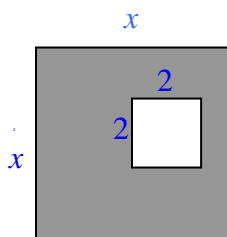


## Sample Question 1



In the figure above, a small square is inside a larger square. What is the area, in terms of  $x$ , of the shaded region?

- (A)  $4 - x^2$
- (B)  $x^2 - 4$
- (C)  $4 - 2x$
- (D)  $2x - 4$
- (E)  $x^2 - 2$

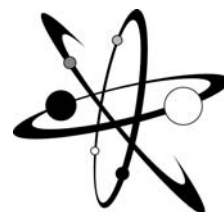


**Remember: Adjacent sides touch.**  
**MACology: Thoughts of the Master Tester**

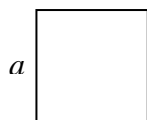
Oh, don't you just love The Man? Sometimes, we don't have to know jack squat other than how to read His test to beat him. Check this one out. All we need to do is write an equation to find the area of the big square minus the smaller square in the middle.

But, you say, "I forgot how to find areas!" (*chewing pencil*).

Stop gnawing on your pencil and flip back to the beginning of Section 3. See that part you skipped over, the one with all the formulas? There it is, plain as day:  $A = l \times w$ .



Finding the area of a square is wicked easy. Length and width are the same! We only need to know the length of one side. To find the area, just multiply the length of one side by itself:




The area is  $a \times a$ , or  $a^2$ .

For this problem, the area of the shaded section is the area of the big square minus the area of the little white square. Find the areas by plugging their sides into the equation,  $a \times a$ .

The area of the big square is:  $x \times x = x^2$ .

The area of the little square is:  $2 \times 2 = 2^2 = 4$ .

Now to find the area of the shaded region, subtract the smaller square's area from the larger square:  $x^2 - 4$ . The correct answer is choice **B**. Like taking candy from a baby.

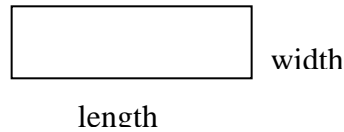
<h1>MAC</h1>  <p>Multiple Analysis of Choices</p>	<p>Take a look at the diagram. You know that the shaded area doesn't include the small white square. Pick one of the choices that subtracts something from a variable expression. Why? Because the larger square's sides are given as variables. Pick among <b>B</b>, <b>D</b>, and <b>E</b>. Of those, we should pick between <b>B</b> and <b>E</b> because they both have <math>x^2</math>.</p> <p>(A) <del><math>4 - x^2</math></del>    Outside <b>Nuclear Family</b>          (B) <math>x^2 - 4</math>          (C) <del><math>4 - 2x</math></del>    Outside <b>Nuclear Family</b>          (D) <del><math>2x - 4</math></del>    Outside <b>Nuclear Family</b>          (E) <math>x^2 - 2</math></p>
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Common Mistakes leading to other choices:

- (A) Subtracted the area of the smaller square from the bigger square
- (B) Correct
- (C) Added instead of multiplying; multiplied variables incorrectly ( $x \times x = x^2$ , not  $2x$ ), subtracted the terms in the wrong order
- (D) Added instead of multiplying to find the area; multiplied variables incorrectly ( $x \times x = x^2$ , not  $2x$ )
- (E) Forgot to multiply  $2 \times 2$  to get the area of the small square

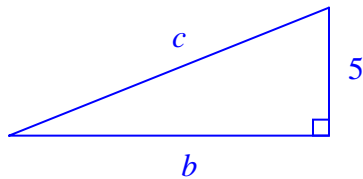


The area of a rectangle is the length times the width. That means that you multiply the lengths of 2 adjacent sides (sides that touch):



$$\text{Area} = \text{length} \times \text{width}$$

### Sample Question 2



Note: Figure not drawn to scale

In the right triangle above, if  $c = 8$ , what is the value of  $b$ ?

- (A) 6
- (B)  $\sqrt{39}$  (approximately 6.24)
- (C)  $\sqrt{42}$  (approximately 6.48)
- (D)  $\sqrt{47}$  (approximately 6.86)
- (E) 7



**Remember: Use The Man's Geometry-O-Rama Box! (The references, yo.)**

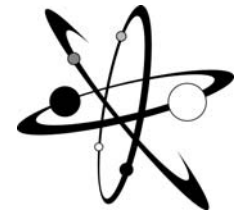
**MACology: Thoughts of the Master Tester**

This problem asks us to find the length of side  $b$  of the triangle. The best way to solve this problem is to use the relation for right triangles in the Reference Information section on page 407, which connects the lengths of a right triangle's three sides.

Let's review triangles. (Hey, you! Don't start snoring yet. Triangles are extra fun and exciting...well, beating The Man at his own game is, anyway. ) The small square in the corner of

the triangle means it's a right or  $90^\circ$ -angle, telling us that this is a *right triangle*. It also means that we can use several facts about right triangles that tell us important information about them. One of these is the *Pythagorean Theorem*,  $a^2 + b^2 = c^2$ , an equation that relates the lengths of all three sides in a right triangle.

To use the theorem (developed by a dead Greek, or should I say geek, named Pythagoras!), just remember that the longest side of a right triangle is across from the right angle. This side is the *hypotenuse*, represented by the letter  $c$ . The other two sides are  $a$  and  $b$  (it doesn't matter which side is which). Now, we can solve for any of the missing sides.




In this problem, we can see that we have a right triangle where the side marked  $c$  is the hypotenuse and we know that  $c = 8$ , and side is  $a = 5$ . Let's plug these two numbers into the Pythagorean Theorem:

$$\begin{aligned}a^2 + b^2 &= c^2 \\(5)^2 + b^2 &= (8)^2 \\(5 \times 5) + b^2 &= (8 \times 8) \\25 + b^2 &= 64\end{aligned}$$

Simplify the equation to solve for  $b$ :


$$\begin{aligned}25 - b^2 - 25 &= 64 - 25 \\b^2 &= 39 \\\sqrt{b^2} &= \sqrt{39} \\b &= \sqrt{39}\end{aligned}$$

The correct answer is **B**.

<h1>MAC</h1>  <p>Multiple Analysis of Choices</p>	<p>Choices <b>B</b>, <b>C</b>, and <b>D</b> all have square roots in them and make up a <b>Nuclear Family</b>. Choose the <b>Center of Symmetry</b> of the <b>Nuclear Family</b>, and select <b>C</b>.</p> <p><del>(A)</del> Outside the <b>Nuclear Family</b></p> <p>(B) <math>\sqrt{39}</math> (approximately 6.24)</p> <p>(C) <math>\sqrt{42}</math> (approximately 6.48)</p> <p style="text-align: center;"><b>Center of Symmetry</b></p> <p>(D) <math>\sqrt{47}</math> (approximately 6.86)</p> <p><del>(E)</del> Outside the <b>Nuclear Family</b></p>
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Common Mistakes leading to other choices:

- (A) Correct
- (B) Guess
- (C) Guess
- (D) Guess
- (E) Guess

	<p>The Reference Info at the beginning of each math section has other important facts about triangles. For instance, the sum of the angles in a triangle is <math>180^\circ</math> and the area of a triangle is half the length of the triangle's base multiplied by the triangle's height. Always glance at The Man's Geometry Box before starting triangle problems. The dude put it there for a reason!</p>
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### Sample Question 3

The average of 3 consecutive integers is 240. What is the sum of the three consecutive integers?



**Remember: The average of  $N$  numbers is their the sum divided by  $N$ .**

**MACology: Thoughts of the Master Tester**

This question asks us to find the sum of three consecutive integers if we know that their average is 240. (If your response is “Holy crap, I have no idea how to do this,” hang with me. I’ve got you covered!) What exactly is this problem asking? An integer is any whole number and can be positive, negative, or zero. Examples of integers are 7,  $-2$ , 100, and 0. Some numbers that are not integers are 1.2,  $\frac{3}{5}$ , and  $-6.1$ . The “sum of consecutive integers,” is a confusing way of saying, “adding up a few in a row.” For example, “the sum of consecutive integers from 8 to 10” is the same as saying, “ $8 + 9 + 10$ .”

When you add consecutive integers, the result is the same as multiplying the average of those integers by the number of consecutive integers you’re adding. I know I lost you there—it’s all good. You’ll see when we look at the example of  $8 + 9 + 10$ . The average of a set of numbers is what we get when we add all those numbers together, and then divide by how many numbers are in the set. The average of the three numbers 8, 9, and 10 is:

$$\frac{8+9+10}{3} = \frac{27}{3} = 9$$

Here’s the fastest way. Remember that when we added 8, 9, and 10, the answer was the same as if we had just multiplied the average of 8, 9, and 10, (9) by 3:

$$8 + 9 + 10 = 27$$

$$9 \times 3 = 27$$

Let’s try this method on the problem. The average of the consecutive integers was 240.

$$240 \times 3 = 720$$

The answer comes out the same! We could have done this problem in one multiplication with no additional work. *Now that’s what I’m talking about!* The answer is **720**.



This problem seems like more work than it really is.  
Remember the rules:

- ✓ The average of an odd number of consecutive integers is the middle integer.
- ✓ The sum of three consecutive integers is the same as the average of those integers multiplied by three.

These tricks work any time you have an odd number of consecutive integers.