

### Can you help these farmers?

A large piece of land, divided into small plots, belongs to 5 different farmers.

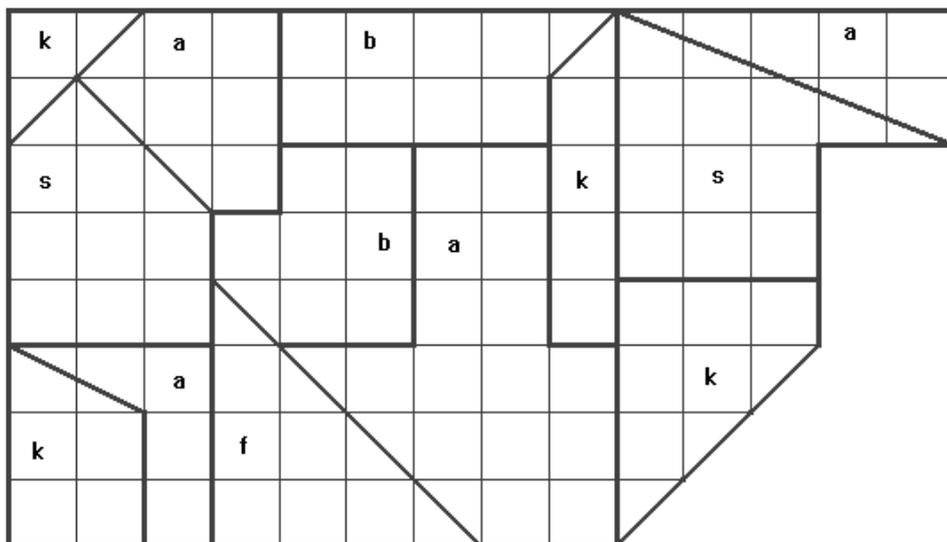
Below is a plan of the area as the land is presently divided.

All the plots labelled (a) belong to farmer (a).

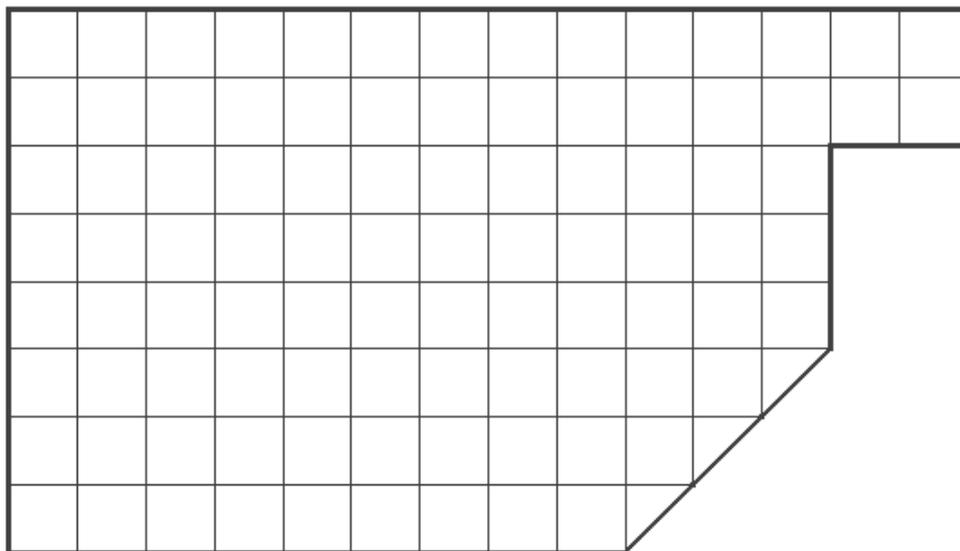
All the plots labelled (s) belong to farmer (s) and so on.

This piece of land must now be re-divided so that each farmer's plots are adjacent to each other.

After the re-division each farmer must have the same area of land as before.

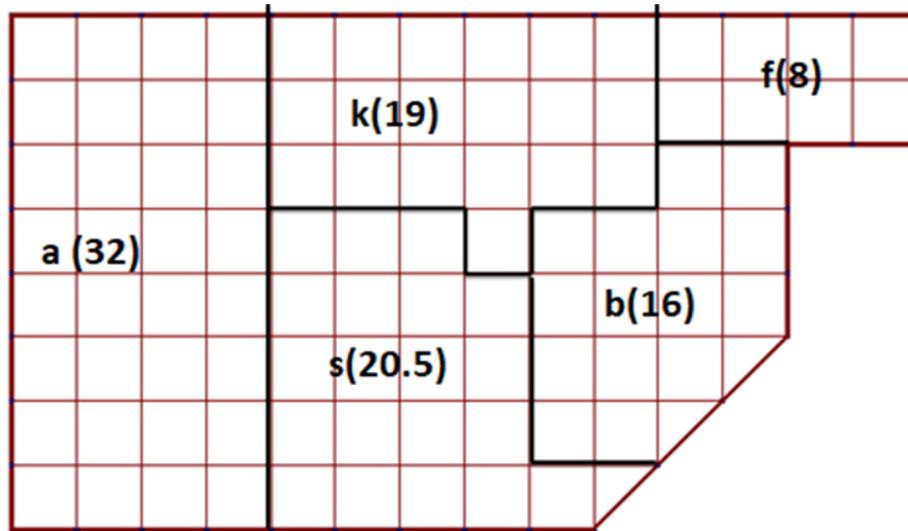


Now show, on the following plan, the new division of the land so that each farmer only has one piece of ground with the same total area as the small plots that each previously had.



## SOLUTION

Here is one possible solution.

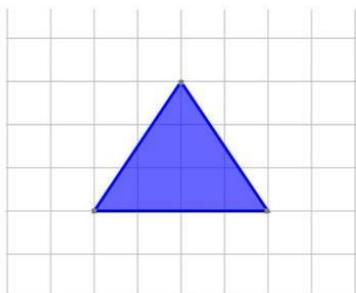


## NOTES FOR TEACHERS

**Diagnostic Assessment** This should take about 5–10 minutes.

1. Write the question on the board, say to the class:  
“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D”.
2. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. **Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

What is the area of the triangle?



- A)  $4\text{cm}^2$
- B)  $6\text{cm}^2$
- C)  $8\text{cm}^2$
- D)  $12\text{cm}^2$

The correct answer and possible misconceptions:

- A) Trying to count the complete squares.
- B) The correct answer.
- C) Trying to put the bits together to form squares.
- D) Mixing up area and perimeter.

<https://diagnosticquestions.com>

### Why do this activity?

This activity helps learners to understand that area is a measurement of a two dimensional surface or piece of land. It also allows them to use their prior knowledge on how to find the area of squares, rectangles and triangles to help them find a solution to the problem.

### Intended learning outcomes

- Recognition of two-dimensional shapes within irregular shapes
- Consolidation of knowledge on how to calculate the area of squares, rectangles and triangles

### Suggestions for teaching

Ask the learners to say whether the farmers' plots are regular or irregular shapes. Then ask them whether they can see two dimensional shapes like rectangles, squares and triangles within the irregular shapes. The learners could then tell you how you find the area of the two dimensional shapes that have been identified.

The learners working in pairs should then be given time to think about the problem and how they are going to solve it. The teacher should only get involved if it is absolutely necessary.

Even then it is only to help them to get started on the problem not to show them how to do it.

### Key questions

Are the pieces of land regular or irregular shapes?

Can you see two dimensional shapes like squares, rectangles and triangles within the irregular shapes?

Do we know how to find the area of squares, rectangles and triangles?

Will this help us to solve this problem?

### Possible extension

Can you find more than one solution to the problem?

### Possible support

Shade using different colours the squares, rectangles and triangles within the irregular shape. Work out the area of the different shapes and add the areas together.

Choose the pairs working together carefully so that more able learners can support less able.

**Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and up to Secondary 5 in East Africa.**

**Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is **not** included in the school curriculum for Grade 12 SA.**

	Lower Primary or Foundation Phase Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 14	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6