

The Scottish Mathematical Council

www.scot-maths.co.uk

MATHEMATICAL CHALLENGE 2017–2018

Entries must be the unaided efforts of individual pupils.

Solutions must include explanations and answers without explanation will be given no credit.

Do not feel that you must hand in answers to all the questions.

CURRENT AND RECENT SPONSORS OF MATHEMATICAL CHALLENGE ARE

The Edinburgh Mathematical Society, The Maxwell Foundation, Professor L E Fraenkel,

The London Mathematical Society and The Scottish International Education Trust.

The Scottish Mathematical Council is indebted to the above for their generous support and gratefully acknowledges financial and other assistance from schools, universities and education authorities.

Particular thanks are due to the Universities of Aberdeen, Edinburgh, Glasgow, Heriot Watt, St Andrews, Stirling, Strathclyde and to Bearsden Academy, Kelvinside Academy and Northfield Academy.

Junior Division: Problems 1

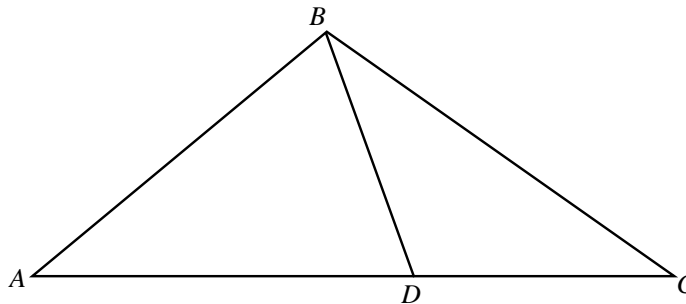
- J1.** In our local town we still have a grocer, newsagent, butcher and baker and they have shops next to each other. They are all members of the local golf club and their names are Alan, Bill, Colin and David (not, perhaps, in this order).

Colin and David shave themselves whereas the baker prefers to go to the barber's across the way. David and Alan often play golf with the newsagent and the baker. David's shop is next to the butcher's.

One of the men has a beard. What is his occupation?

- J2.** Jonas travels 26 miles in 3 hours, partly on foot and partly by bike. He walks at 4 mph and cycles at 12mph. For what length of time does Jonas walk? How far does he cycle?

J3.



In the diagram $AB = BC = AD$ and $\angle BAD = 20^\circ$.
Find $\angle CBD$.

- J4.** Two fractions are equally spaced between $\frac{1}{4}$ and $\frac{2}{3}$ on a number line. What are the two fractions?

SEE OVER FOR QUESTION J5.



Mathematical Challenge Problems 1

JUNIOR DIVISION 2017-2018

PLEASE USE CAPITALS TO COMPLETE

SURNAME

OTHER NAME(S)
(underline the one
you prefer)

SCHOOL

AGE

YEAR OF STUDY

FOR OFFICIAL USE

Marker

Marks

1	2	3	4	5

Total

— — — — - **CUT ALONG HERE** — — — —

Please write your solutions on A4 paper and staple the above form to them.

PLEASE WRITE YOUR NAME ON EVERY PAGE.

Send your entry through your school to the section organisers.

For further information on the competition, please see the Information Circular, which has been distributed to all secondary schools. Please contact the local organiser, whose name and address are given above, if you require a further copy.

J5. The value of $50!$ is the product of all the whole numbers from 1 to 50 inclusive, i.e.

$$50! = 1 \times 2 \times 3 \times 4 \times \dots \times 49 \times 50.$$

Find how many times 2 will divide $50!$.

END OF PROBLEM SET 1

CLOSING DATE FOR RECEIPT OF SOLUTIONS :

29 September 2017

Look out for Problems 2 in early December!

Look on the SMC web site:

www.scot-maths.co.uk

for information about Mathematical Challenge