AIMSSEC

SAME AREA

Not drawn accurately

$x - 1$

12

$x + 1$

$x + 2$
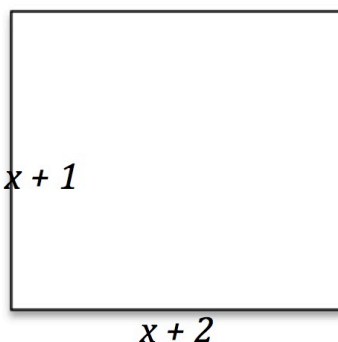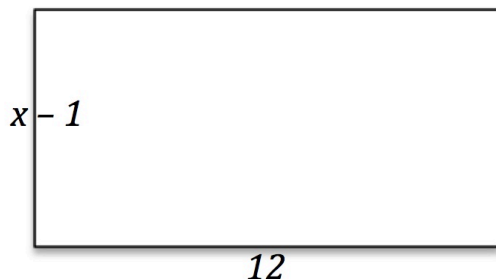
The rectangles shown are the same area. Find the area.

Make up some similar questions of your own.

SOLUTION

As the rectangles are the same area

$12(x - 1) = (x + 1)(x + 2)$

$12x - 12 = x^2 + 3x + 2$

$x^2 - 9x + 14 = 0$

$(x - 2)(x - 7) = 0$

$x = 2$ or 7

The areas could be 1×12 and 3×4 for $x = 2$ or 6×12 and 8×9 for $x = 7$.

The areas are either 12 square units or 72 square units.

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.
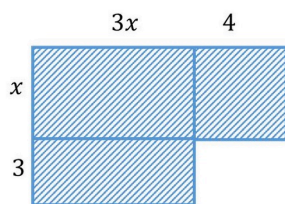5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

The area of this shape is 82 square units. Which of the following statements is correct?

$3x$ 4

x

3

!! NOT TO SCALE !!

A $4x^2 + 13x = 90$

B $3x^2 + 7x + 12 = 82$

C $3x^2 + 13x = 82$

D $3x^2 + 13x + 12 = 82$

C. is the correct answer.
Common Misconceptions

Learners answering **A.** or **B.** are either guessing or unable do the algebra.

D. Learners have multiplied x + 3 by 3x + 4 which gives more area than shaded.
https://diagnosticquestions.com

Why do this activity?
This activity engages learners in constructing the quadratic equations that they need to solve and then solving the equations. It could be used as an introduction to quadratic equations as compiling the equation from the diagram is a good exercise in algebra and it is quite is to factorise $x^2 - 9x + 14 = 0$.
Or it could be used as a very quick lesson starter to review solving quadratic equations. By making up their own examples and challenging their partner to solve them learners can gain practice in solving equations in an enjoyable way.

Intended learning outcomes
Learners will experience constructing, simplifying, and solving a quadratic equation.
By making up similar examples of their own they will gain a deeper understanding of trinomials and quadratic equations.

Suggestions for teaching
Start with the diagnostic question. Then you can write the question on the board and ask the learners to work on it on their own for 5 minutes and then to compare their methods and answers with their partner. Give them time to make up their own examples and solve their partner's example. Then ask some learners to come to the board and write up their problems and challenge the whole class to solve them.
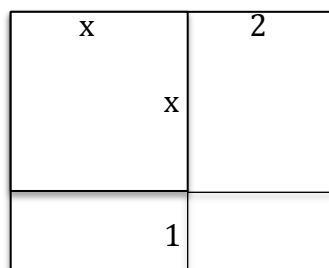
Key questions
Can you write down the areas of each rectangle?
Can you simplify that expression?
Have you used all the information?
Can you find a value of x that satisfies your equation.
How many solutions are there?

Possible extension
Find x in the diagnostic question to 2 decimal places. The solution is x = 3.49

Possible support

This diagram should help learners to find (x + 1) multiplied by (x + 2) and recognising that this involves 4 terms.