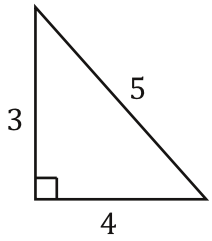
3-4-5 and Other Pythagorean Triples

Q: Isn't there an easier way!!!??? A: Well... sometimes...

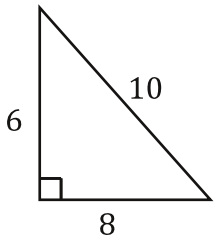
Take the side lengths 3-4 and 5. Do these make a right triangle?

$a^2+b^2=c^2$

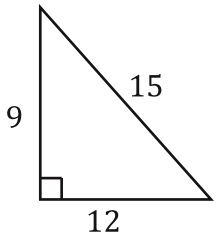


Multiply each side by two and you get 6-8-10, and by 3 you get 9-12-15, right? Do these work too?

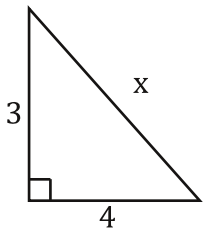
$a^2+b^2=c^2$

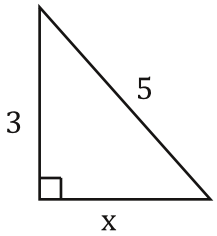


$a^2+b^2=c^2$



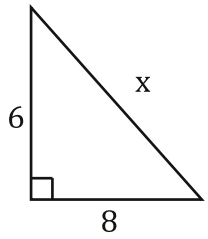
That means that 3-4-5 is a right triangle. So is any enlargement like times 2 or 3 or 7 or 100. So, 21-28-35 is really just a 3-4-5 times 7. In this case, the 7 is what we call the Scale Factor. Great, "so how does that make it easier?" you say. To find this just divide all the side lengths by the same number until you get to 3-4-5. Well, what if we had some triangles that had looked like these....

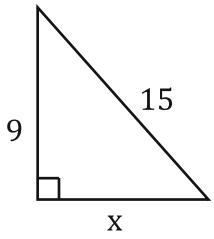




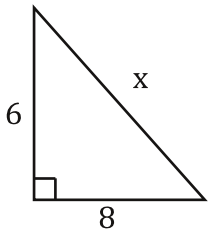
Oh sure, you could use the Pythagorean theorem, or you know that you have 3 and 4 for the legs of the first example. So, the hypotenuse must be 5 because that is the only number that works. Also, you have 5 for the hypotenuse in the second, and 3 for one leg so the other must be 4. Easy huh!

What about these...





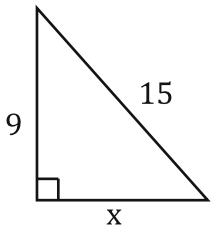
Those look tough, but they are all 3-4-5's multiplied by some scale factor. All you have to do is figure out the scale factor. Figure out which is missing... the 3, the 4, or the 5, and then multiply it by the same scale factor. Just like that you have the answer. Look at these examples.....



Scale Factor=2

x=2*5
x=10

Now try one yourself...



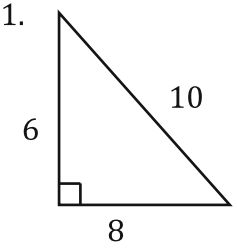
Good, now that you have the 3-4-5 down, there are a few others you should know. Actually there are lists of thousands of these things, in fact there are an infinite number of Pythagorean triples, but memorizing just a few of the smaller ones can make things much easier.

Here are a few more 5-12-13, 8-15-17, and 7-24-25. Also, any combination that comes out as a whole number and is true for the Pythagorean theorem is a Pythagorean Triple!

Okay, let's ease into this one to help you get it.

For each, identify the Pythagorean triple and the scale factor. Mark A for 3-4-5, B for 5-12-13, C for 8-15-17, and D for 7-24-25.

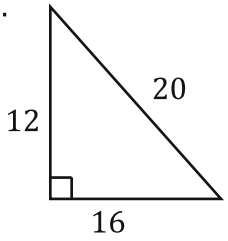
1.



3-4-5

Scale factor=2

2.



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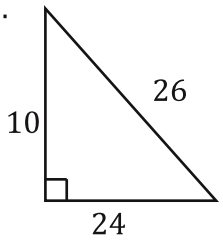

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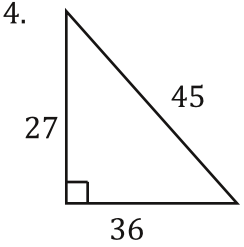

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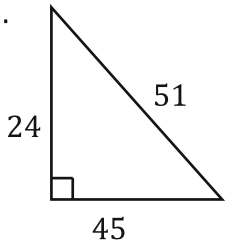

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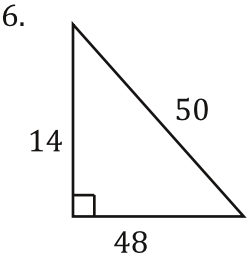
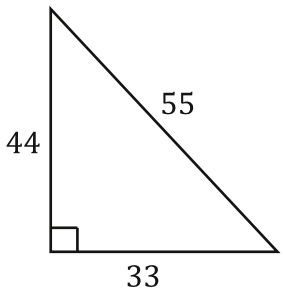


Bubble the correct answer choice from each item above.

#1.	#2.	#3.	#4.	#5.	#6.
●A.	○A.	○A.	○A.	○A.	○A.
○B.	○B.	○B.	○B.	○B.	○B.
○C.	○C.	○C.	○C.	○C.	○C.
○D.	○D.	○D.	○D.	○D.	○D.

1.



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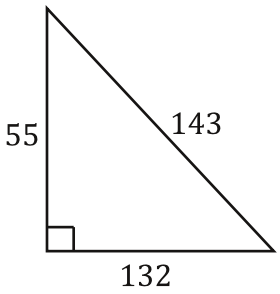

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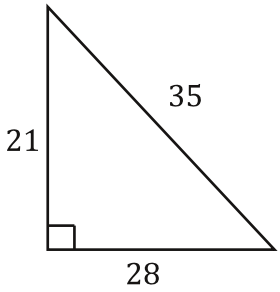

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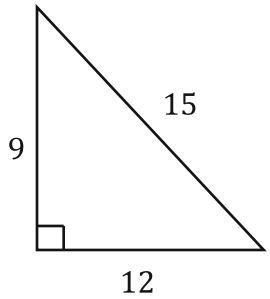

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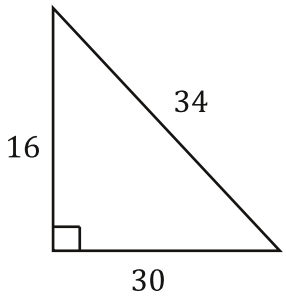

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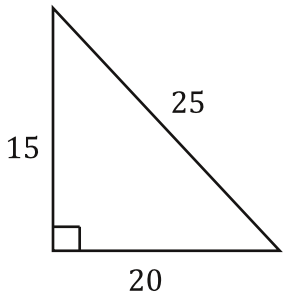

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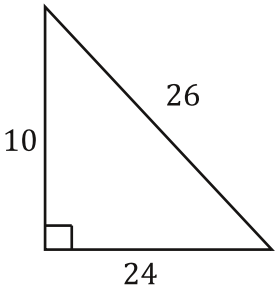

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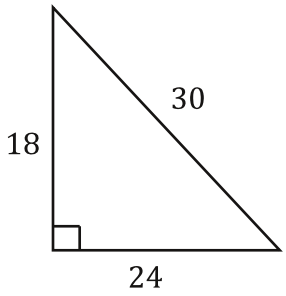

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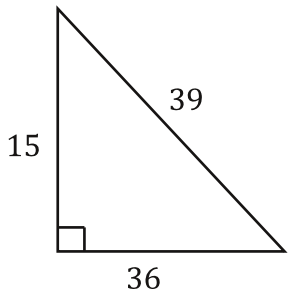

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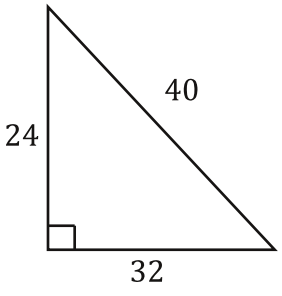
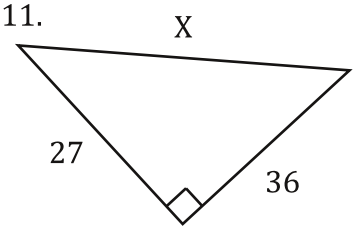


Bubble the correct answer choice from each item above.

#1.	#2.	#3.	#4.	#5.	#6.	#7.	#8.	#9.	#10.
○A.	○A.	○A.	○A.	○A.	○A.	○A.	○A.	○A.	○A.
○B.	○B.	○B.	○B.	○B.	○B.	○B.	○B.	○B.	○B.
○C.	○C.	○C.	○C.	○C.	○C.	○C.	○C.	○C.	○C.
○D.	○D.	○D.	○D.	○D.	○D.	○D.	○D.	○D.	○D.

For these... write the kind of Pythagorean triple, the scale factor, and find the missing length.

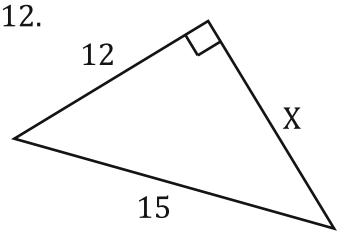
11.



3-4-5

Scale factor=9
x=9*5
x=45

12.



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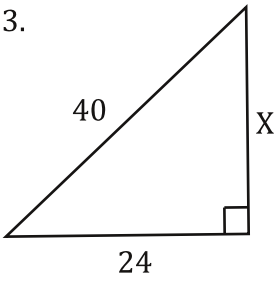

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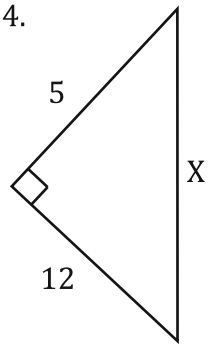

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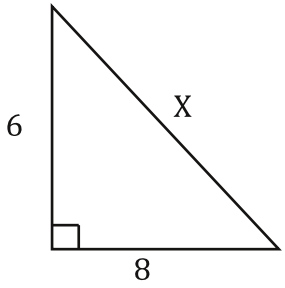

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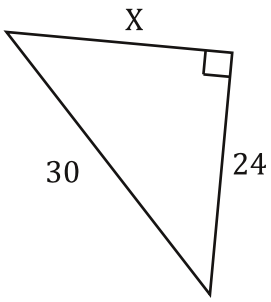

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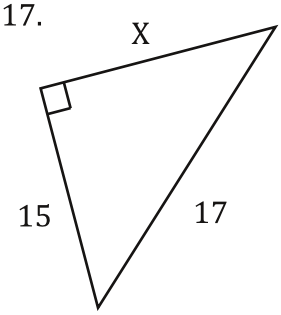

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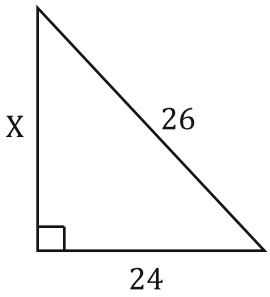
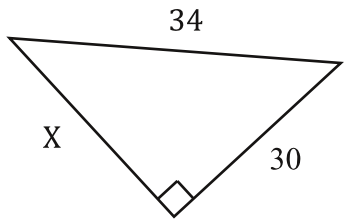


Bubble all the correct answers from above. Don't bubble incorrect answers.

○26 ○24 ○45 ○16 ○7 ○5 ○18 ○13 ○5 ○10 ○18 ○28 ○32 ○10

19.



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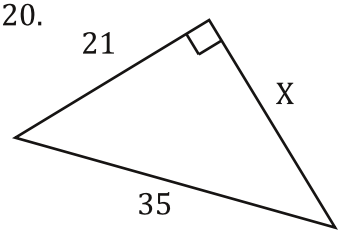

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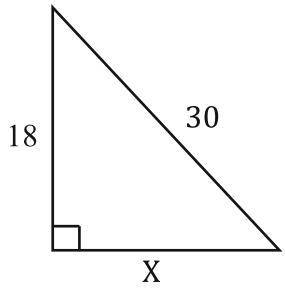

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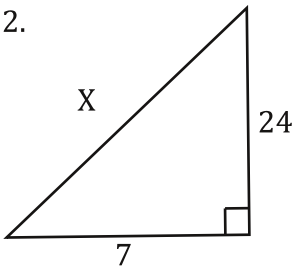

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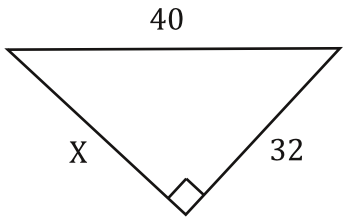

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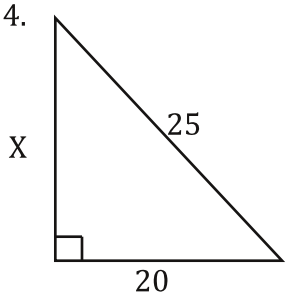

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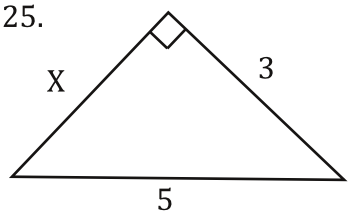

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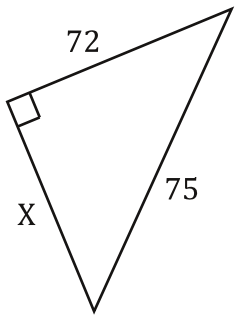
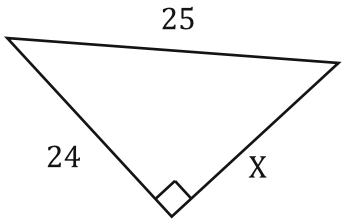


Bubble all the correct answers from above. Don't bubble incorrect answers.

○ 21 ○ 4 ○ 32 ○ 24 ○ 32 ○ 24 ○ 36 ○ 12 ○ 3 ○ 42 ○ 16 ○ 28 ○ 25 ○ 15

27.



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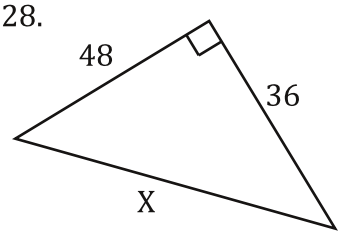

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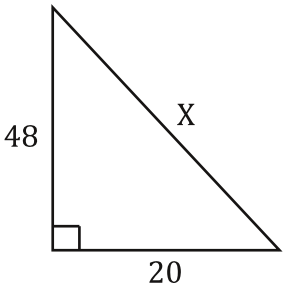

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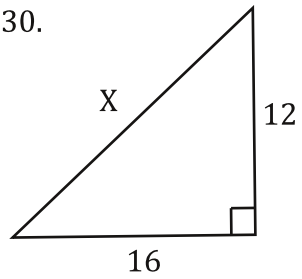

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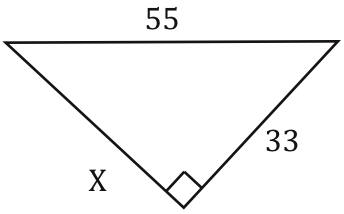

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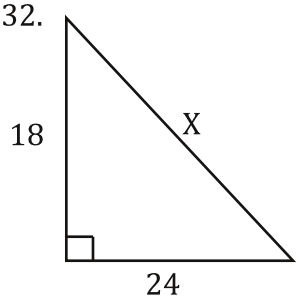

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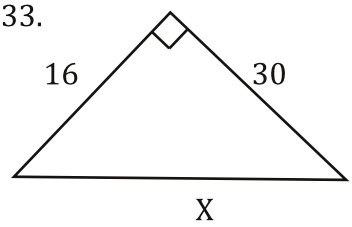

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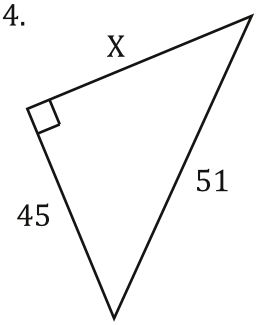

Bubble all the correct answers from above. Don't bubble incorrect answers.

○ 20 ○ 40 ○ 32 ○ 34 ○ 52 ○ 24 ○ 36 ○ 60 ○ 50 ○ 30 ○ 22 ○ 44 ○ 7 ○ 16