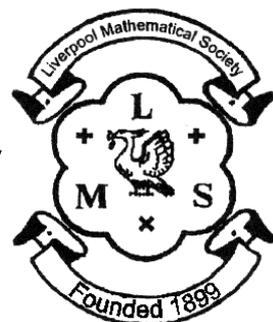# MATHEMATICAL EDUCATION ON MERSEYSIDE

Sponsored by

Challenge '14
For Year 8 or below

Illustrations by Peter H Ackerley

Rules
1) Challenge '14 should be attempted at home during February half term.
2) Your entry must be your own work, though of course you may ask for help on how to get started or for the meanings of unfamiliar words.
3) Entries without any working out at all or written on this sheet **will not be marked**.
4) It is possible to win a prize even if you have not completed all of the questions, so hand in your entry even if it is not quite finished.
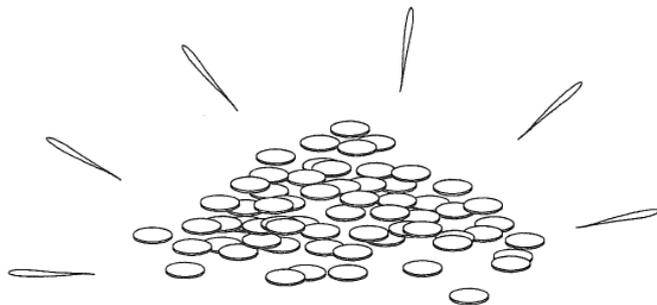5) You must write **your name and school in neat writing on every page.**

Either you or your maths teacher needs to return your entry by 7th March to this address:

A Prize Giving Evening will be held at the University of Liverpool on 14th May.
We hope that you enjoy the questions.

1. Danegeld

Egil and Kol have both returned home with Danegeld given to them to buy off their invasions of Anglo Saxon England. Together, they received 25,000 pieces of silver; however, Egil had 7,000 more than Kol. How much silver did each of them take back?
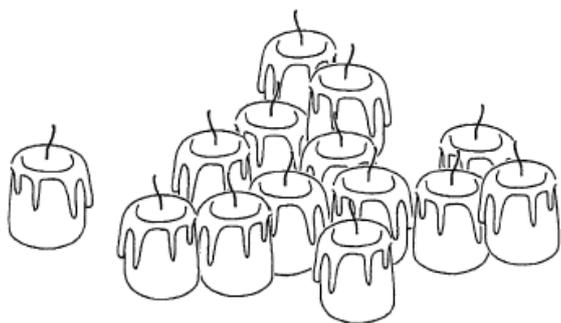
2. Valhalla at Ragnorak

Odin's great hall of Valhalla has many doors. For every Oak door, there are 4 Elm doors. For every Elm door, there are 3 Pine doors. There is a Larch door to the left of every Oak and every Elm door, and an Ash door to the right of every Oak and every Elm door. 800 warriors will march out through each door at the start of Ragnorak. There are 20 Oak doors. How many warriors will there be?

3. Loki's game,

Loki, the trickster god, offers to give you the treasure in a chest if you can crack the five-digit combination. He gives you 5 clues: Each digit is 0, 1, 2, 3, 4 or 5; no digit is repeated; the first digit is an even number; the first three digits add up to 4; the fifth digit is larger than the fourth. He will allow you 6 attempts to open the lock. Can you guarantee successfully opening the lock?
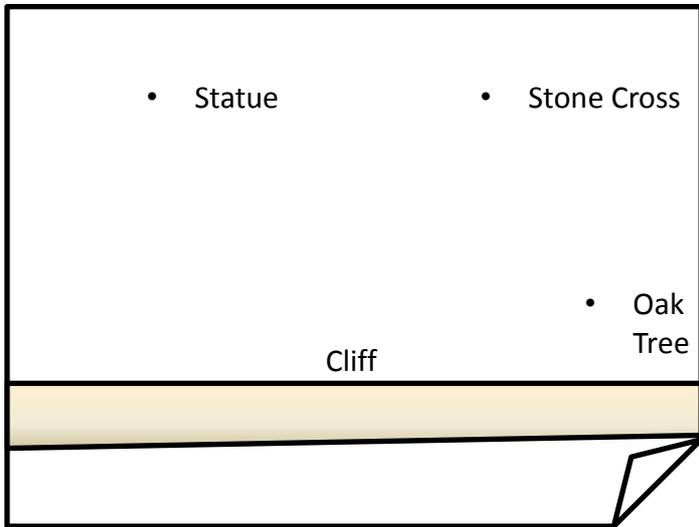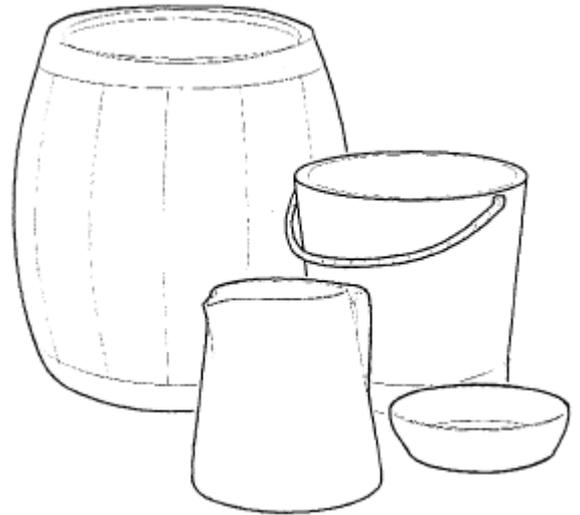
4. Not Fork Handles!

Idunn collects candle stumps from around Asgard. She can make a new candle from 4 stumps. A candle will provide light for one night, whilst burning down to a stump. She collects 64 candle stumps. For how many nights will she have light, starting with these 64 stumps?

5. A barrel of laughs

Adric's barrel contains 24 pints of Viking Mead, which are to be shared equally between Adric, Beowolf and Canute. Unfortunately there are only 3 containers available: Doris the barmaid's bowl of capacity 5 pints, Beowolf's jug of capacity 11 pints, and Canute's bucket of capacity 13 pints. If each man is going to take his share in his container, how should the containers be used to give each man his fair share?

(It is not possible to pour beer back into the barrel, and Doris must get her bowl back before the three men leave).

6. Dig This

Mervin has successfully hidden the treasure, but has forgotten where; all he can remember is the following clues:

The treasure is buried at the same distance from the stone cross and the old Oak Tree. It is also twice as far from the statue as it is from the cliff edge. Make an exact copy of the map, marking the centres of the cross, statue and tree, and the cliff edge, and mark with a X where the treasure is buried.

7. One L of a Field

Harald, when not with his raiding party in the North of England, tends his farm in Norway. His best field is an L-shape; you may think of this as a larger rectangle with a smaller rectangle cut from it. The length of the larger rectangle is 2 metres longer than the width. The smaller rectangle has one side that is 8m shorter, and another side that is 6m shorter, than the width of the larger rectangle. The field has an area of 272m² and he intends to fence it off with rope to keep in his cows. Starting from one corner, he puts fenceposts at 3-metre intervals, but additional posts are *then* erected where they are required for keeping the rope taut. How many fenceposts are needed?

8. Rune Code

This letter is written in normal modern English. Your task is to decode it.

[Letter written in runic cipher — 11 lines of runes]