

8. Rune Code

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

HMFR YFTNMR BRFP
IT PFH TMRIBGM THM YLIX PFRIFRH
FTTFLAMH THM MFTFHTMRM FTNFT
THMM HFYM LGTHMRMH FAR TRMFHARM
RFFH FTH HFYM MFTM FFF PITH FTT FY
FAR XFTHFTH MFTMM
THMM BRIT MFT TMRMM BFRTH FTH
HFRMHFFFM FTT FY THMLFFH FTH LIXH
LGTFHM HMTH NH FTH HCFRM NMTH FTH
XMMHMMFA HFYM
MFRH
BRFTNMR MFTTHMP

Solutions will be posted on <http://www.soton.ac.uk/maths/outreach/index.page>
shortly after the prize evening in May.

**The competition in Hampshire is organised by
Mathematical Sciences, Mathematical Education and Learn
with US Outreach Team, University of Southampton**

With kind acknowledgement to MEM (Mathematical Education
on Merseyside) for providing these questions and the concept
of the Challenge Competition.

www.maths.liv.ac.uk/~mem

For more competitions and information on maths related
careers look at:

www.mathscareers.org.uk

Mathematical
Sciences

UNIVERSITY OF
Southampton

University of Southampton Maths Challenge '14 Year 8 and Below

Illustrations by Peter H Ackerley

Rules

- 1) Challenge '14 should be attempted at home (perhaps during the 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 24th March** to this address:

**Maths Challenge '14 Entries,
Dr Nick Wright,
Mathematical Sciences,
University of Southampton,
University Road,
SOUTHAMPTON.
SO17 1BJ.**

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

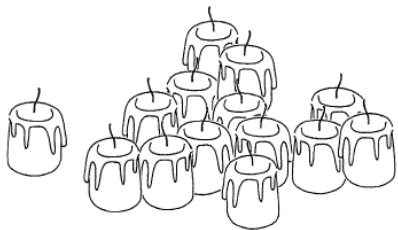
1. Danegeld

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?



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?



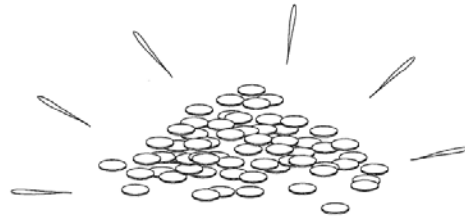
2. Valhalla at Ragnarok

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 Ragnarok. There are 20 Oak doors. How many warriors will there be?



4. Not Fork Handles!

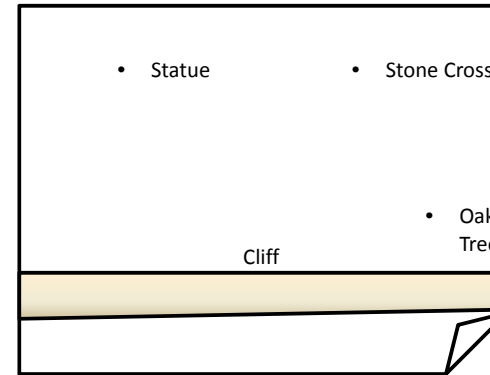
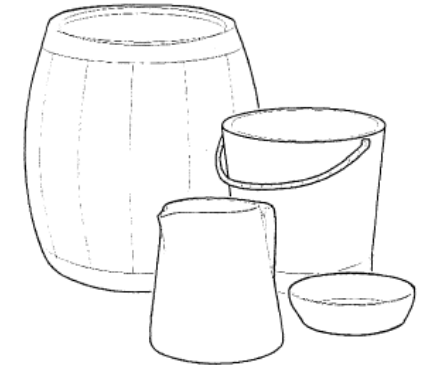
Idunn collects candle stumps from around Asgard. She can make a new candle from 4 stumps. A candle will provide light for one night, whilst burning down to a stump. She collects 64 candle stumps. For how many nights will she have light, starting with these 64 stumps?



5. A barrel of laughs

Adric's barrel contains 24 pints of Viking Mead, which are to be shared equally between Adric, Beowulf and Canute. Unfortunately, there are only 3 containers available: Doris the barmaid's bowl of capacity 5 pints, Beowulf'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).



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?

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.

