Pythag Theorem & SOH CAH TOA

a. Pythagorean Theorem is used to find missing sides in a triangle.

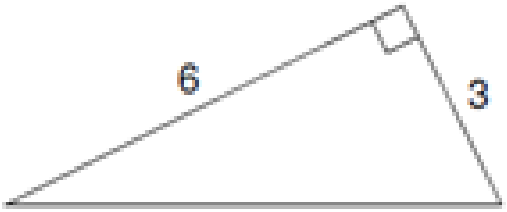
$$a^2 + b^2 = c^2$$

b. "a" and "b" represent the legs of the triangle

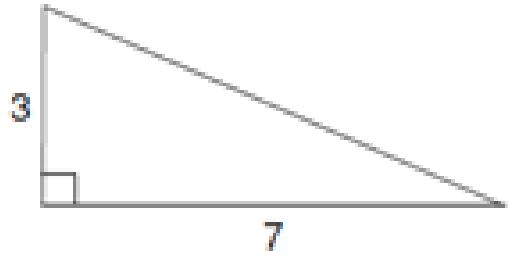
c. "c" represents the hypotenuse

d. Examples: Find the missing sides using Pythagorean Theorem

i.

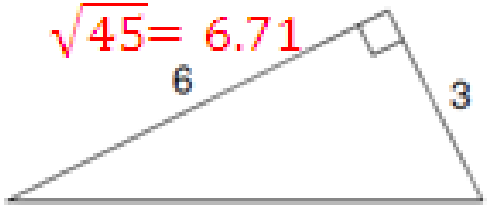


2.

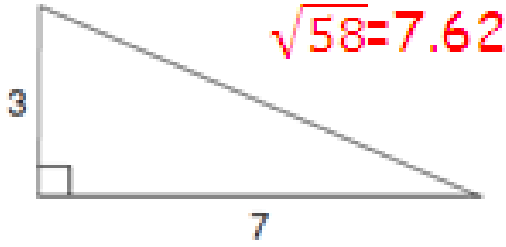


d. Examples: Find the missing sides using Pythagorean Theorem

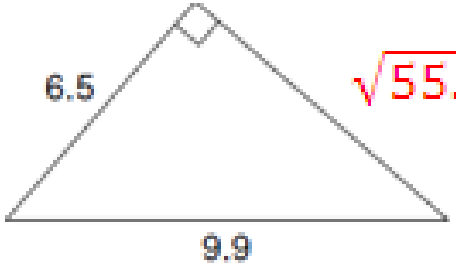
v. $\sqrt{45} = 6.71$



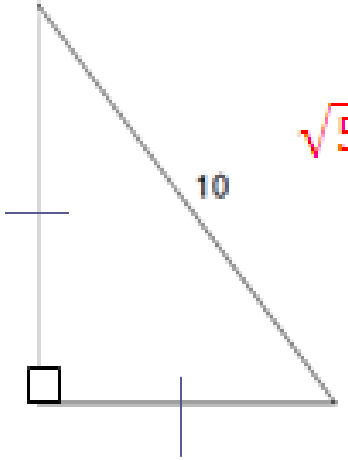
2. $\sqrt{58} = 7.62$



4. $\sqrt{55.76} = 7.47$



4. $\sqrt{50} = 7.07$

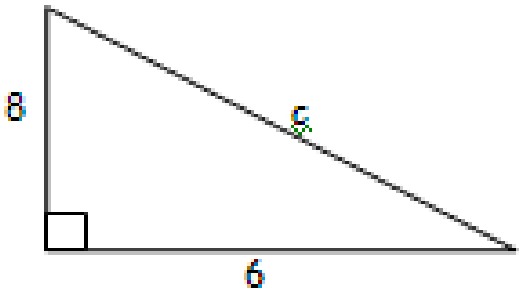


Pythagorean Thm Practice – Page 16-17

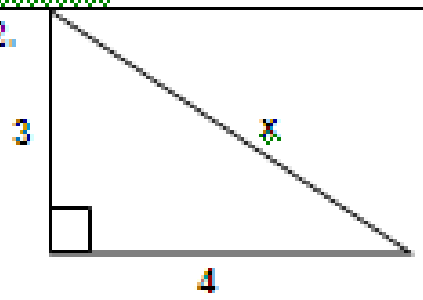
- Complete the practice on page 16-17.

Solve for each variable. Round each answer to the nearest tenth. Show all work.

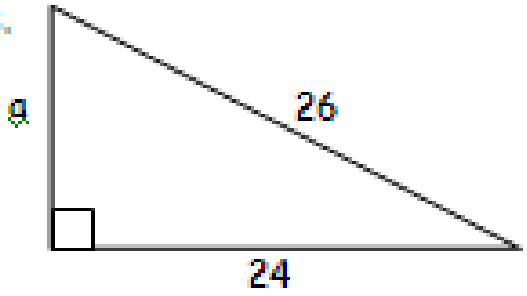
1.



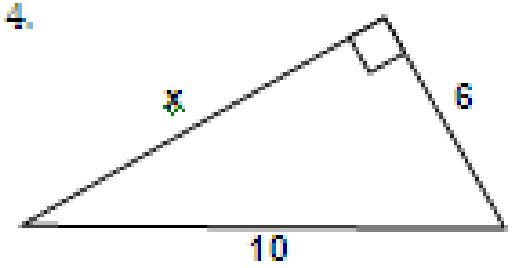
2.



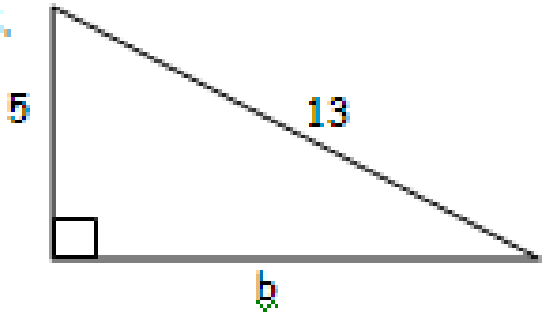
3.



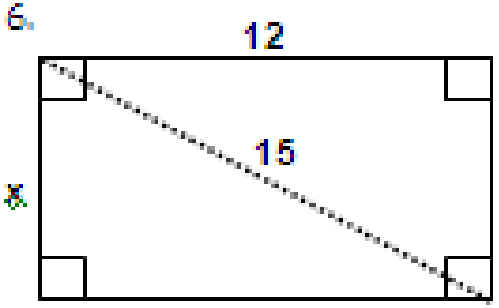
4.



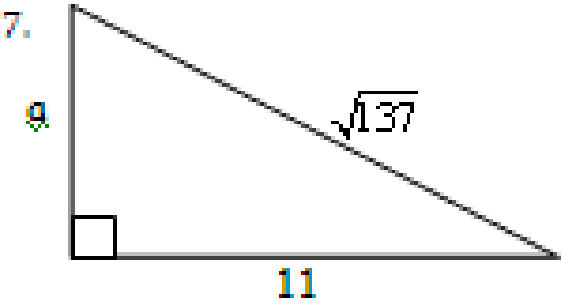
5.



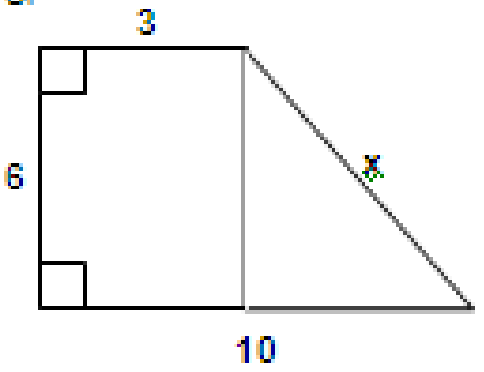
6.

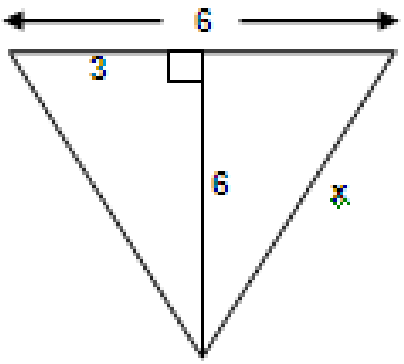


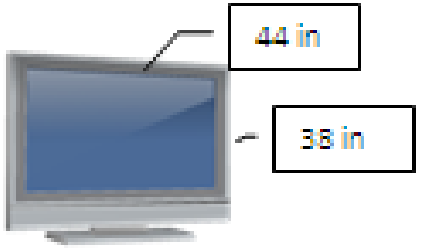
7.



8.



9. 	10. Find the length of the diagonal of a square whose side length is 10 inches
11. The length of one of the legs in a right triangle is 4 inches. If the hypotenuse is 12 inches long, what is the length of the other leg?	12. The diagonal crossbar of an old wooden gate has rusted. The gate is rectangular, 3 feet by 4 feet. How long is the crossbar (diagonal)?

13. Find the length of a diagonal of a square enclosure with a perimeter of 16 feet.	14. What is the diagonal measurement of the TV screen shown in the figure below? 

SOHCAHTOA

a. SOHCAHTOA is used to help find missing sides and angles in a right triangle when Pythagorean Theorem does not work!

S (sine) **O** (opposite) **H** (hypotenuse) → $sin(\theta) = \frac{Opposite\ Side}{Hypotenuse\ Side}$

C (cosine) **A** (adjacent) **H** (hypotenuse) → $cos(\theta) = \frac{Adjacent\ Side}{Hypotenuse\ Side}$

T (tangent) **O** (opposite) **A** (adjacent) → $tan(\theta) = \frac{Opposite\ Side}{Adjacent\ Side}$

b. Setting up Trigonometry Ratios and Solving for Sides

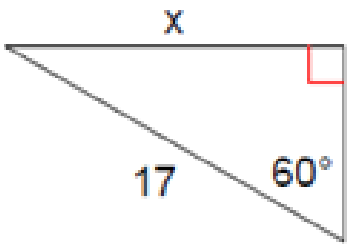
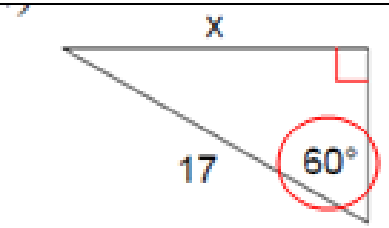
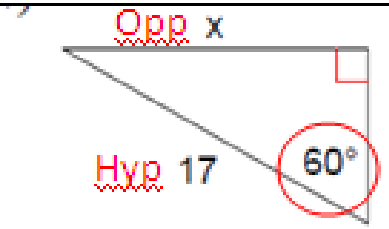
i. Select a given angle (NOT the right angle)

ii. Label your sides (Opposite, Adjacent, Hypotenuse)

iii. Decide which trig function you can use:

- ✓ SOH if we have the opposite and hypotenuse
- ✓ CAH if we have the adjacent and the hypotenuse
- ✓ TOA if we have the opposite and the adjacent

iv. Set up the proportion and solve for x!

Example: 	
1. Select a given angle	
2. Label your sides	
3. Decide which Trig to use	Opp and Hyp → SOH

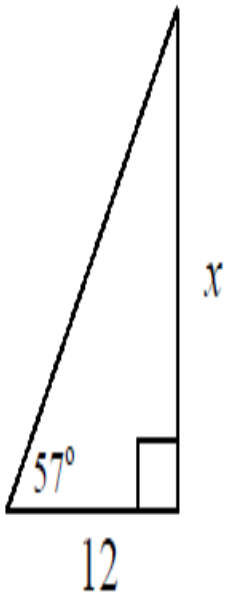
3. Decide which Trig to use	Opp and Hyp → SOH
4. Set up the proportion	$\sin(60) = \frac{x}{17}$
5. Solve the proportion	x = sin (60) *17 = **14.7**
6. Check your work!	$\sin(60^\circ) = \frac{14.72}{17}$

$$0.8660 = 0.8659$$

we call this close enough!

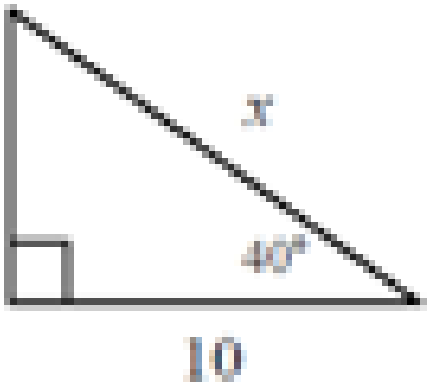
Examples: Find x in each of the triangles below. Round your final answers to the nearest hundredth. (*Figures may not be drawn to scale.*)

a)

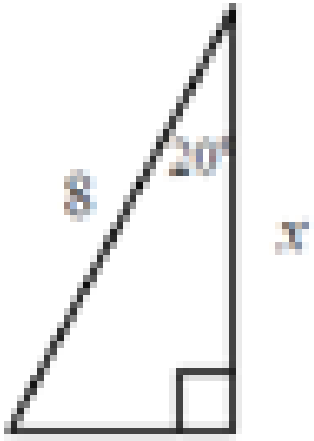


$x \approx$ _____

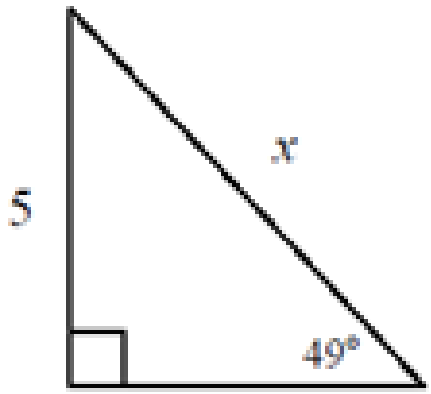
b)



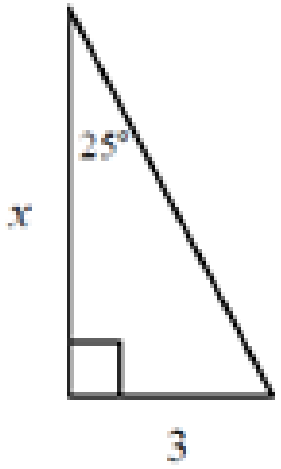
c)



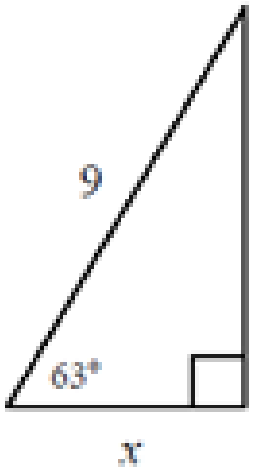
d)



e)



f)



I. Review: SOHCAHTOA

SOH	CAH	TOA
$\sin(\text{angle}) = \frac{\text{opposite}}{\text{hypotenuse}}$	$\cos(\text{angle}) = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\tan(\text{angle}) = \frac{\text{opposite}}{\text{adjacent}}$

II. Setting up Trigonometry Ratios and Solving for Angles

i. Select a given angle (NOT the right angle)

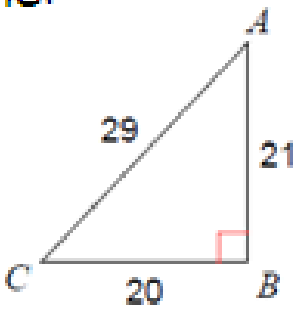
ii. Label your sides (Opposite, Adjacent, Hypotenuse)

iii. Decide which trig function you can use:

- ✓ SOH if we have the opposite and hypotenuse
- ✓ CAH if we have the adjacent and the hypotenuse
- ✓ TOA if we have the opposite and the adjacent

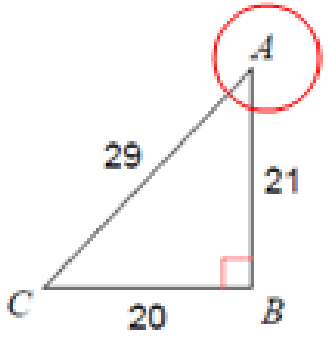
iv. Solve the equation … remember to you your inverses!

Example:

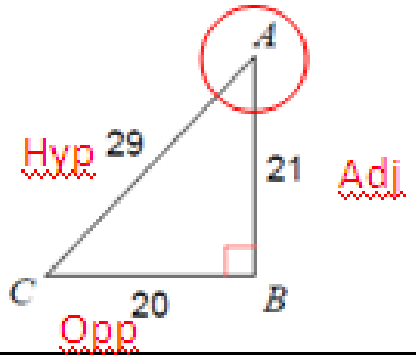


Find the measure of angle A.

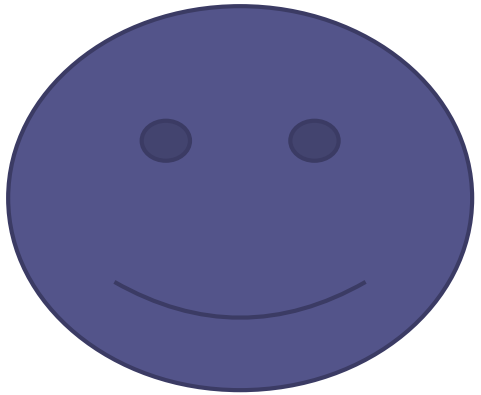
1. Select a given angle



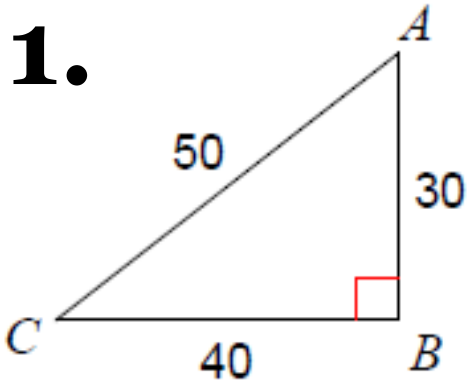
2. Label your sides



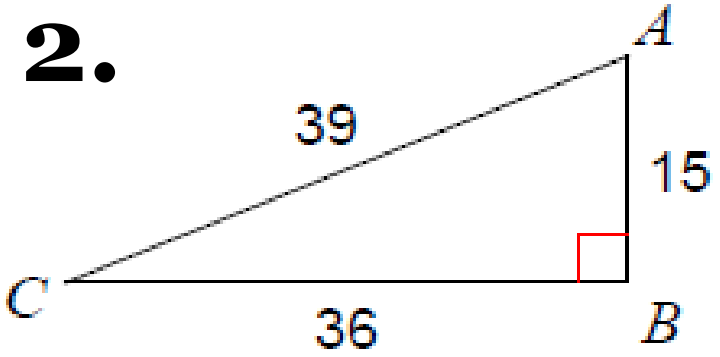
3. Decide which Trig to use	We have ALL sides, can use any of them! Let's use CAH...(adj and hyp)
4. Set up the proportion	$\cos(x) = \frac{21}{29}$
5. Solve the equation	$\cos^{-1}(21/29) = \mathbf{43.6°}$
6. Check your work!	$\cos(43.6) = \frac{21}{29}$



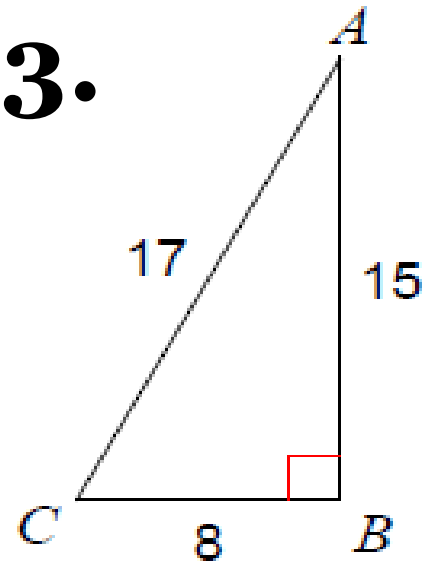
1.



2.



3.



What did the math book say to the other math book?

“I’ve got problems!”