CAN YOU HELP THESE FARMERS?

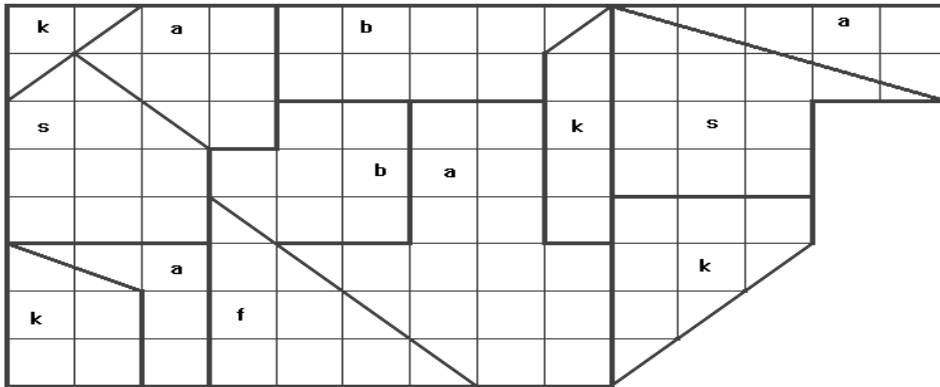A large piece of land, divided into small plots, belongs to 5 different farmers.
Below is a plan of the area as the land is presently divided.
All the plots labelled (a) belong to farmer (a).
All the plots labelled (s) belong to farmer (s) and so on.
This piece of land must now be re-divided so that each farmer's plots are adjacent to each other.
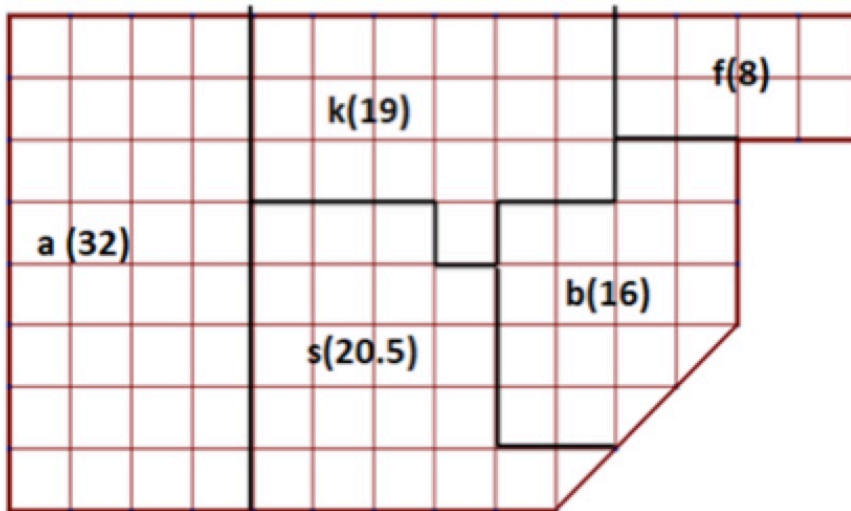After the re-division each farmer must have the same area of land as before.

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.

Help

Using 5 different colours shade the plots of land for each of the 5 farmers. Work out the area of land each farmer had. How can you use this information to divide the land as required?

Extension

Can you find more than one solution to the problem?

NOTES FOR TEACHERS

## SOLUTION

Here is one possible solution.

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?
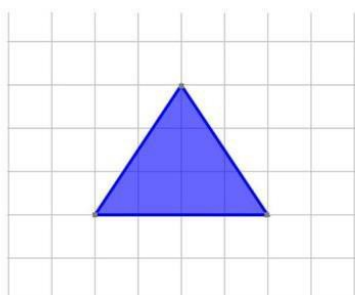
A) 4cm²

B) 6cm²

C) 8cm²

D) 12cm²

The correct answer is B.
Possible misconceptions:

A. May have tried to count the squares

C. May have tried to count the squares or to put the parts together to count squares.

D. May have given the perimeter not knowing the difference between are 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.

Learning objectives

In doing this activity students will have an opportunity to:
- Recognise two-dimensional shapes within irregular shapes;
- Consolidate knowledge on how to calculate the area of squares, rectangles and triangles.

Generic competences

We need to prepare children for a job market where existing knowledge and skills have limited value unless they can be applied in novel ways to produce new knowledge that solves today's complex problems to improve the quality of life for all.

In doing this activity students will have an opportunity to:
- develop the skill of interpreting and creating visual images to represent concepts and situations;
- solve problems – to interpret and solve problems in a variety of situations.

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?**

Follow up

Doesn't Add Up https://aiminghigh.aimssec.ac.za/years-7-10-doesnt-add-up/

	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. New material will be added for Secondary 6. **For resources for teaching A level mathematics see https://nrich.maths.org/12339** Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is **beyond** 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**