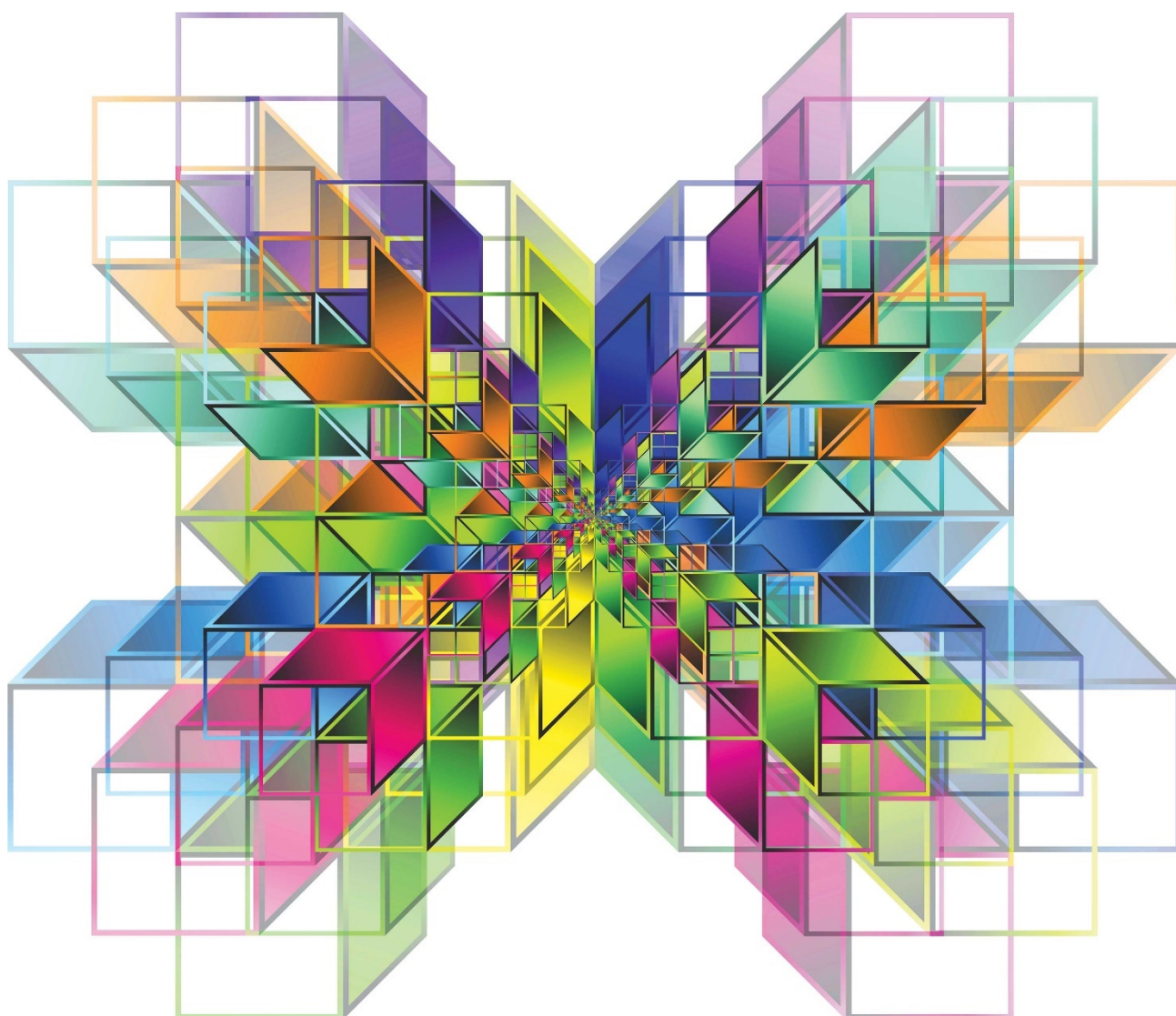


GCSE MATHS

HoD Virtual Communities

Resources booklet

Published: Autumn 2021



Contents

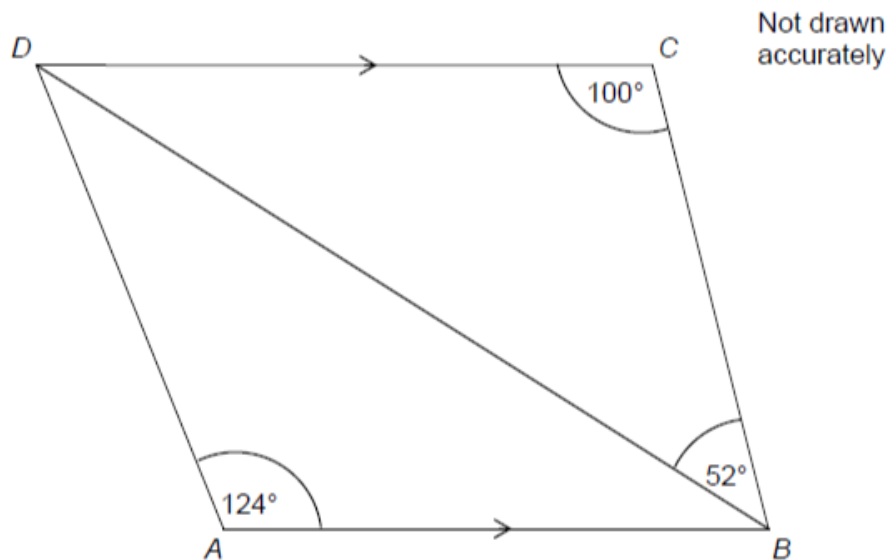
Contents	Page
Starter questions	4
Blank Tarsia template	6
Example relay from TES	7
Resource links	11

Starter questions

Two GCSE questions from the practice papers

Foundation question

30 In the diagram, DC is parallel to AB .



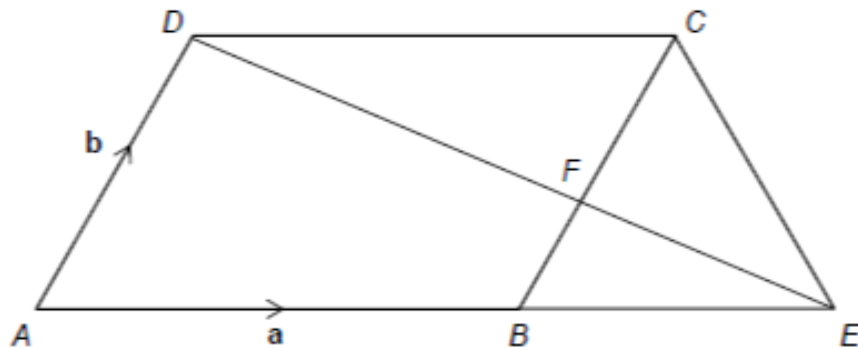
Show that triangle ABD is isosceles.

[3 marks]

Higher question

- 25 $ABCD$ is a parallelogram.
 ABE is a straight line and $AB : BE = 3 : 2$
 BC and ED intersect at F .
 $\vec{AB} = \mathbf{a}$ and $\vec{AD} = \mathbf{b}$

Not drawn
accurately



- 25 (a) Work out \vec{ED} in terms of \mathbf{a} and \mathbf{b} .
Give your answer in its simplest form.

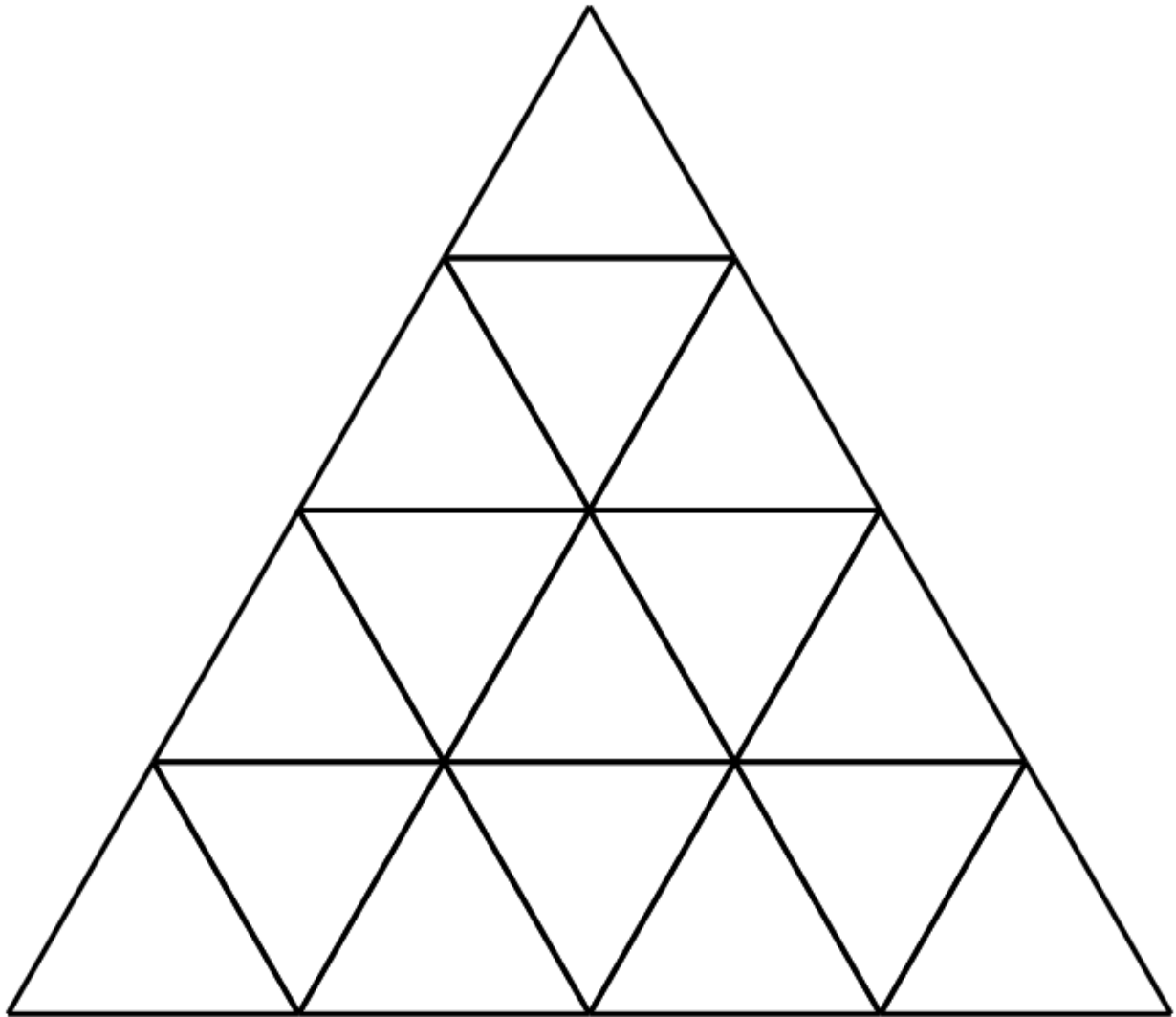
[3 marks]

Answer _____

- 25 (b) Deduce \vec{EF} in terms of \mathbf{a} and \mathbf{b} .

[2 marks]

Blank Tarsia template



Example relay race from TES

These are great activities for students and you can use a variety of different resources (ie exam questions, UKMT questions etc).

You can either give groups (of three or maybe four) one question at a time or, to make organising simpler, maybe give them four at once and once they're completed (or tried twice), give them the next four.

[Math Relay Races](#): Creative Commons Licence CC-BY

RELAY QUESTION 1

Jane is older than Kim.
Kim is older than Shawn.
Shawn is younger than Jane.
Rachel is older than Jane

List the people from oldest to youngest.

RELAY QUESTION 2

A ball is dropped from a height of 125m.
Each time it hits the ground it bounces $\frac{3}{5}$ of
the height it fell.



How high will the ball
bounce on the 3rd bounce?

RELAY QUESTION 3

What is the four-digit number in which the
first digit is one-third the second, the third
is the sum of the first and second, and the
last is three times the second?

--	--	--	--

RELAY QUESTION 4

In the first year of production
a play sells 1572 tickets, in its
second year it sells 1753
tickets, in its third year it sells
152 less than in its second
year. How many tickets are
sold in 3 years?



RELAY QUESTION 5

Add up all the numbers on the telephone dial, and then multiply that sum by every number on the telephone dial. What do you get?



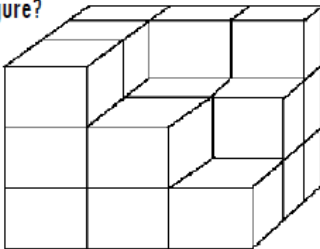
RELAY QUESTION 6

Replace each blank with the correct digit.

$$\begin{array}{r} 43_2 \\ 42_ \\ +_127 \\ \hline 8893 \\ \hline \end{array}$$

RELAY QUESTION 7

How many cubes are needed to build this solid figure?



RELAY QUESTION 8

You bought 2 antique lamps for £50 each. Later, you were offered £60 for one and sold it. Then you changed your mind when you saw another such lamp being sold for more, and bought it back for £70. You then sold it for £80. The 2nd one didn't sell at all, so you reduced it to 10% of what you paid for it and finally managed to get rid of it. Overall, how much money did you make or lose?

RELAY QUESTION 9

Place the digits 9, 4, 7, 6, 5, 1, in the boxes in order to get the largest result.

$$(\square\square \times \square\square) + (\square \times \square) = ?$$

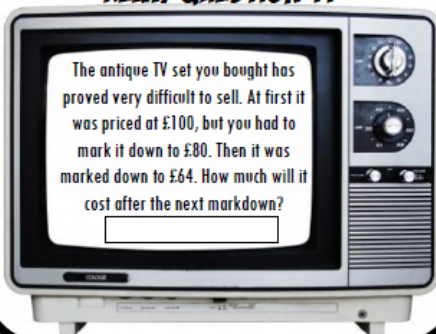
RELAY QUESTION 10

John was having a hard time lining up his tin soldiers. He didn't have that many (fewer than a hundred) but he couldn't seem to arrange them in parade properly. He kept having numbers left over. He tried rows of 5 and there were 4 left over — rows of 6, 4 left over — rows of 7, 1 left over. He finally decided to have a very narrow parade and arranged them in rows of 4. This time it worked. What's the smallest number of tin soldiers he could have?



RELAY QUESTION 11

The antique TV set you bought has proved very difficult to sell. At first it was priced at £100, but you had to mark it down to £80. Then it was marked down to £64. How much will it cost after the next markdown?



RELAY QUESTION 12



Linda didn't like to tell her age, so when she was asked, her mother answered for her. Her mother said, "I'm just seven times as old as she is now. In twenty years, she will be just half the age that I will be then."

How old is clever little Linda?

RELAY QUESTION 13

I stroll daily at 2 miles an hour. My jogger friend, however, has worked to change this, saying, "Why don't you jog? You'd cover the same 12-mile distance, and you'd save a lot of time." I notice that he jogs exactly 3 times as fast as I stroll. How much time will I save if I jogged with him?



RELAY QUESTION 14

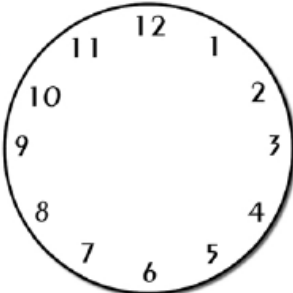
Using the number 987654321 and seven addition signs we can make 99:

$$9+8+7+65+4+3+2+1 = 99$$

Can you use 987654321 and six addition signs to make 99?

RELAY QUESTION 15

Divide the clock face into 3 parts with 2 lines so that the sum of the numbers in the three parts are equal.

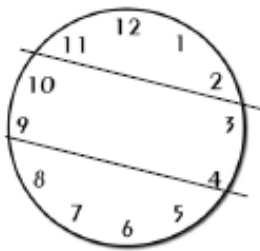


RELAY QUESTION 16

The local sweetie shop sold large packets of sweets for 25p and small packets for 10p. The new cashier wasn't up to the job, though; she marked down the number of sacks she sold, but forgot to record their prices. At the end of the day, she found she had sold 385 packs of sweets and had £62.65 in her cash register. Fortunately, she figured out how many of each size of packs of sweets she had sold before her boss came by. Can you?

Relay Answers:

1. Rachel, Jane, Kim, Shawn
2. 27cm
3. 1349
4. £4926
5. Zero.
6. Each blank needs a '4'.
7. 22
8. Lost £25
9. $[9][5] * [7][6] + [4] * [1] = 7224$
10. 64 soldiers
11. £51.20
12. 4
13. 4hours
14. $9+8+7+6+5+43+21 = 99$
15. see below...



16. 161 large packs and 224 small ones.

Resource links

Teaching resources

Focus on success packs

aqa.org.uk/subjects/mathematics/gcse/mathematics-8300/planning-resources

TES relay races pack

tes.com/teaching-resource/maths-relay-races-problem-solving-puzzles-6064073

UKMT Maths challenges – Lots of individual and team resources

ukmt.org.uk/

TES Murder mysteries

tes.com/teaching-resources/blog/fun-murder-mystery-activities

Miss B resources: Murder mysteries

missbsresources.com/maths-resources/maths-murder-mysteries

ATM books with group solving activities (worth searching the rest of the site)

atm.org.uk/Shop/We-Can-Work-It-Out-1-e-book/dnl073

Building Success from STEM/National Strategies

12263.stem.org.uk/styled/styled-10/index.html

NCETM video lessons

ncetm.org.uk/in-the-classroom/teaching-maths-through-the-pandemic/support-for-primary-teachers/primary-video-lessons/

Staff collaboration research

TES: 'Collaboration is key. But it's not enough to simply ask teachers to work together'
[tes.com/news/collaboration-key-its-not-enough-simply-ask-teachers-work-together](https://www.tes.com/news/collaboration-key-its-not-enough-simply-ask-teachers-work-together)

TES: 'Collaborative planning: 7 steps to doing it well'
[tes.com/news/collaborative-planning-7-steps-doing-it-well](https://www.tes.com/news/collaborative-planning-7-steps-doing-it-well)

Schoology: Teacher collaboration blog
[schoology.com/blog/teacher-collaboration](https://www.schoology.com/blog/teacher-collaboration)

Does Teacher Collaboration Improve Student Achievement?
[frontiersin.org/articles/10.3389/feduc.2019.00085/full](https://www.frontiersin.org/articles/10.3389/feduc.2019.00085/full)

Sharing good practice: Strategies to encourage teacher collaboration
blog.irisconnect.com/uk/sharing-and-collaboration-in-schools

Teacher Collaboration in Instructional Teams and Student Achievement
citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.921.1537&rep=rep1&type=pdf

20 collaborative learning tips and strategies
teachthought.com/pedagogy/20-collaborative-learning-tips-and-strategies/

How Can We Promote Teacher Collaboration?
[ascd.org/el/articles/how-can-we-promote-teacher-collaboration](https://www.ascd.org/el/articles/how-can-we-promote-teacher-collaboration)

Improving professional development for teachers
suttontrust.com/wp-content/uploads/2019/12/Developing-Teachers-1.pdf

Improving the impact of teachers on pupil achievement in the UK – interim findings
suttontrust.com/wp-content/uploads/2019/12/2teachers-impact-report-final-1.pdf

Developing a sustainable and scalable model for the professional learning of mathematics teachers
nottingham.ac.uk/research/groups/crme/documents/lemaps-report.pdf

Student collaboration research

Boaler, J. & William, D. & Brown, M. (2000), *Students Experiences of Ability Grouping: Disaffection, Polarisation and the Construction of Failure*, British Educational Research Journal, Vol. 26, no. 5, pp. 631-648

bera-journals.onlinelibrary.wiley.com/doi/10.1080/713651583

Nardi, E. & Steward, S. (2003) *Is Mathematics T.I.R.E.D? A profile of Quiet Disaffections in the Secondary Mathematics Classroom*, British Educational Journal, Vol. 29, No. 3, pp. 345-367

jstor.org/stable/1502257

Five Maths activities that promote student collaboration in the classroom

sadlier.com/school/sadlier-math-blog/5-math-activities-that-promote-student-collaboration-in-the-classroom-collaborative-learning

Collaborative learning in Mathematics

numeracy4schools.files.wordpress.com/2015/03/collaborative-learning-in-mathematics.pdf

Working together: how collaboration creates meaningful learning

mathsnoproblem.com/blog/teaching-practice/collaboration-for-meaningful-learning/

San Francisco Unified Schools District: Collaborative group work

sfusdmath.org/collaborative-group-work.html

NRICH: Being collaborative

rich.maths.org/11420

Education Endowment Foundation: Collaborative learning approaches

educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/collaborative-learning/

NCETM: An effective model for collaborative planning in Maths

ncetm.org.uk/features/an-effective-model-for-collaborative-planning-in-maths/

Edwards, J. and Jones, K. (1999), *Students' Views of Learning Mathematics in Collaborative Small Groups*. In: O. Zaslavsky (Ed), Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, Volume 2, pp 281-288

eprints.soton.ac.uk/41273/1/Edwards_Jones_PME23_1999.pdf

Cornell University: Collaborative Learning

teaching.cornell.edu/teaching-resources/active-collaborative-learning/collaborative-learning

Notes

Contact us

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

Tel: 0161 957 3852

Email: maths@aqa.org.uk

Twitter: @AQAMaths

aqa.org.uk