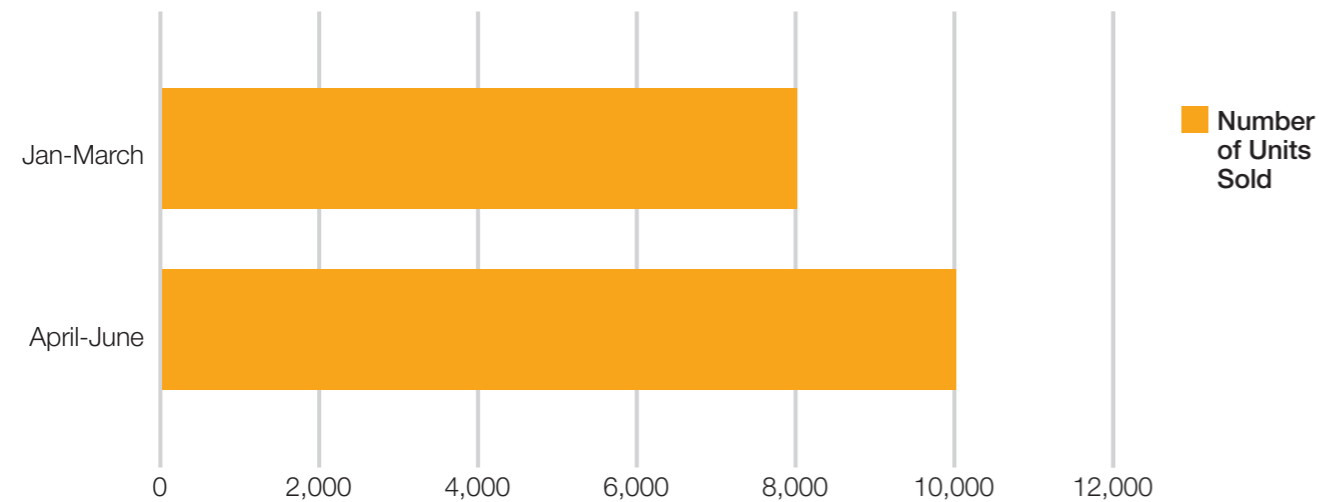


### Question 9

In 2015, a business sold 50,000 units. Selling price per unit was £5 and the variable cost per unit was £1.50. Fixed costs for the year were £75,000. In 2016, the business reduced the selling price per unit by 5%. This led to an 8% increase in the number of units sold. Calculate how much profit the business made in 2016, assuming variable cost per unit and fixed costs remained the same.

### Question 10

Below is a chart showing the number of units a business sold over a 6 month period. Between January and March, the selling price per unit was £15 and the variable cost per unit was £5. Due to a change in supplier, the variable cost per unit fell by 20% between April and June. Because of this, the business decided to reduce its prices by 10% during this period. Fixed costs are £60,000 per year. Based on this information, calculate the average monthly profit between January and June.



## 2 Decision Trees

The AQA Specification states that students should be able to understand and interpret decision trees and calculate expected value and net gains. However, one activity has been included that requires the construction of a decision tree, as this can help to deepen understanding.

### Question 1

A business is considering developing a new product. The probability of the new product being a success is 0.7 and should lead to an extra £500,000 in sales. The probability of failure is 0.3 and this would lead to additional sales of £50,000. Calculate the expected value of the new product.

### Question 2

The business in question 1 has re-evaluated the new product option and now believes that the probability of the new product being a success will be 0.6 and the probability of the new product being a failure will be 0.4. The business also believes that if the product is a success then sales revenue will be 5% higher than originally estimated, but if it fails the additional sales generated will be as previously predicted. Calculate the new expected value.

### Question 3

A clothes shop is considering opening a second retail outlet. The cost of opening this second outlet is estimated to be £80,000. The probability of the new retail outlet being a success is 0.8 and would result in £220,000 of revenue being generated. The probability of failure is 0.2 which would result in £90,000 of revenue being gained. Calculate the net gain of the proposal.



### Question 4

A pub is considering converting its first floor into 10 rooms which can be let out on a bed and breakfast basis. The table below contains the forecasted data of the proposed conversion. Calculate the expected value and net gain of the proposed conversion.



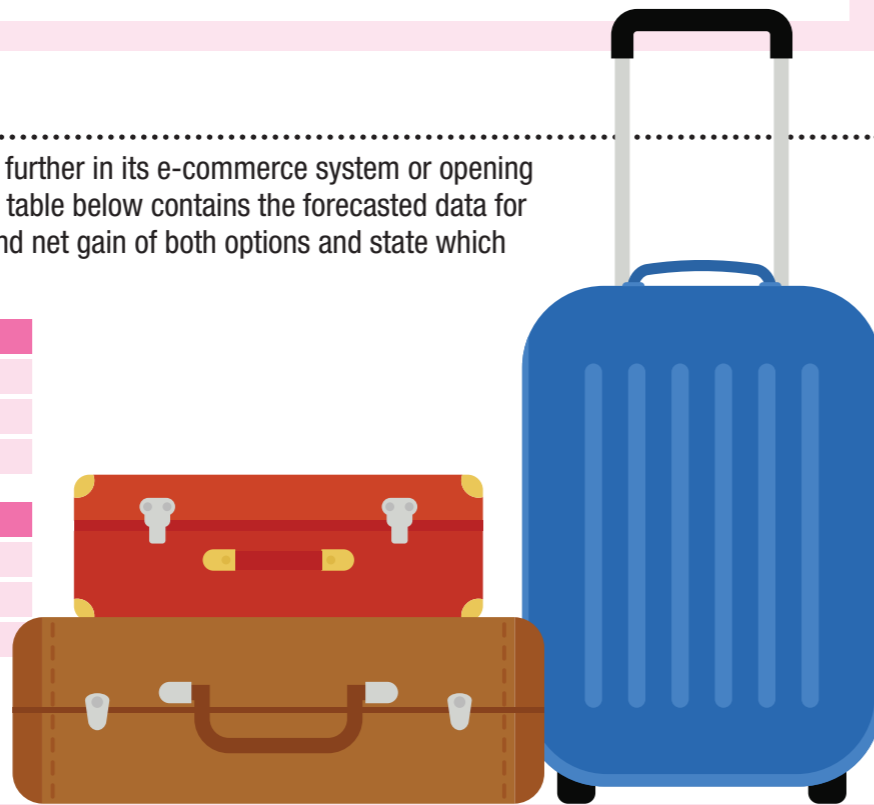
Cost of investment	£180,000
Probability of revenue being £340,000 per year	0.6
Probability of revenue being £210,000 per year	0.4

### Question 5

A travel agent is considering either investing further in its e-commerce system or opening a new branch in a different part of town. The table below contains the forecasted data for both options. Calculate the expected value and net gain of both options and state which option should be chosen based on the data.

E-Commerce System	
Cost of Investment	£80,000
Probability of revenue being £120,000	0.7
Probability of revenue being £40,000	0.3

New Branch	
Cost of Investment	£65,000
Probability of revenue being £90,000	0.8
Probability of revenue being £55,000	0.2



### Question 6

A business is looking at two options to increase sales.

#### Option 1

Probability of high sales is 0.6 which would result in sales being £50,000. Probability of low sales is 0.4 and would result in sales being 1/8 lower than if sales were high. The cost of this option is £20,000.

#### Option 2

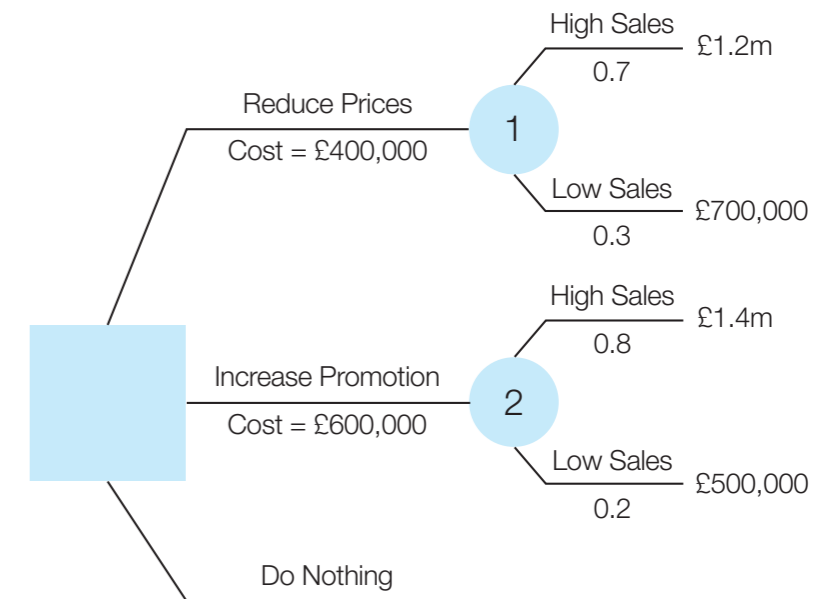
Probability of high sales is 0.7 and would result in sales being 15% higher than if sales were low. Probability of sales being low is 0.3 and would result in sales being £40,000. The cost of this option is £18,000.

Calculate the expected value and net gain of both options and state which option should be chosen based on the data.

### Question 7

A local supermarket is considering two options to increase sales. One option is to reduce prices; the other option is to increase promotion. Opposite is a decision tree outlining the cost, probability and expected sales from both options.

Calculate the expected value and net gain of both options and state which option should be chosen based on the data.



### Question 8

A UK holiday park company is considering two options to increase profits. One option is to open a further park in the UK. The other option is to open a park in the south of France.

#### UK Park

The cost of opening a further park in the UK is estimated to be £1.5 million. The probability of the venture being a success is 0.7. This would result in estimated sales of £2.2 million. Failure would result in estimated sales of £800,000.

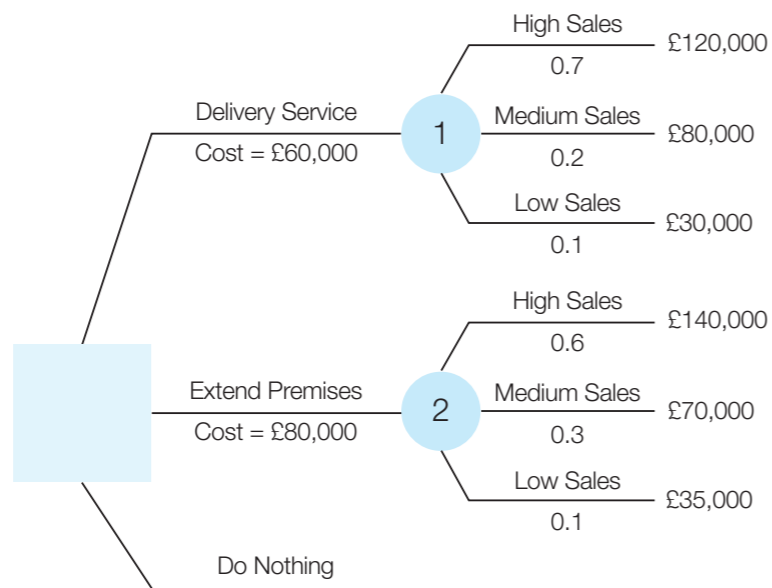
#### South of France Park

The cost of opening a park in the south of France is estimated to be £2.2 million. The probability of the venture being a success is 0.6. This would result in estimated sales of £3 million. Failure would result in estimated sales of £1.8 million.

Calculate the expected value and net gain of both options and state which option the business should choose based on the data.

### Question 9

A restaurant is looking at two options to increase sales. The first option is to offer a delivery service to customers within a 10 mile radius of the restaurant. The second option is to extend the premises to increase overall capacity. Opposite is a decision tree outlining the cost, probability and expected sales from both options. Based on the data, calculate the expected value and net gain of both options and state which option should be chosen.



### Question 10

A car showroom is considering 2 different options to increase sales. The first option is to increase the size of the sales team by employing 5 new staff. This will cost £200,000. The probability that this will result in high sales is 0.7 and should result in sales of £500,000. The probability of low sales is 0.3 and if sales are low, then this will result in sales of £250,000.

The second option is to extend the size of the showroom to accommodate more vehicles. The cost of the extension is estimated to be £80,000. The probability of high sales is 0.6, the probability of medium sales is 0.3 and the probability of low sales is 0.1. Low sales have been estimated to be £180,000, medium sales have been estimated to be £240,000 and high sales have been estimated to be £350,000.

Construct a decision tree and calculate the expected value and net gain of both options. State which option the business should choose based on the data.

