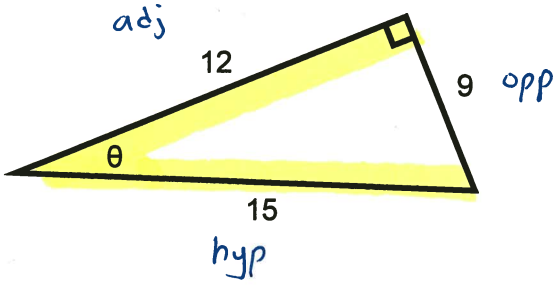
KEY

L03 - Trigonometry (Solving for Sides)

Part 1 - Solving for Angles

1. Label all sides of the triangle (opp, adj, hyp).
2. Using each ratio, solve for the angle (yes, you should get the same answer all 3 times)



SohCahToa

$\sin\theta = \frac{o}{h}$ $\cos\theta = \frac{a}{h}$ $\tan\theta = \frac{o}{a}$

$\sin\theta = \frac{o}{h}$

$\sin\theta = \frac{9}{15}$

$\sin\theta = 0.6$

$\theta = \sin^{-1}(0.6)$

$\theta = 36.9°$

$\cos\theta = \frac{a}{h}$

$\cos\theta = \frac{12}{15}$

$\cos\theta = 0.8$

$\theta = \cos^{-1}(0.8)$

$\theta = 36.9°$

$\tan\theta = \frac{o}{a}$

$\tan\theta = \frac{9}{12}$

$\tan\theta = 0.75$

$\theta = \tan^{-1}(0.75)$

$\theta = 36.9°$

KEY

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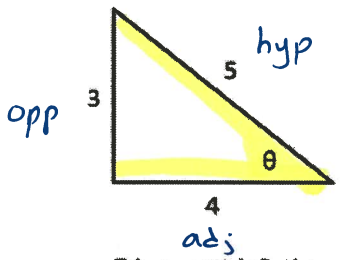
Use the following information to answer Q1-3:

Labelling the Sides of a Triangle



Trigonometric Ratio

1 – Sin
2 – Cos
3 – Tan

Q1: Determine the length of each side of the triangle.

Orientation:	4	5	3
Description:	**Length of the Adjacent side**	**Length of the Hypotenuse**	**Length of the Opposite side**

(Record your three-digit answer in the Numerical Response boxes below)

4	5	3	

Q2: To solve the triangle above for θ, we will use a trigonometric ratio ***a*** from the text box above. The value of this ratio is $\frac{b}{c}$, where ***a***, ***b***, and ***c*** are ___, ___, and ___.

(Record your three digit answer in the Numerical Response boxes below)

Option #1

$\sin\theta = \frac{o}{h}$

$\sin\theta = \frac{3}{5}$

1	3	5	

Option #2

$\cos\theta = \frac{a}{h}$

$\cos\theta = \frac{4}{5}$

2	4	5	

Option #3

$\tan\theta = \frac{o}{a}$

$\tan\theta = \frac{3}{4}$

3	3	4	

Q3: What is the value of θ?

(Record your three digit answer in the Numerical Response boxes below)

3	6	.	9

$\sin\theta = \frac{3}{5}$

$\sin\theta = 0.6$

$\theta = \sin^{-1}(0.6)$

$\theta = 36.9°$

$\cos\theta = \frac{4}{5}$

$\cos\theta = 0.8$

$\theta = \cos^{-1}(0.8)$

$\theta = 36.9°$

$\tan\theta = \frac{3}{4}$

$\tan\theta = 0.75$

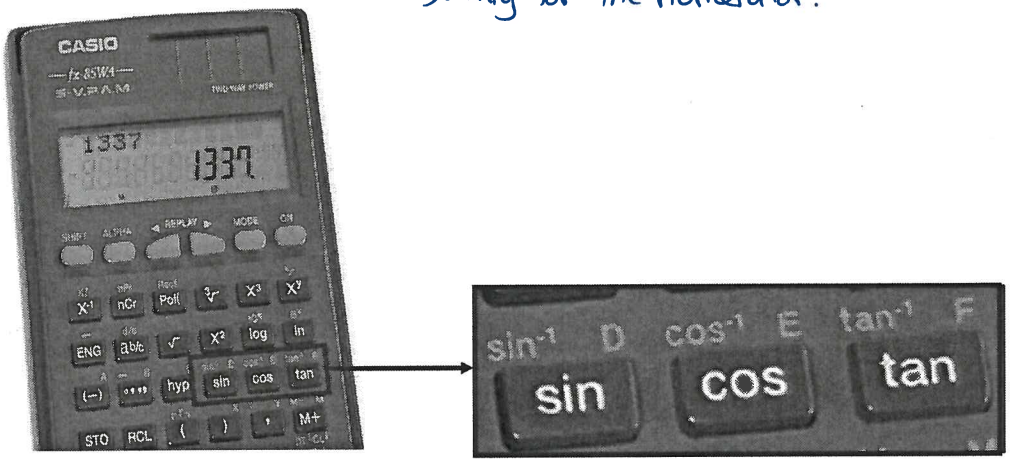
$\theta = \tan^{-1}(0.75)$

$\theta = 36.9°$

KEY

Part 2 - Solving for Sides - Easy Calculations

Solving for the numerator.

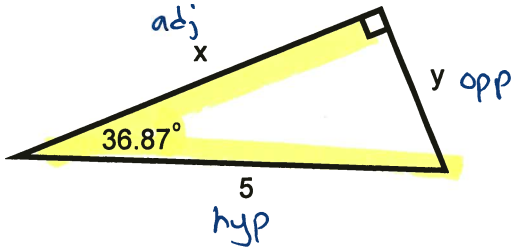


Step 1: Label all sides.

Step 2: Which side are you solving for? Choose your appropriate ratio.

Step 3: Convert your angle to a ratio (in decimal form).

Step 4: Solve for the unknown side.



SohCahToa

$\sin\theta = \frac{o}{h}$ $\cos\theta = \frac{a}{h}$ $\tan\theta = \frac{o}{a}$

Solving for x

We know hyp, and are looking for adj.

SohCahToa

$\cos\theta = \frac{a}{h}$

$\cos 36.87^\circ = \frac{x}{5}$

$0.8 = \frac{x}{5}$

$\cdot 5 \quad \cdot 5$

$4 = x$

Solving for y

We know hyp, and are looking for opp

SohCahToa

$\sin\theta = \frac{o}{h}$

$\sin 36.87 = \frac{y}{5}$

$0.6 = \frac{y}{5}$

$\cdot 5 \quad \cdot 5$

$3 = y$

KEY

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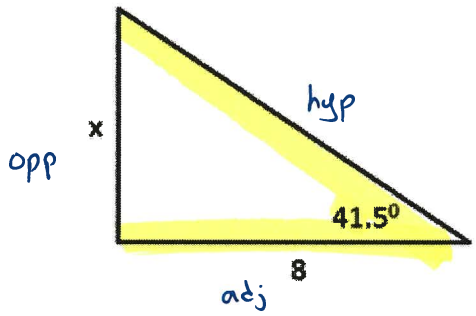
Use the following information to answer Q4-6:

Labelling the Sides of a Triangle



Side Orientation

1 – Diagonal
2 – Horizontal
3 – Vertical

Q4: Use the numbers above to identify each side of the triangle.

Orientation:	2	1	3
Description:	**Adjacent**	**Hypotenuse**	**Opposite**

(Record your three-digit answer in the Numerical

2	1	3	

Q5: To solve the triangle above for side x, we will use which trigonometric ratio?

a. Sin
b. Cos
c. Tan
d. All of the above

We know adj, and are looking for opp.
SohCahToa
$\tan\theta = \frac{o}{a}$

Q6: What is the value of x, to the nearest tenth?

(Record your answer in the Numerical Response boxes below)

7	.	0	8

$\tan\theta = \frac{o}{a}$

$\tan 41.5 = \frac{x}{8}$

$0.8847 = \frac{x}{8}$

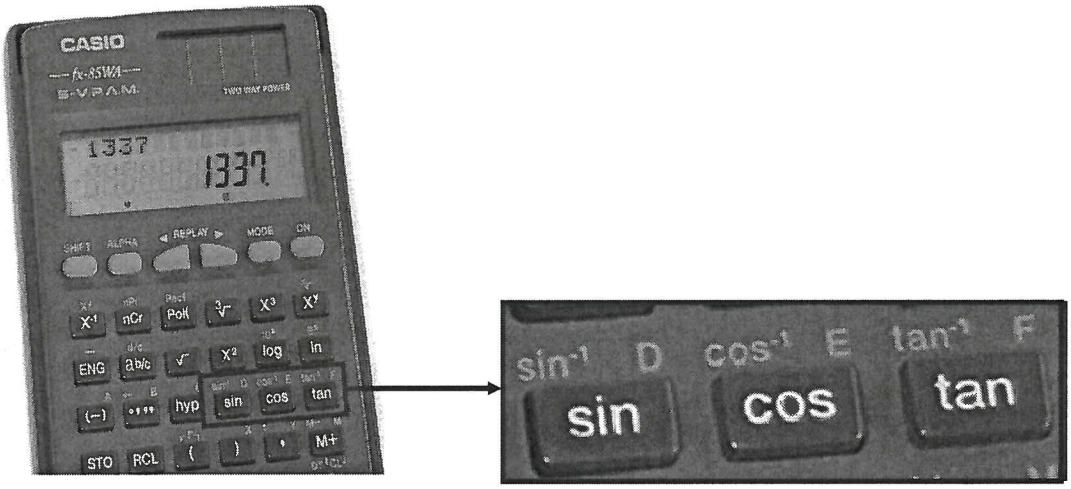
$\cdot 8 \qquad \cdot 8$

$x = 7.0778\ldots$

$x \approx 7.08$

KEY

Part 3 - Solving for Sides - Hard Calculations



Step 1: Label all sides.

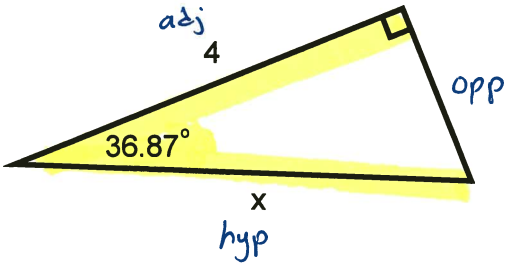
Step 2: Which side are you solving for?
Choose your appropriate ratio.

Step 3: Convert your angle to a ratio
(in decimal form).

Step 4: Solve for the unknown side.

SohCahToa

$\text{Sin}\,\theta = \frac{o}{h}$ $\text{Cos}\,\theta = \frac{a}{h}$ $\text{Tan}\,\theta = \frac{o}{a}$



SohCahToa

$\text{Cos}\,\theta = \frac{a}{h}$

$\text{Cos}\,36.87 = \frac{4}{x}$

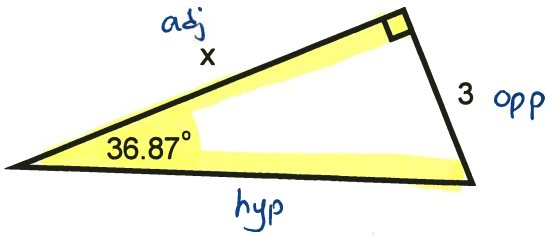
$0.8 = \frac{4}{x}$

$\cdot x \quad \cdot x$

$(0.8)x = 4$

$\div 0.8 \quad \div 0.8$

$x = 5$



SohCahToa

$\text{Tan}\,\theta = \frac{o}{a}$

$\text{Tan}\,36.87 = \frac{3}{x}$

$0.75 = \frac{3}{x}$

$\cdot x \quad \cdot x$

$(0.75)x = 3$

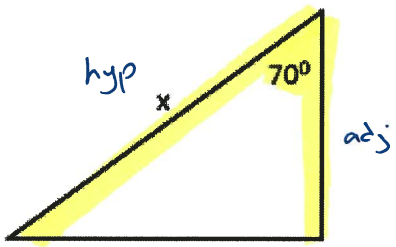
$\div 0.75 \quad \div 0.75$

$x = 4$

KEY

Use the following information to answer Q7-9:

Labelling the Sides of a Triangle



Side Orientation

1 – Diagonal
2 – Horizontal
3 – Vertical

Q7: Use the numbers above to identify each side of the triangle.

Orientation:	3	1	2
Description:	**Adjacent**	**Hypotenuse**	**Opposite**

(Record your three-digit answer in the Numerical

3	1	2	

Q8: To solve the triangle above for side *x*, we will use which trigonometric ratio?

SohCahToa

a. Sin
b. Cos
c. Tan
d. All of the above

Q9: What is the value of x, to the nearest tenth?

(Record your answer in the Numerical Response boxes below)

4	.	3	

$\sin\theta = \frac{o}{h}$

$\sin 70^\circ = \frac{4}{x}$

$0.93969 = \frac{4}{x}$

$\cdot x \qquad \cdot x$

$x(0.93969) = 4$

$\div 0.93969 \qquad \div 0.93969$

$x = 4.2567\ldots$

$x \approx 4.3$