

MATHS CHALLENGE!!

Over the years, Jaffna Hindu College has been renowned for the high quality mathematics A-Level (HSC) standard that was taught and learnt at the school. The school has been recognised as having students of high mathematical ability across the whole island and many students from JHC have gained first place in mathematics across Sri Lanka

In this booklet, we have included some challenging mathematics problems for junior and intermediate levels. These questions were prepared by: Mr. S. Mahendrarman, Member of JHC OBA, in memory of Mr.K.Arirajasingham, Former Mathematics Teacher JHC.

Also we have included a 2 unit mathematics trial paper suitable for HSC students. This paper was prepared by Dr. E. Ambikairajah, committee member of JHC OBA. If you know any HSC students, perhaps these questions might be good practice!

For anyone who can answer all of the mathematical questions in the Challenging Section, please send your solutions to **Jaffna Hindu College OBA - NSW Branch, PO Box 7740, Baulkham Hills Business Centre, Baulkham Hills, NSW 2153**

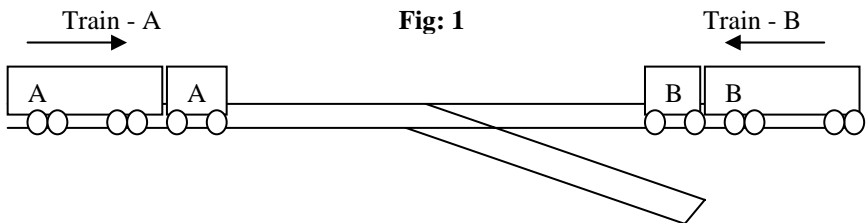
Your solutions for the challenging problems will be marked and if you receive a score of 100%, you will receive a prize. Please enclose your name, postal address and phone number with your solutions.

Good luck!

Challenging Problems (Junior Level 8-12 Years)

- (1) A family of four (father, mother, son and daughter) has to cross a bridge in the darkness. Maximum of only two could cross at any one time. They have got only one torchlight and they cannot cross without the light. The son could cross the bridge in 1 minute while daughter needs 2 min, father needs 5 min and the mother needs 10 min.
- What is the minimum time required for the family to cross the bridge?

- (2) Show by series of diagrams how, two trains A & B of equal length with 10 carriages and engine traveling in opposite direction could cross each other on a straight track. There is a small branch line just enough for 10 carriages. **Fig: 1.** (Note: After the crossing, engine A must go with train A & engine B must go with train B in the front of the carriages)

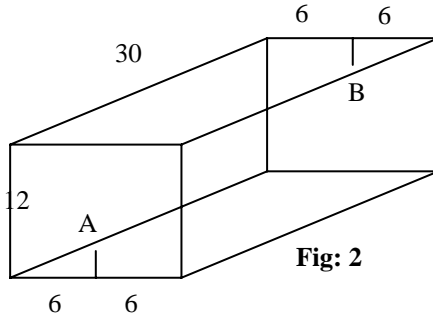


- (3) You have two hourglasses: a 7-minute one and an 11-minute one. Using just these hourglasses, accurately time 15 minutes.

Challenging Problems (Intermediate Level 13-18 Years)

- (1) A room 12 feet wide, 12 feet height and 30 feet in length. An ant, located one of the sidewall 1 foot from the floor and 6 feet from the long wall at point A, must crawl along the surface of the room to reach a point on the opposite side of the wall 1 feet from the roof and 6 feet from the long walls to a point B (Fig. 2). What is the length of the shortest such path?

Hint: Surface of the room (walls, floor & roof)



- (2) Pentominoes:

When equal size squares are joined together edge-to-edge, many interesting shapes are formed. When 5 equal squares (1×1) are joined 12 different "Pentominoes" are formed.

- a) Draw all 12 pentominoes
- b) Show by diagram that they can be fitted into rectangles of (4×15), (5×12), (6×10) and (3×20).

- (3) Fill in the spaces marked with X with digits from 0 to 9.

(When the 3-digit number divides the 8-digit number the answer is a 5-digit number with no remainders.)

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