



Oxford Cambridge and RSA

Level 3 Certificate
Quantitative Reasoning (MEI)
H866/01 Introduction to Quantitative Reasoning

Insert

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Lotteries and raffles

In the UK National Lottery players enter by selecting 6 numbers from 1 to 59. Twice each week numbers are selected at random on a television show. To win the jackpot players must match all 6 numbers. If they match fewer numbers they may win a smaller amount. Players may enter multiple times for each draw, choosing a different set of numbers each time. Many players enter every draw. The outcome of each draw is independent.

People who enter the lottery are also entered into a raffle. In this type of game a fixed number of entries is selected at random to win a prize.

Many other countries have similar lottery and raffle systems. There is also a Europe-wide game called “Euromillions” which has a similar lottery and raffle structure to the UK National Lottery.

Although some prizes are very large the probability of winning the jackpot is very, very small; for example the probability of winning the jackpot in the UK National Lottery is about 1 in 45 million. Both lotteries and raffles are designed so that if they are played many times the amount a player would expect to win is less than the amount he or she would spend.

Glaciers

A glacier is a large body of ice found in very cold environments. Some of the largest glaciers are huge; they can be around $10\,000\text{ km}^3$ or 1×10^{16} litres; that is 10 million billion litres!

Many glaciers are currently melting, with the water flowing into glacial lakes. Climate scientists often measure the amount of melted water coming out of a glacier to see if there is evidence of global warming. One possible consequence of global warming is that sea levels will rise.

Car Rental

When renting a car, various factors are taken into account for the cost, including:

- the number of passengers the car can take,
- the storage capacity,
- the fuel efficiency.

Fuel efficiency can be measured in miles per gallon (MPG). Normally two figures are given. Fuel efficiency for “urban driving” and fuel efficiency for “motorway driving”.

For example, the advertisement below shows that the Chevrolet Aveo can carry four passengers, has a storage capacity of 12 cubic feet, an “urban driving” fuel efficiency of 25 miles per gallon and a “motorway driving” fuel efficiency of 34 miles per gallon.

<p>Chevrolet Aveo</p>  <p>X 4 12 cb ft MPG 25/34</p>	<p>Ford Focus</p>  <p>X 5 13 cb ft MPG 27/37</p>	<p>Chrysler 200</p>  <p>X 5 14 cb ft MPG 21/30</p>	<p>Ford Fusion</p>  <p>X 5 16 cb ft MPG 23/33</p>
<p>Chevrolet Impala</p>  <p>X 5 19 cb ft MPG 18/30</p>	<p>Ford Crown Victoria</p>  <p>X 6 21 cb ft MPG 16/24</p>	<p>Ford Mustang</p>  <p>X 4 9 cb ft MPG 19/30</p>	<p>Dodge Grand Caravan</p>  <p>X 7 33 cb ft MPG 17/25</p>
<p>Jeep® Liberty</p>  <p>X 5 25 cb ft MPG 15/21</p>	<p>Jeep® Grand Cherokee</p>  <p>X 5 35 cb ft MPG 16/23</p>	<p>Chevrolet Traverse</p>  <p>X 7/8* 24 cb ft MPG 17/24</p>	<p>Ford 12-Pass Van</p>  <p>X 12 14 cb ft MPG 13/17</p>



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