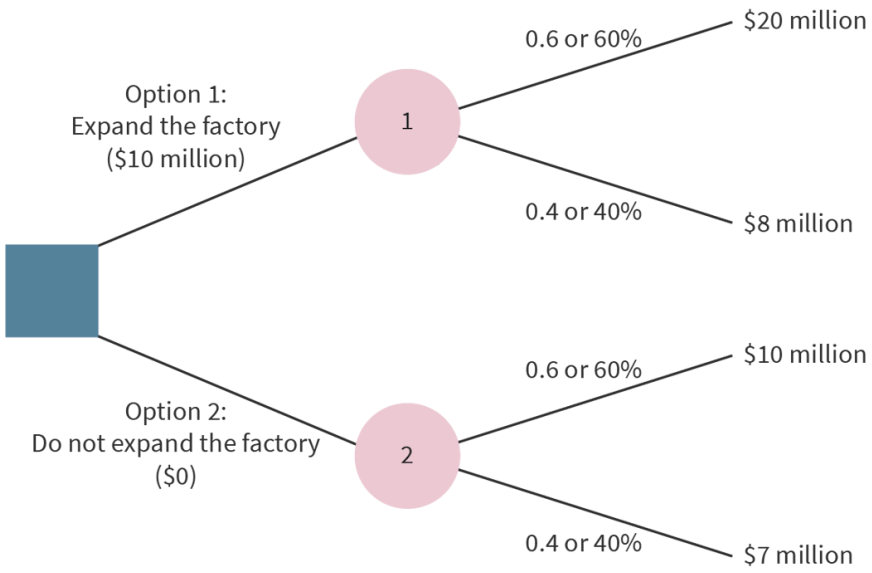

Figure 4. Drawing the second part of the decision tree to show the probabilities associated with each option.

More information for figure 4

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/types-of-costs-expenses-id-39301/print/) Assign

The diagram is a decision tree with two main options labeled "Option 1: Expand the factory ($10 million)" leading to two probability nodes labeled 1 and 2. From node 1, there are two branches: one with a probability of 0.6 (or 60%), resulting in $20 million revenue, and another with a probability of 0.4 (or 40%), resulting in $8 million revenue. Option 2 is "Do not expand the factory ($0)" leading to node 2, which also has two branches: a 0.6 probability resulting in $10 million, and a 0.4 probability resulting in $7 million. The probabilities from each node total 100%, representing the certainty of an outcome occurring from each decision point.

[Generated by AI]

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

If you decide to expand the factory (option 1) and if the company is successful in the new market, it will be able to sell more components. As a result, the estimated revenues are $20 million over the life of the project. If you decide to expand the factory and the company is not successful in the new market, revenues earned by the enlarged factory will be lower, at $8 million.

If you decide not to expand the factory (option 2), the company will be unable to meet a higher level of demand. As a result, if the company is successful in the new market, the estimated revenues will only be $10 million. If the company is not successful with its current factory capacity, expected revenues would be $7 million.

All these expected revenues should be written at the end of the branches of the decision tree (as shown in **Figure 4**).

Solving the decision tree

Once you have drawn the decision tree, you can calculate the expected value (EV) of expanding the factory compared to the expected value of not expanding the factory, given the uncertainty of the success. Solving the decision tree to find these expected values involves three steps, as follows:

Step A: Calculate the expected value (EV) of revenues from each possible outcome. The expected value of revenues is the estimated revenue multiplied by the probability that it will happen. It can be helpful to write the EVs at the end of the branches as shown in **Figure 5**.

Expected values for option 1 (expanding the factory):

- If successful: $0.6 \times \$20 \text{ million} = \$12.0 \text{ million}$
- If unsuccessful: $0.4 \times \$8 \text{ million} = \$3.2 \text{ million}$

Expected values for option 2 (**not** expanding the factory):

- If successful: $0.6 \times \$10 \text{ million} = \$6.0 \text{ million}$
- If unsuccessful: $0.4 \times \$7 \text{ million} = \$2.8 \text{ million}$

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Step B: Calculate the **total** expected value of each of the two possible outcomes (success or not) for each option (expand the factory or not). It can be helpful to write the total expected value of each option above or below the probability node, as shown in **Figure 5**.

Total expected value for option 1 (expanding the factory):

- $\$12 \text{ million} + \$3.2 \text{ million} = \$15.2 \text{ million}$

Total expected values for option 2 (**not** expanding the factory):

- $\$6 \text{ million} + \$2.8 \text{ million} = \$8.8 \text{ million}$

Step C: Calculate the **net** expected value of each option by subtracting the initial costs. This number can be written next to the decision node, as in **Figure 5**.

Net expected value for option 1 (expanding the factory):

- $\$15.2 \text{ million} - \$10 \text{ million} = \$5.2 \text{ million}$

Net expected value for option 2 (**not** expanding the factory):

- $\$8.8 \text{ million} - \$0 = \$8.8 \text{ million}$

The completed tree will be as shown in **Figure 5**.

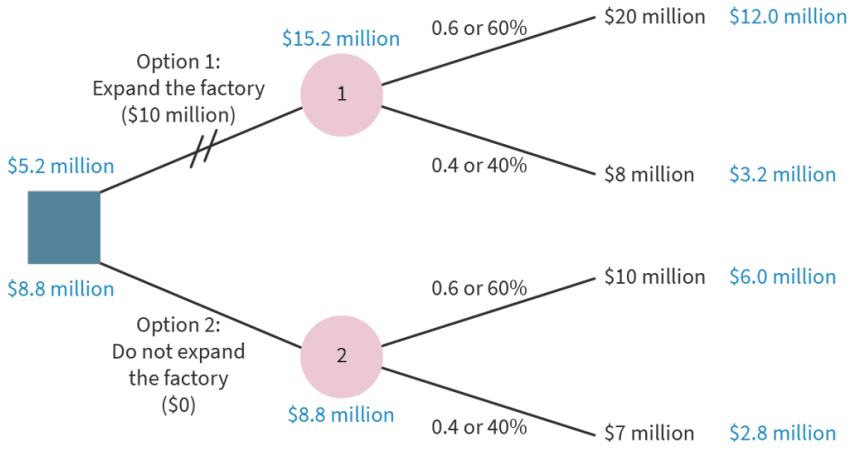

Figure 5. Solving the decision tree.

More information for figure 5

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

This is a decision tree diagram illustrating two main choices regarding factory expansion. The initial node splits into two options: Option 1, 'Expand the factory,' requires a $10 million investment, while Option 2, 'Do not expand the factory,' requires no additional cost. For each option, further decision paths with associated probabilities and outcomes are shown.

Option 1 leads to two outcomes: a 60% probability (0.6) of a $20 million outcome, resulting in a $12.0 million expected value, and a 40% probability (0.4) of an $8 million outcome, leading to a $3.2 million expected value.

Option 2 also leads to two outcomes: a 60% probability (0.6) of a $10 million outcome, producing a $6.0 million expected value, and a 40% probability (0.4) of a $7 million outcome, yielding a $2.8 million expected value.

These paths show the expected values depending on the calculated probabilities and forecasted profits, illustrating the potential outcomes of the factory expansion decision.

[Generated by AI]

The following equations summarise the calculations involved in solving the decision tree. EV stands for expected value, which is the predicted profit of each outcome given the expected probabilities and the forecast profits.

EV of expanding the factory net of costs
$= (0.6 \times \$20 \text{ million}) + (0.4 \times \$8 \text{ million}) - \$10 \text{ million}$

$= \$5.2 \text{ million}$

EV of not expanding the factory net of costs
$= (0.6 \times \$10 \text{ million}) + (0.4 \times \$7 \text{ million}) - \$0$

$= \$8.8 \text{ million}$

On purely estimated financial grounds, the factory should not be expanded, since the expected value of this option (option 2) is $8.8 million, while the expected value of expanding the

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

factory (option 1) is only $5.2 million. The rational decision, based only on this quantitative data, is therefore not to expand the factory. The option to expand (option 1) is therefore the 'rejected option'; that line on the decision tree is therefore crossed out.

Exam tip

To access full marks, you are expected to write out the working, as above, in addition to providing the information on the decision tree.

Also, it is important to indicate the rejected option(s) on the decision tree.

Activity

The Doctrex laboratory has carried out research for new treatments for influenza. The researchers have identified three different programs (A, B and C) to develop a vaccination. The costs, probabilities and revenue of these programs are given in **Table 1**.

Table 1. Costs, probabilities and revenue of programs A, B and C.

Program	Costs (in thousands of $)	Probability of success	Revenue (in thousands of $)	Probability of failure
A	2000	0.3	20 000	0.7
B	2600	0.4	17 000	0.6
C	1400	0.5	9000	0.5

1. Construct a fully labelled decision tree. [4 marks]
2. Calculate the expected value (EV) of the three programs and recommend an option to follow based on this information. [2 marks]

1. The decision tree should be drawn as follows:

Student view

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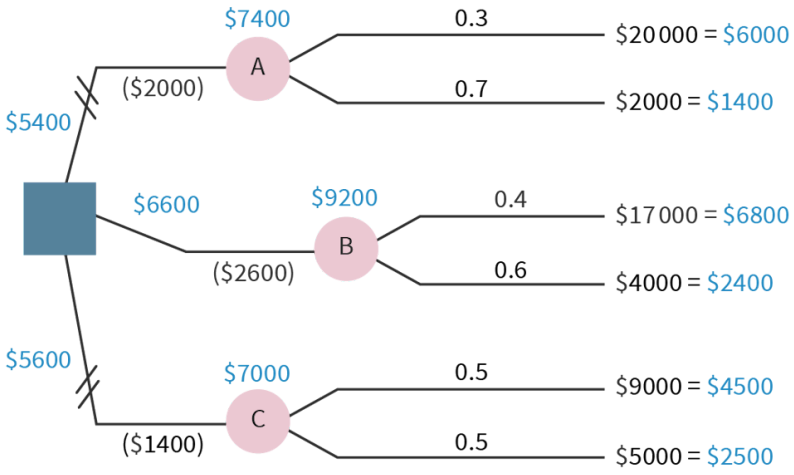

Figure 6. Decision tree for programs A, B and C (with figures in thousands of $)

2. The expected values of the three programs are:

EV of program A: (6000 + 1400) — 2000 = $5400 (thousand)
EV of program B: (6800 + 2400) — 2600 = $6600 (thousand)
EV of program C: (4500 + 1400) — 2000 = $5600 (thousand)

The best option, considering only the quantitative estimated value, is B because it has the largest estimated value at $6 600 000.

Solving more complex decision trees

Decision trees can be more complex than the example outlined in this section. A branch with a decision can lead to further decisions or probabilities with their own probabilities and branches, which might look like the diagram shown in **Figure 7**. **Figure 7** illustrates a complex decision tree that has an additional subset of decision nodes (indicated by the squares).

Student view

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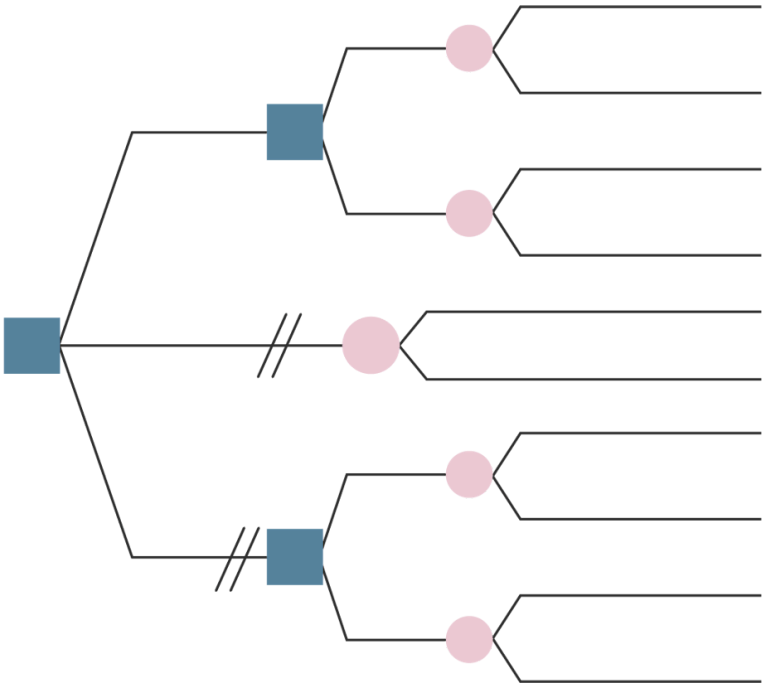

Figure 7. A more complex decision tree has additional nodes and branches.

More information for figure 7

The image depicts a complex decision tree diagram. It starts with a blue square node, expanding into three main branches. Each branch leads to further decision nodes represented by pink circles, some of which branch out again creating subsequent layers.

- The top branch from the initial blue node splits, leading to another blue square node, which then bifurcates into two more branches ending in pink circular nodes.
- The middle branch from the initial blue node narrows into a pink circle, then splits into two branches culminating in pink circular nodes.
- The bottom branch leads to a path where a blue square node splits into two paths that end in pink circles.

This diagram illustrates decision points and possible outcomes through its bifurcating structure, suggesting multiple pathways and scenarios.

[Generated by AI]

Solving these more complex decision trees is no different from solving the simpler version you have worked with until now. You would construct the decision tree with the decision nodes and branches from left to right. You would then solve the decision tree from right to left to determine the estimated values.

Student view

Overview (/study/app/business-hl/sid-351-cid-762729/o

It is also possible to put 'no change' on a decision tree branch. That way you can compare the results of various options to the revenues and costs associated with the current situation of the business.

Activity

Learner Profile: Knowledgeable
Approaches to Learning: Thinking skills (transfer)

Coffee Stop (CS) is a small cafe serving a variety of coffee drinks and healthy snacks. CS wants to increase its profits and is considering several options, as outlined below.

Option 1: Establish fair trade relationships with coffee farmers to better target ethical consumers.

Option 2: Buy a second coffee machine, that is either:

- **2a:** the same type of manual machine that the cafe currently owns
- **2b:** a new type of coffee machine that grinds and makes the coffee automatically, but still requires a person to operate

For both options 2a and 2b, the cafe would need to hire another employee, which would cost $75 000 over five years.

The probabilities, additional costs and additional revenues forecast for each option are given in **Table 2**. The costs and revenues are projected over a five-year period.

Table 2. Forecast additional costs, additional revenues and probabilities of each option for five years.

Option	Forecast additional costs ($)	Forecast additional revenue if successful ($) (Probability 0.50)	Forecast add revenue if successful (Probability
Option 1 Establish fair trade relationships with coffee farmers.	18 000	32 000	20 000
Option 2a Buy the same type of coffee machine requiring manual operation.	4000	120 000	50 000

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Option	Forecast additional costs ($)	Forecast additional revenue if successful ($) (Probability 0.50)	Forecast add revenue if successful (Probability
Option 2b Buy a new type of coffee machine that grinds and makes coffee automatically.	11 000	140 000	50 000

Questions

1. Construct a fully labelled decision tree. [4 marks]
2. Calculate the expected value (EV) of the three options and recommend an option to follow based on this information. [2 marks]

Question 1

Construct a decision tree as shown in **Figure 8**.

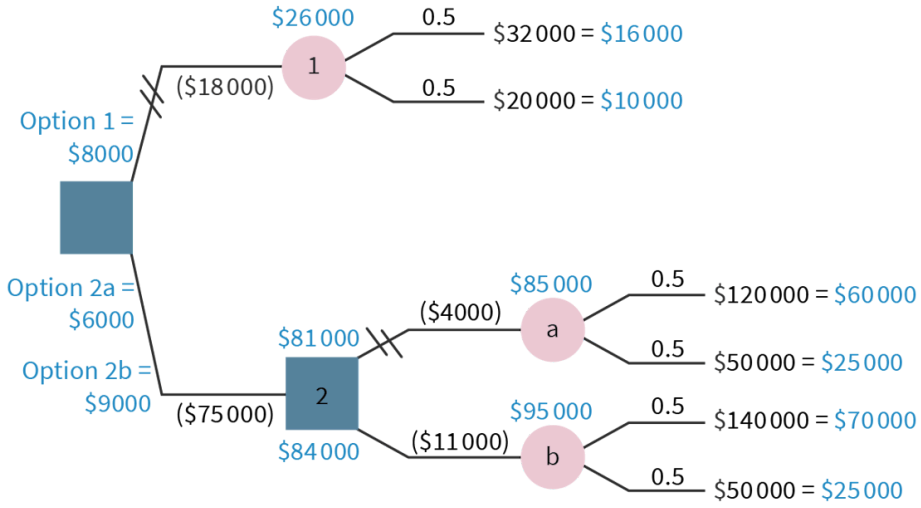

Figure 8. Decision tree for Coffee Stop.

Question 2

The expected values of the three programs are:

EV of option 1: (16 000 + 10 000) — 18 000 = $8000
EV of option 2a: (60 000 + 25 000) — 4000 — 75 000 = $6000
EV of option 2b: (70 000 + 25 000) — 11 000 — 75 000 = $9000

The best option, considering only the quantitative estimated value, is option 2b because it has the largest estimated value of $9000.

Student view

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However, it is important to consider that there may be other, qualitative reasons for choosing a different option. For example, if CS is trying to improve its global—social and global—ecological impact, then it might choose option 1, even though that option has a lower estimated value.

In general, if the estimated values of the different options are close to one another, a business may be more likely to consider other qualitative factors in the decision.

Evaluation of the decision tree tool

Table 3 outlines some of the advantages and disadvantages of using the decision tree tool for making business decisions.

Table 3. Advantages and disadvantages of the decision tree tool.

Advantages	Disadvantages
Visual representation. Provides a clear representation of complex problems, making the alternatives easier to understand and communicate.	**No qualitative factors.** Does not take qualitative factors into account.
Risk consideration. Allows for the integration of uncertainty (risk) into the analysis.	**Estimated values.** Probabilities used are only estimates, as are the projected revenues, and could lead to false results.
All options. Considers all available options, even the 'don't change' option, which is often ignored.	**Prone to bias.** The probabilities and the estimated figures for profit and loss might be prone to bias from the decision-maker, who may favour one option over another. This could lead to inaccurate results.

Student view

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3. Finance and accounts / 3.3 Costs and revenues

Checklist

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/checklist-id-39305/print/) Assign

What you should know

By the end of this subtopic, you should be able to:

- define the following terms: (AO1)
  - costs
  - fixed costs
  - variable costs
  - total costs
  - sales revenue
  - expected value
  - contribution
  - cost centre
  - profit centre
  - expected value
- distinguish between fixed costs, variable costs, semi-variable costs, direct costs and indirect costs, using examples (AO2)
- distinguish between revenue and revenue streams, using examples (AO2)
- prepare a decision tree and recommend a course of action for a business based on the results (AO4, AO3)

3. Finance and accounts / 3.3 Costs and revenues

Reflection

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/reflection-id-48321/print/) Assign

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Teacher instructions

The goal of this section is to encourage students to pause at the end of the subtopic and to reflect on their learning. Students can use the questions provided below to guide their reflection. The questions encourage students to look at the bigger picture and to consider how the subtopic's contents might have impacted the way they view the subject.

The following table shows you how each prompt aligns to the DP *Business management guide*:

Prompt #	Syllabus alignment
1	**Concept:** Ethics
2	**Learner profile:** Open-minded
3	**Tool:** Decision trees

Students can submit their reflections to you by clicking on 'Submit'. You will then see their answers in the 'Insights' part of the Kognity platform.

Reflection

In this subtopic you learned about costs and revenues of businesses.

Take a moment to reflect on your learning so far. You can use the following questions to guide your reflection. If you click 'Submit', your answers will be shared with your teacher.

1. Publicly held companies have an obligation to the shareholders. Do they also have an obligation to the customers to maintain their low prices in the face of rising costs?
2. To reduce fixed costs, businesses often choose to close storefronts and sell online. You may see online clothing retail stores, dark kitchens (catering kitchens optimised for food delivery) and online marketplaces in your social media feed rather than in a mall. Despite this trend, many companies still maintain a physical presence. What do you predict for the future: will there still be brick-and-mortar stores or will most commerce move online?
3. Is it ever possible to correctly assign the probability of success/failure values in a decision tree analysis (see Section 3.3.4 (/study/app/business-hl/sid-351-cid-762729/book/tool-decision-tree-

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

id-39304/))?

⚠ Once you submit your response, you won't be able to edit it.

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Submit

Rate subtopic 3.3 Costs and revenues

Help us improve the content and user experience.

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Student view