

# Radical Play

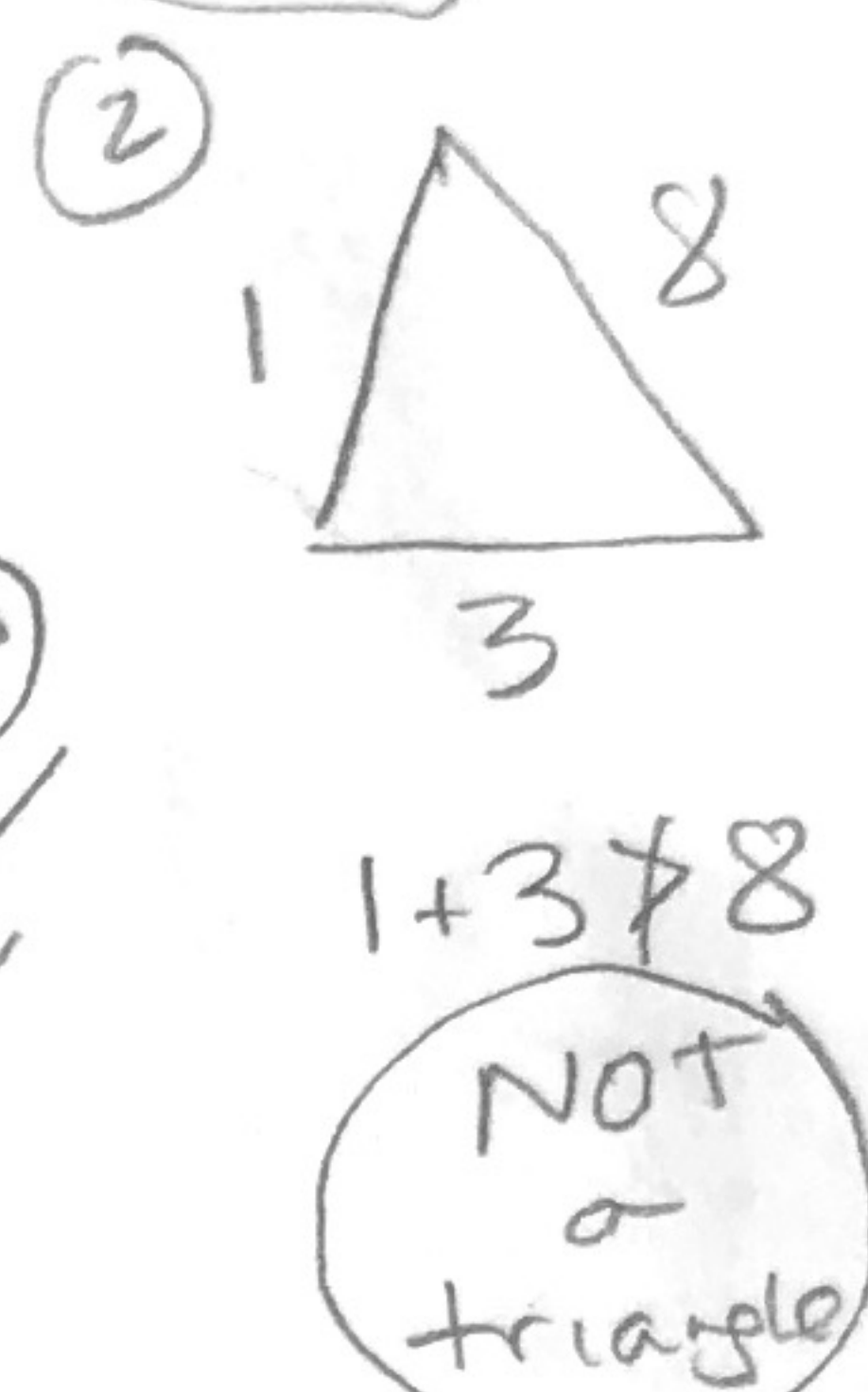
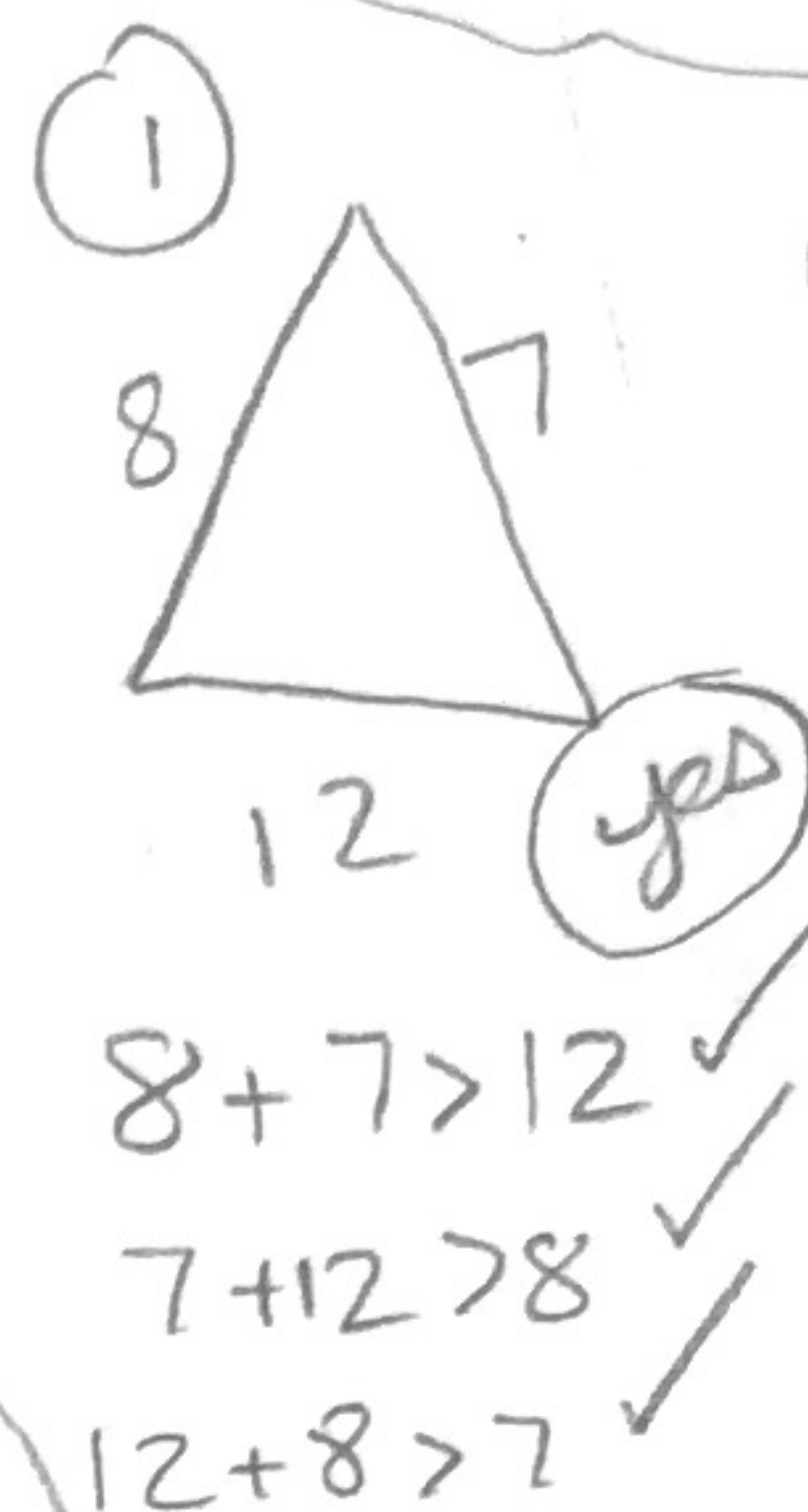
$$\textcircled{1} \sqrt{20} = \sqrt{4} \sqrt{5} = \boxed{2\sqrt{5}}$$

$$\textcircled{3} (\sqrt{7})^2 = \sqrt{49} = \boxed{7}$$

$$\textcircled{2} 2\sqrt{12} = 2 \cdot \sqrt{4} \cdot \sqrt{3} = 2 \cdot 2 \sqrt{3} = \boxed{4\sqrt{3}}$$

$$\textcircled{4} (3\sqrt{5})^2 = 3\sqrt{5} \cdot 3\sqrt{5} = 9\sqrt{25} = 9 \cdot 5 = \boxed{45}$$

# Does it make a triangle?



# What kind of triangle is it?

$\textcircled{1} a^2 + b^2 = c^2$   
Right

$\textcircled{2} a^2 + b^2 > c^2$   
Acute

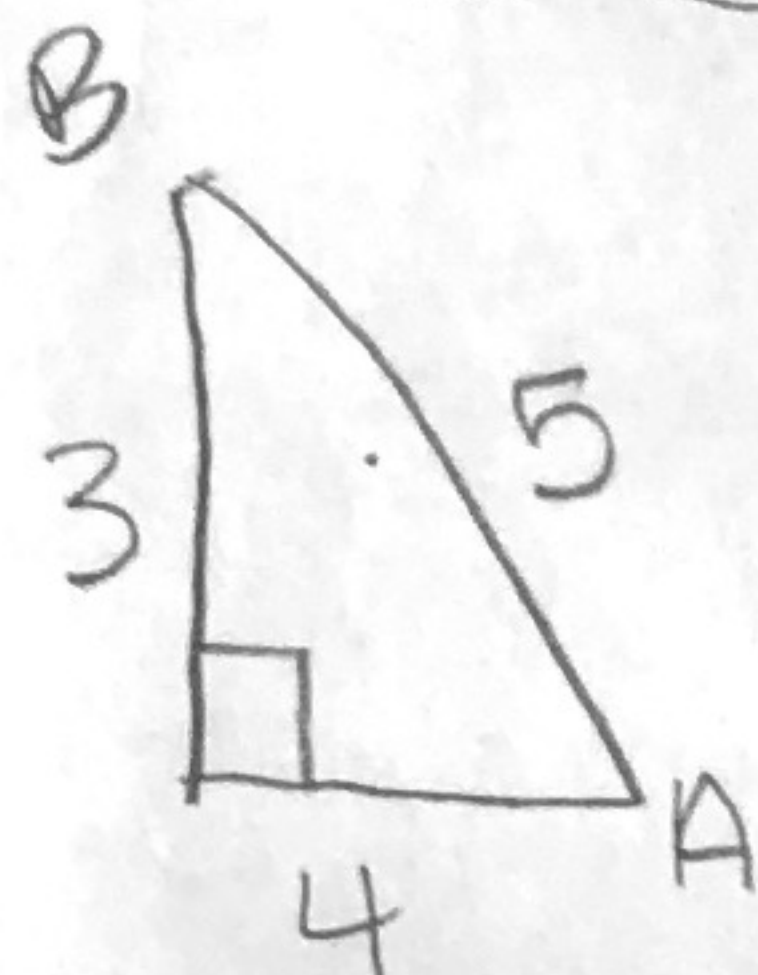
$\textcircled{3} a^2 + b^2 < c^2$   
Obtuse

# Trig Ratios = Sine Cosine Tangent

SOH

CAH

TOA



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

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

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

$$\sin B = \frac{4}{5}$$

$$\cos B = \frac{3}{5}$$

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

Solve a triangle means, find all  
angles  
• find all  
side lengths

## Solve for Angles

① IF you have:

1 angle AND  
rt angle

- Angles sum to  $180^\circ$

(ex)



$$\angle A + 35 + 90 = 180$$

② IF YOU HAVE:

2 sides NO ANGLES

- Inverse Trig

(ex)



choose trig

$$\sin A = \frac{3}{10}$$

$$\sin^{-1}\left(\frac{3}{10}\right) = A$$

$$\angle A = 17.45^\circ$$

## Solve for Side Lengths

① IF YOU HAVE

2 sides

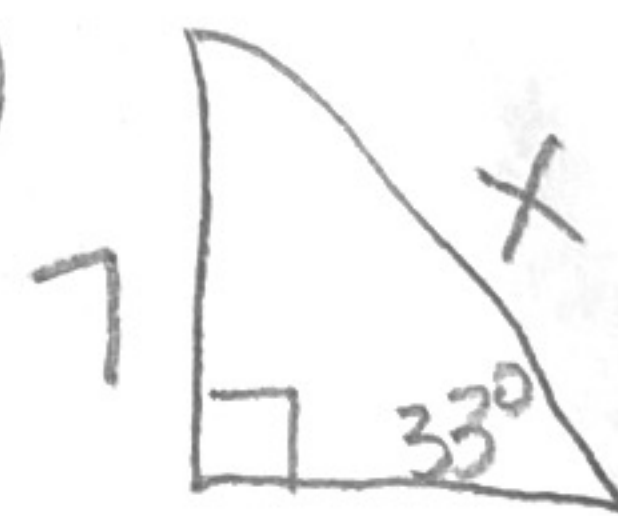
- $a^2 + b^2 = c^2$

② IF YOU HAVE

1 angle 1 side

- use trig

(ex)



choose trig  
function

$$\sin 33 = \frac{7}{X}$$

$$\frac{X}{1} \cdot 545 = \frac{7}{X} \cdot \frac{X}{1}$$

$$.545X = 7$$

$$\frac{.545X}{.545} = \frac{7}{.545}$$

$$X = 12.84$$

# Working with radicals

evens  
due  
Friday

Name

Key

Perform the operation and then simplify the radical.

$$1.) \sqrt{10} \cdot \sqrt{5} = \sqrt{50} = \sqrt{25 \cdot 2} = \boxed{5\sqrt{2}}$$

$$2.) \sqrt{8} \cdot \sqrt{4} = \sqrt{32} = \sqrt{16 \cdot 2} = \boxed{4\sqrt{2}}$$

$$3.) (\sqrt{10})^2 = \boxed{10}$$

$$4.) (2\sqrt{6})^2 = 4 \cdot 6 = \boxed{24}$$

$$(2\sqrt{6})(2\sqrt{6})$$

$$5.) 2\sqrt{5} \cdot 3\sqrt{5} = 6 \cdot 5 = \boxed{30}$$

$$6.) \sqrt{75} = \sqrt{25 \cdot 3} = \boxed{5\sqrt{3}}$$

$$7.) \sqrt{12} = \sqrt{4 \cdot 3} = \boxed{2\sqrt{3}}$$

$$8.) \sqrt{18}$$

$$9.) \sqrt{90} = \sqrt{9 \cdot 10} = \boxed{3\sqrt{10}}$$

$$10.) \sqrt{32}$$

$$11.) \sqrt{500} = \sqrt{100 \cdot 5} = \boxed{10\sqrt{5}}$$

$$12.) \sqrt{20}$$

$$13.) \sqrt{27} = \sqrt{9 \cdot 3} = \boxed{3\sqrt{3}}$$

$$14.) 3\sqrt{4} \cdot 5\sqrt{5}$$

$$15.) (3\sqrt{6})^2 = 9 \cdot 6 = 54$$

$$(3\sqrt{6})(3\sqrt{6})$$

$$9\sqrt{36}$$

$$16.) 7\sqrt{2} \cdot 3\sqrt{12}$$

$$17.) 2\sqrt{11} \cdot 3\sqrt{11} = 6 \cdot 11 = 66$$

$$18.) (3\sqrt{16})^2$$

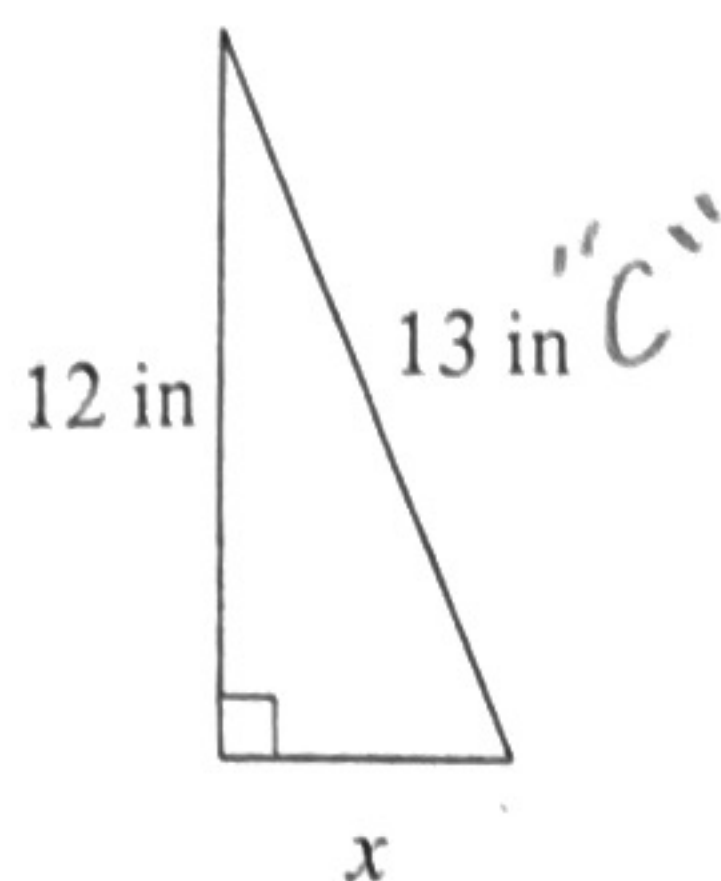
19.) What is a square root? What does it mean when you square something?

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

## The Pythagorean Theorem and Its Converse

Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.

1)



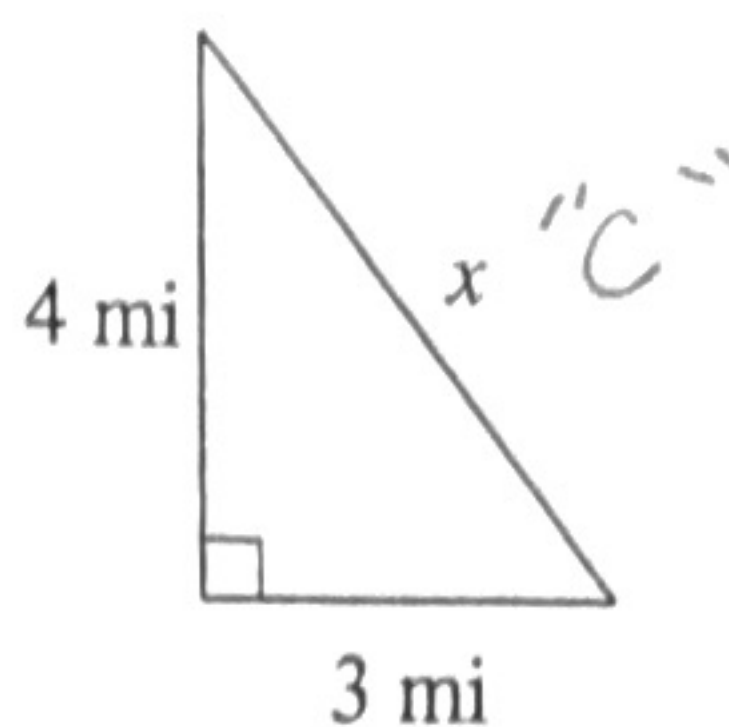
$$12^2 + x^2 = 13^2$$

$$144 + x^2 = 169$$

$$x^2 = 25$$

$$x = 5$$

2)



$$4^2 + 3^2 = x^2$$

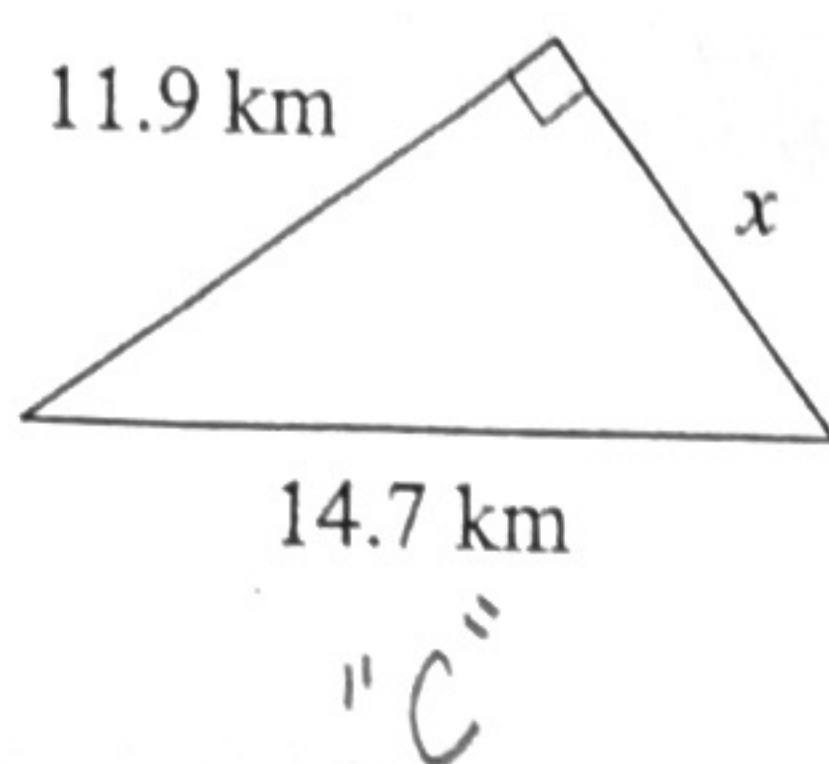
$$16 + 9 = x^2$$

$$\sqrt{25} = x$$

$$x = 5$$

Pythagorean Triples

3)



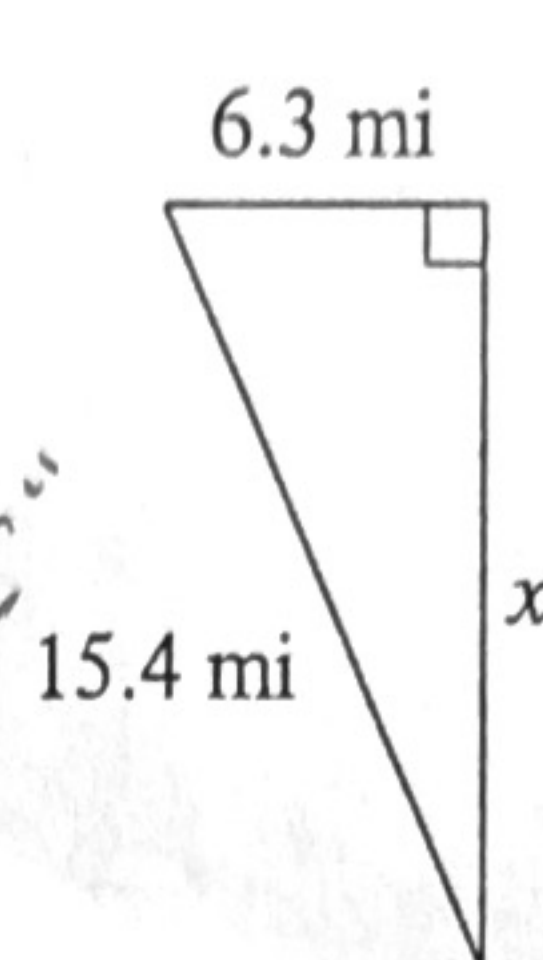
$$(11.9)^2 + x^2 = (14.7)^2$$

$$141.61 + x^2 = 216.09$$

$$x^2 = 74.48$$

$$x = 8.63$$

4)



$$(6.3)^2 + x^2 = (15.4)^2$$

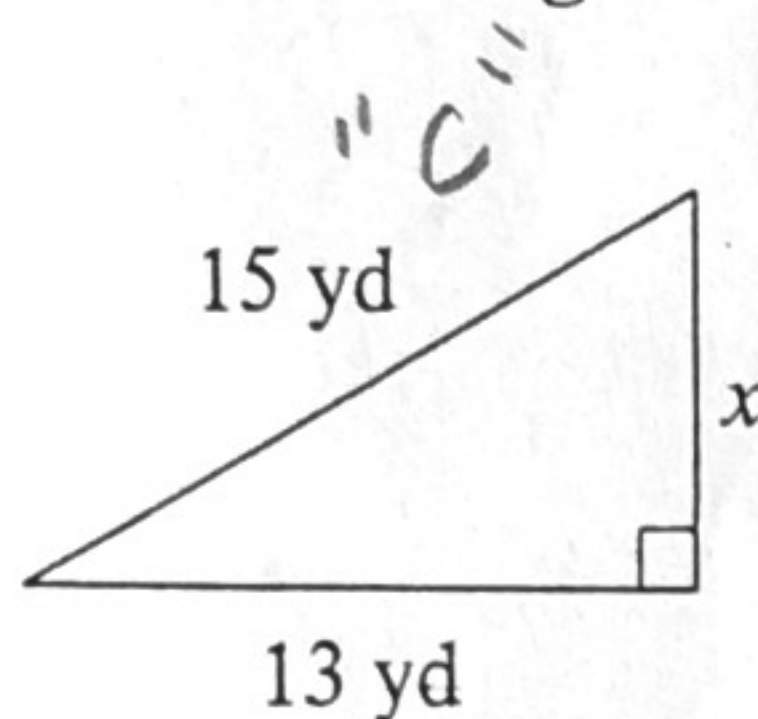
$$39.69 + x^2 = 237.16$$

$$x^2 = 197.47$$

$$x = 14.05$$

Find the missing side of each triangle. Leave your answers in simplest radical form.

5)



$$x^2 + 13^2 = 15^2$$

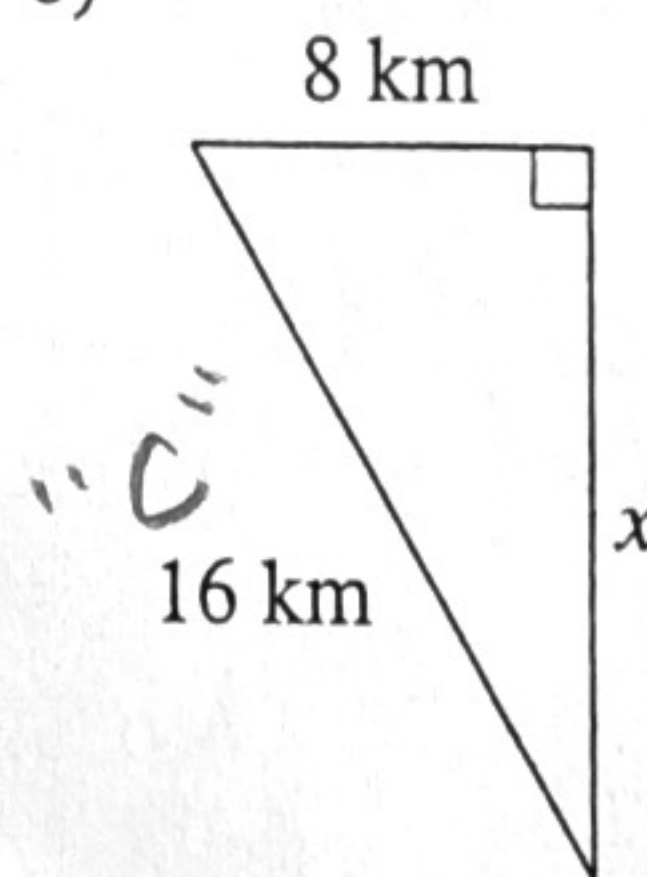
$$x^2 + 169 = 225$$

$$x^2 = 56$$

$$x = \sqrt{56}$$

$$x = 2\sqrt{14}$$

6)



$$8^2 + x^2 = 16^2$$

$$64 + x^2 = 256$$

$$x^2 = 192$$

$$x = \sqrt{192}$$

$$x = 8\sqrt{3}$$

Find the missing side of each right triangle. Side  $c$  is the hypotenuse. Sides  $a$  and  $b$  are the legs. Leave your answers in simplest radical form.7)  $a = 11$  m,  $c = 15$  m

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

$$11^2 + b^2 = 15^2$$

$$121 + b^2 = 225$$

$$b^2 = 104$$

$$b = \sqrt{104}$$

$$b = 2\sqrt{26}$$

8)  $b = \sqrt{6}$  yd,  $c = 4$  yd

$$a^2 + (\sqrt{6})^2 = 4^2$$

$$a^2 + 6 = 16$$

$$a^2 = 10$$

$$a = \sqrt{10}$$

$$a = \sqrt{10}$$

Worksheet B

State if the three numbers can be the measures of the sides of a triangle.

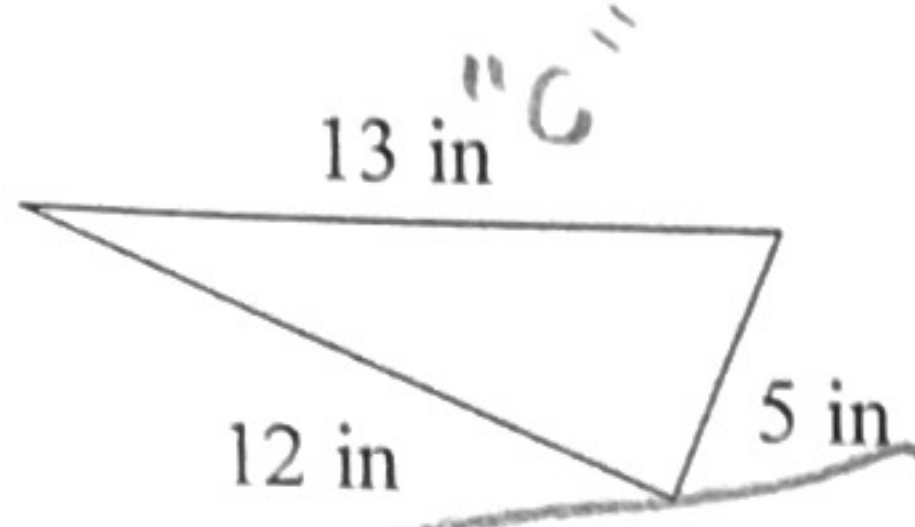
1) 9, 8, 6  
 $9+8 > 6$   
 $8+6 > 9$  ✓ **yes**  
 $6+9 > 8$

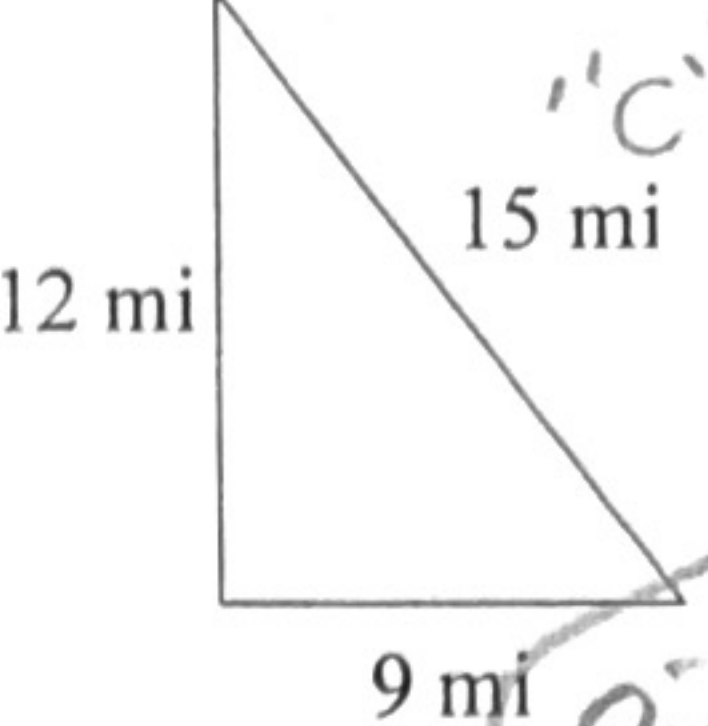
3) 8, 3, 10  
 $8+3 > 10$   
 $3+10 > 8$   
 $8+10 > 3$  ✓ **yes**

2) 12, 6, 9 **yes**

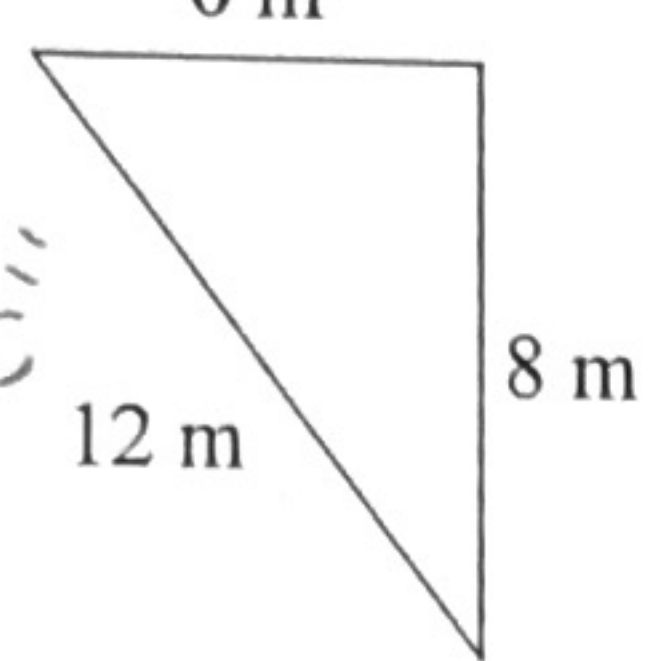
4) 7, 10, 6  $10+6 > 7$  **yes**

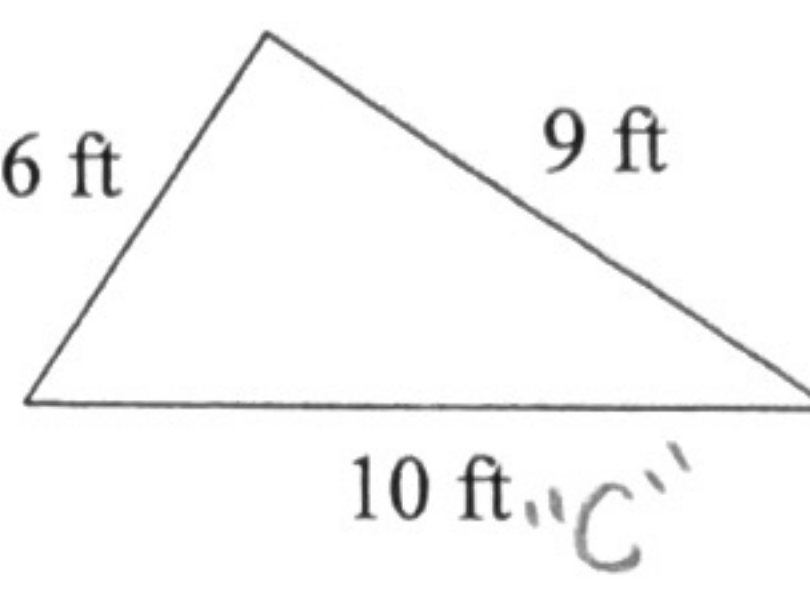
State if each triangle is acute, obtuse, or right.

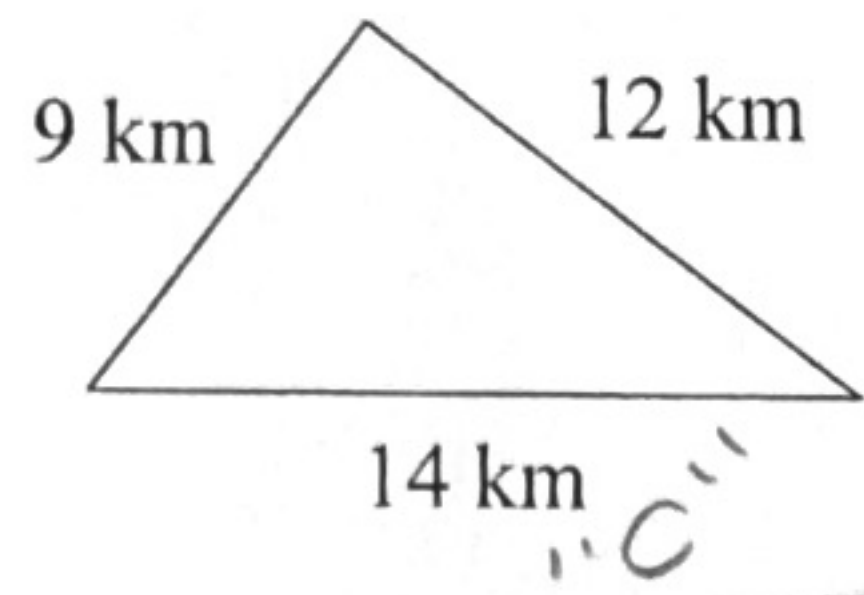
5)  
  
 $12^2 + 5^2 \square 13^2$   
 $144 + 25 \square 169$   
 $169 = 169$   
**Right**

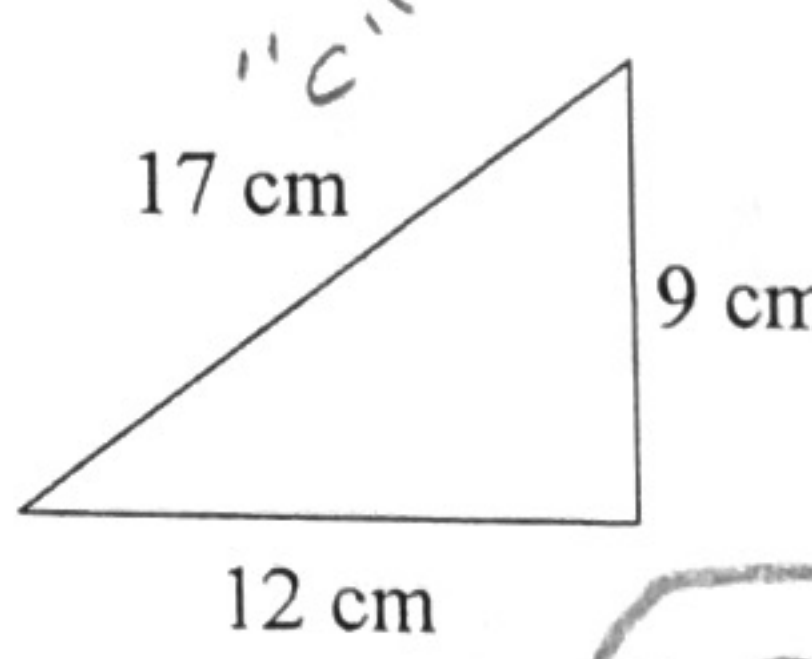
6)  
  
 $12^2 + 9^2 \square 15^2$   
 $144 + 81 \square 225$   
 $225 \geq 225$   
**Right**

$a^2 + b^2 > c^2$  acute  
 $a^2 + b^2 < c^2$  obtuse

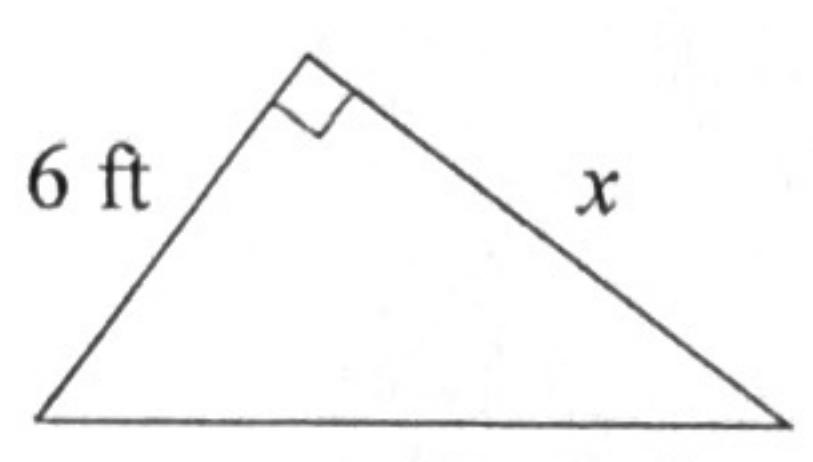
7)  
  
 $6^2 + 8^2 \square 12^2$   
 $36 + 64 \square 144$   
 $100 < 144$   
**Obtuse**

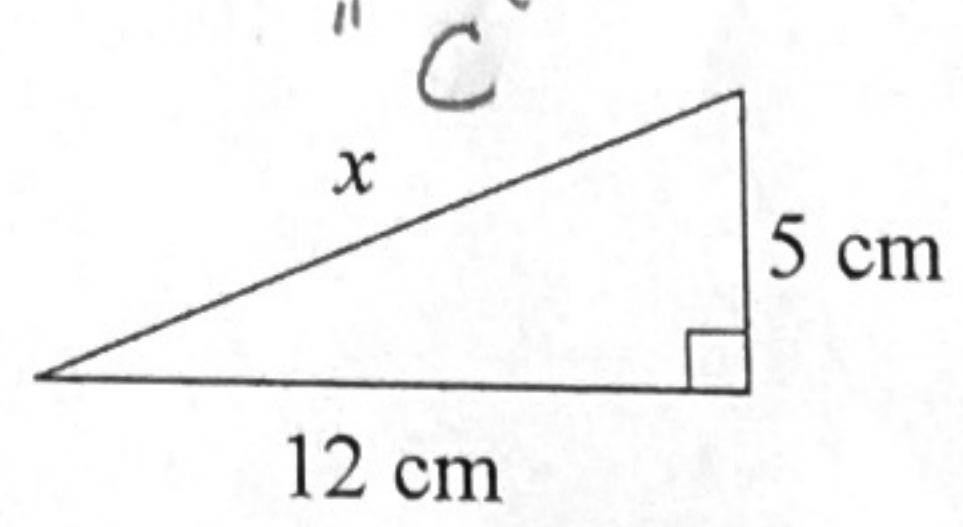
8)  
  
 $6^2 + 9^2 \square 10^2$   
 $36 + 81 \square 100$   
 $117 > 100$   
**Acute**

9)  
  
 $9^2 + 12^2 \square 14^2$   
 $81 + 144 \square 196$   
 $225 > 196$   
**Acute**

10)  
  
 $12^2 + 9^2 \square 17^2$   
 $144 + 81 \square 289$   
 $225 < 289$   
**Obtuse**

Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.

11)  
  
 $6^2 + x^2 = 10^2$   
 $36 + x^2 = 100$   
 $x^2 = 64$   
 $x = 8 \text{ ft}$

12)  
  
 $12^2 + 5^2 = c^2$   
 $144 + 25 = c^2$   
 $\sqrt{169} = \sqrt{c^2}$   
 $c = 13 \text{ cm}$

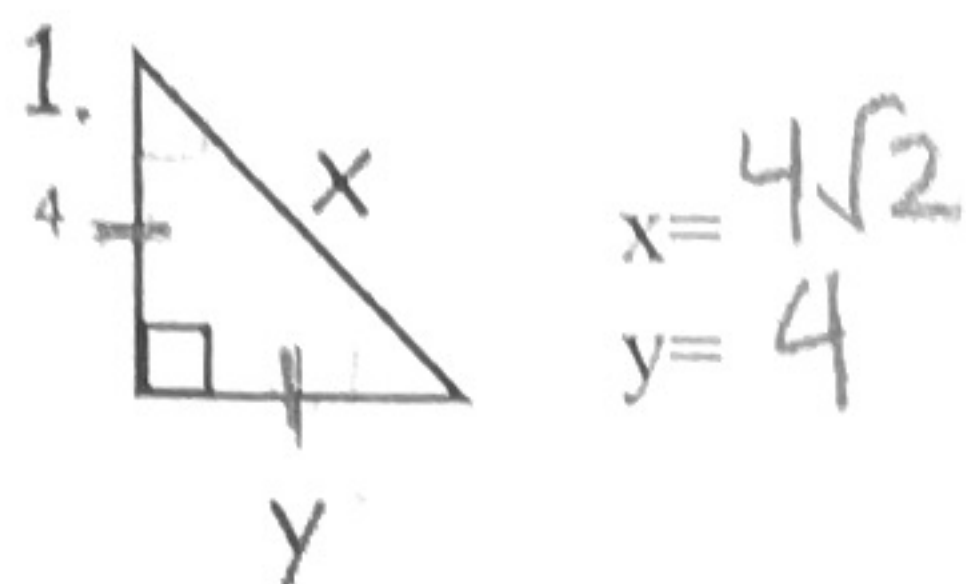
What kind of triangle is it?  
 45-45-90 OR 30-60-90?

Is it a

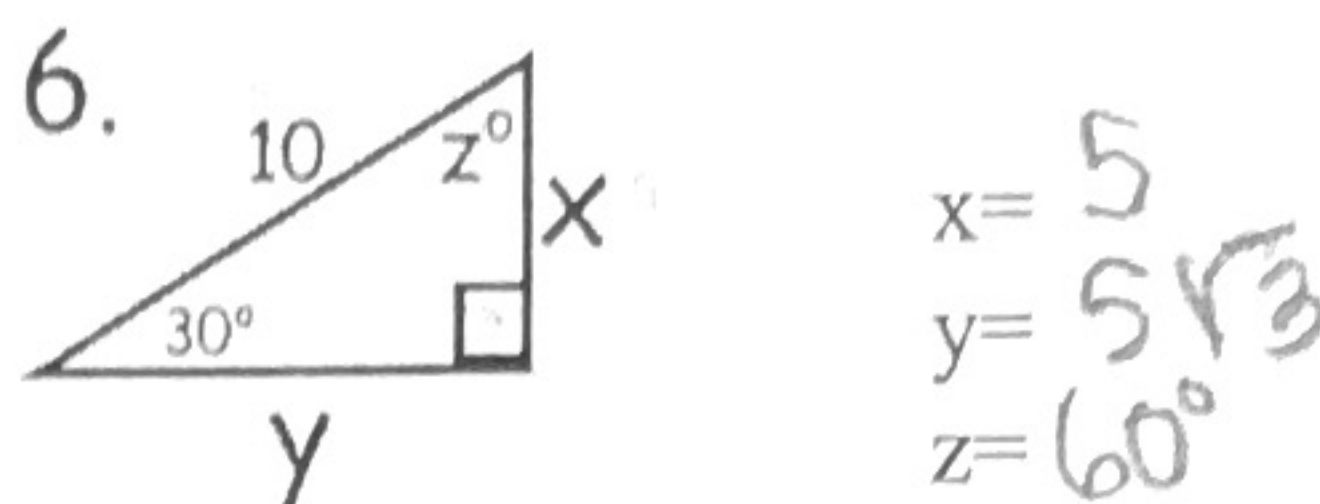
Name Key

Block \_\_\_\_\_

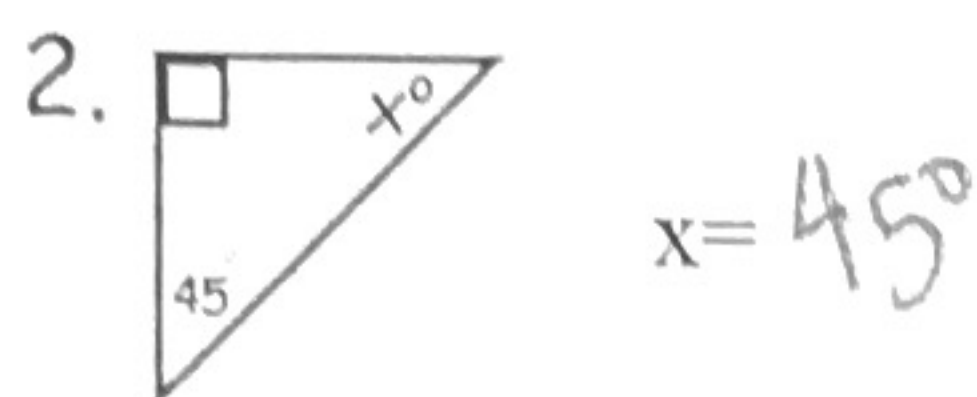
Describe each of the following triangles and solve for the variables.



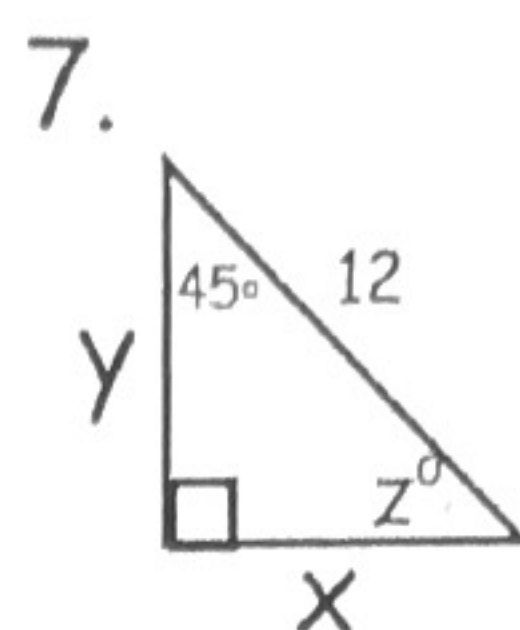
Triangle type 45-45



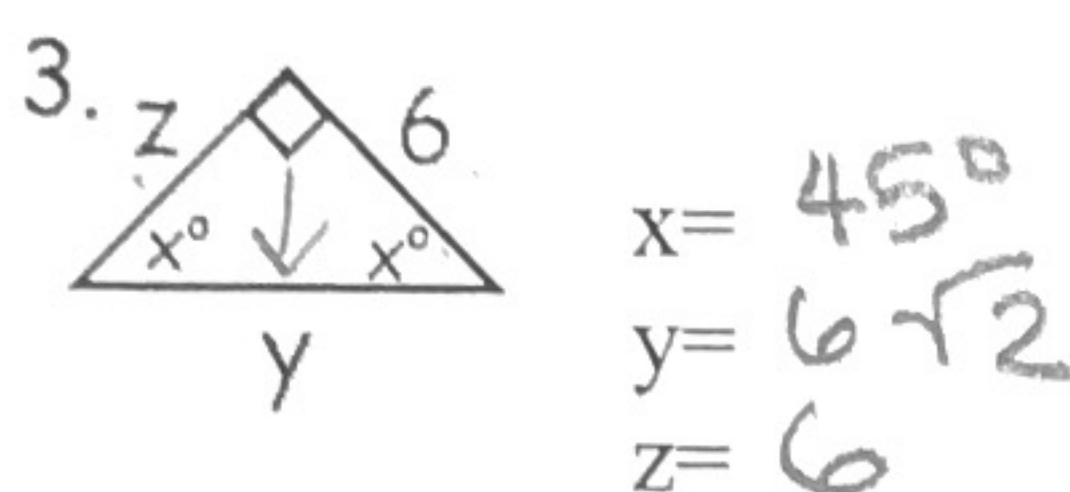
Triangle type 30-60



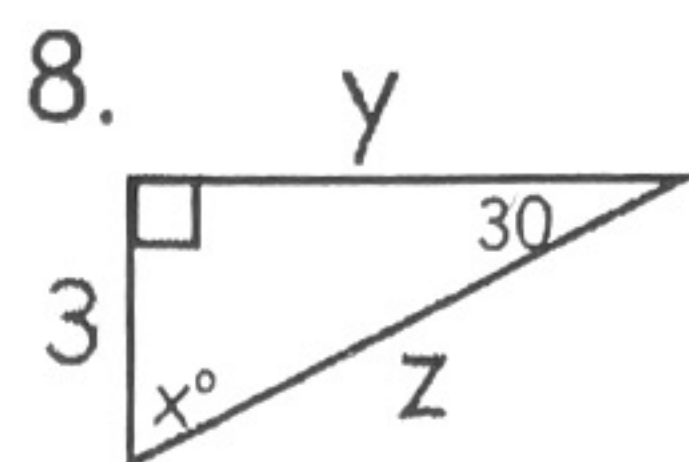
Triangle type 45-45



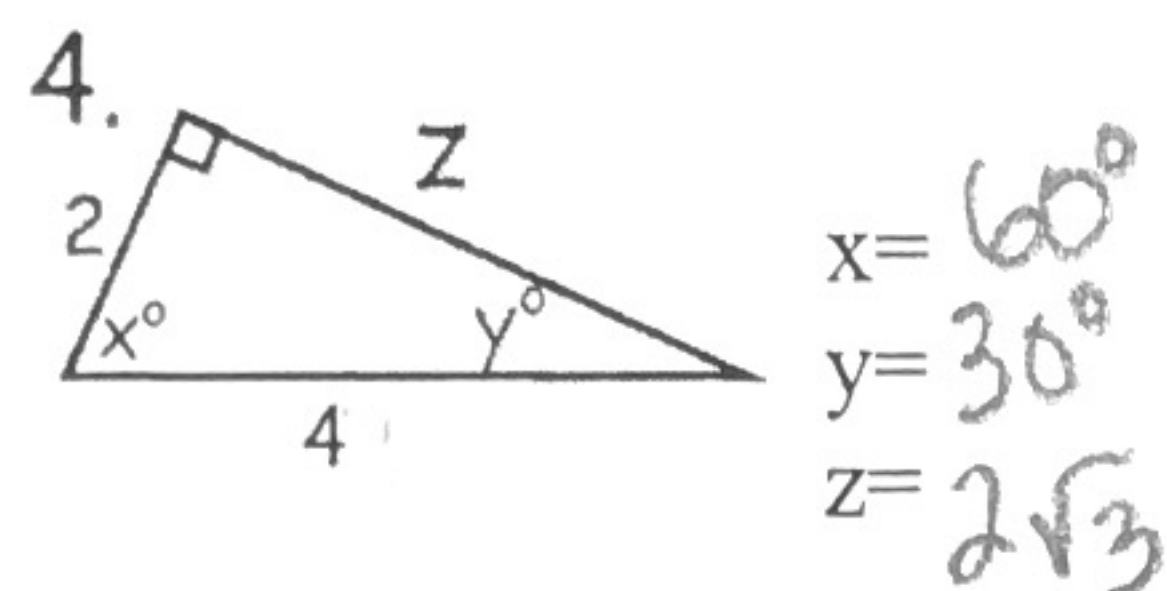
Triangle type 45-45



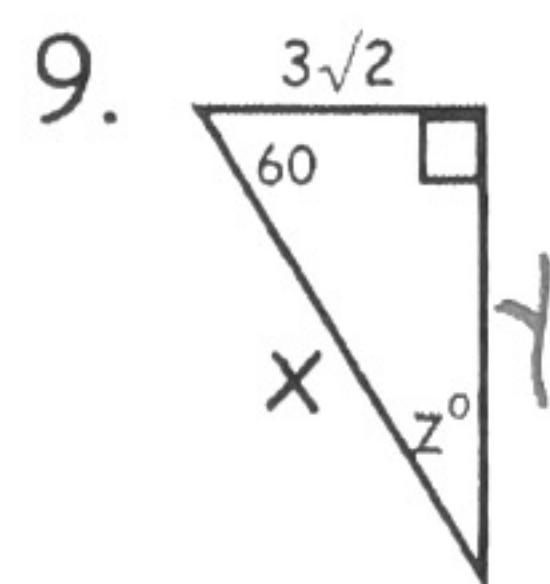
Triangle type 45-45



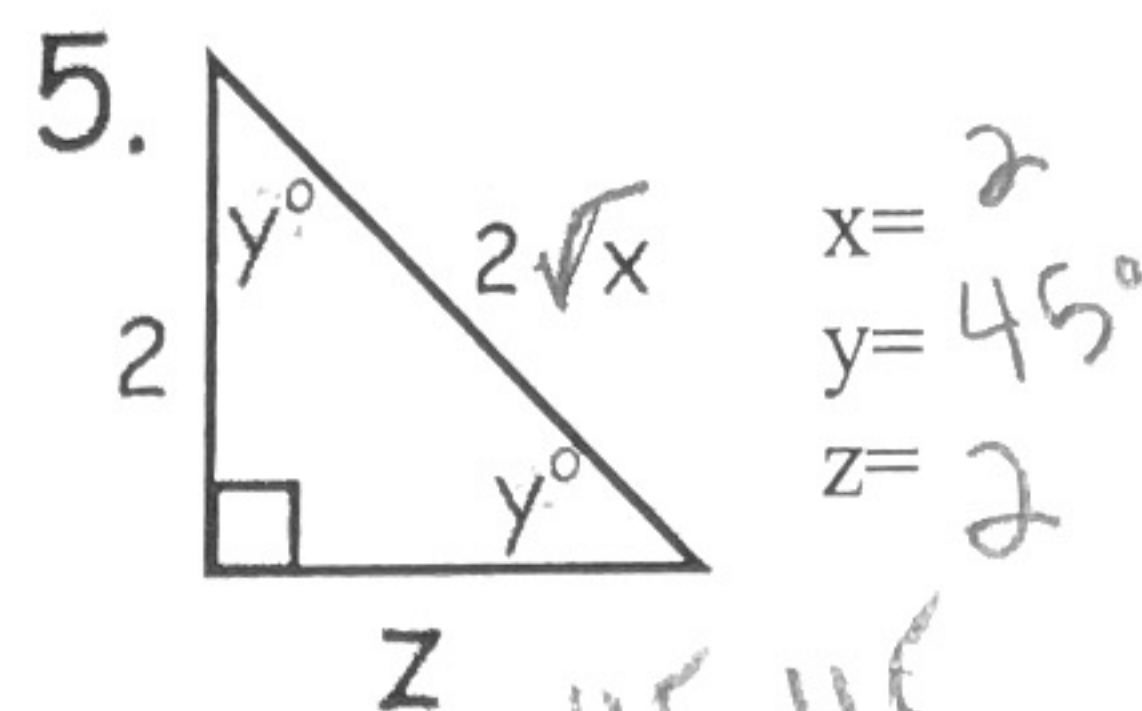
Triangle type 30-60



Triangle type 30-60



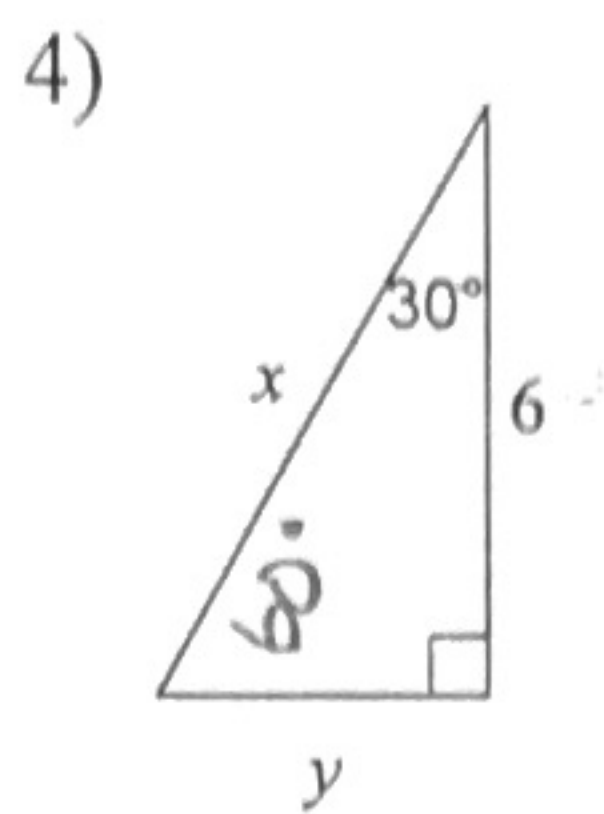
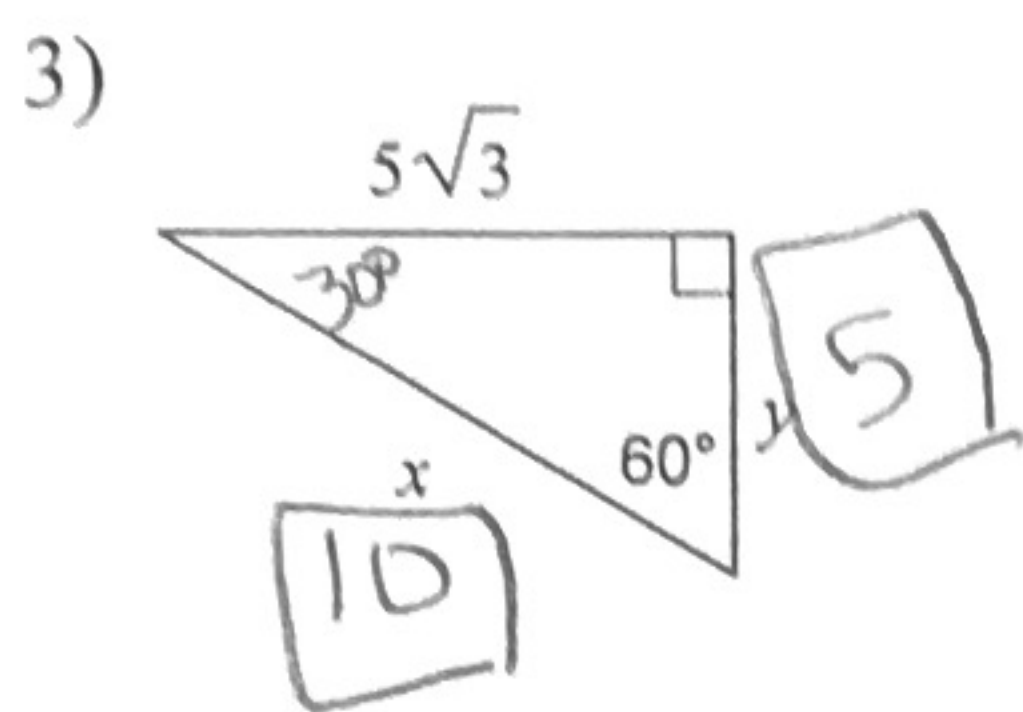
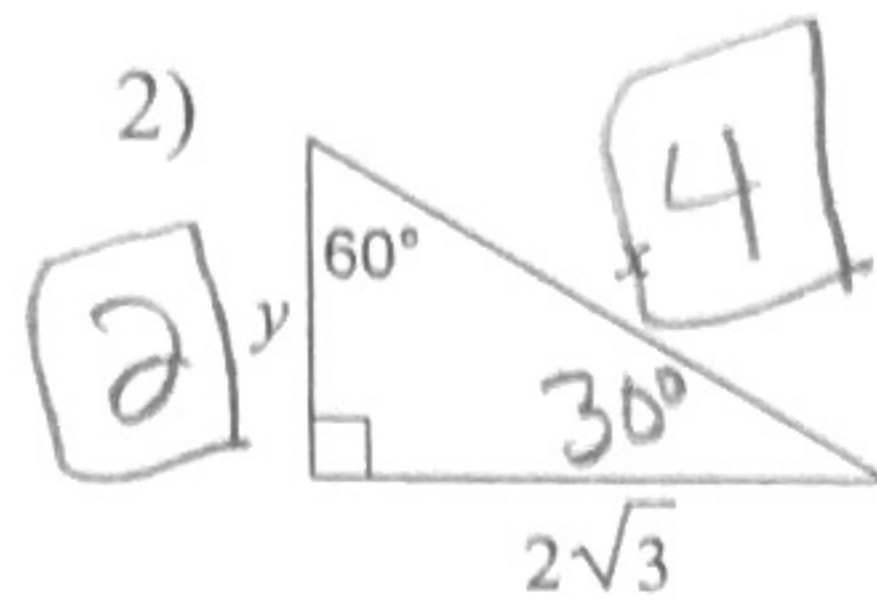
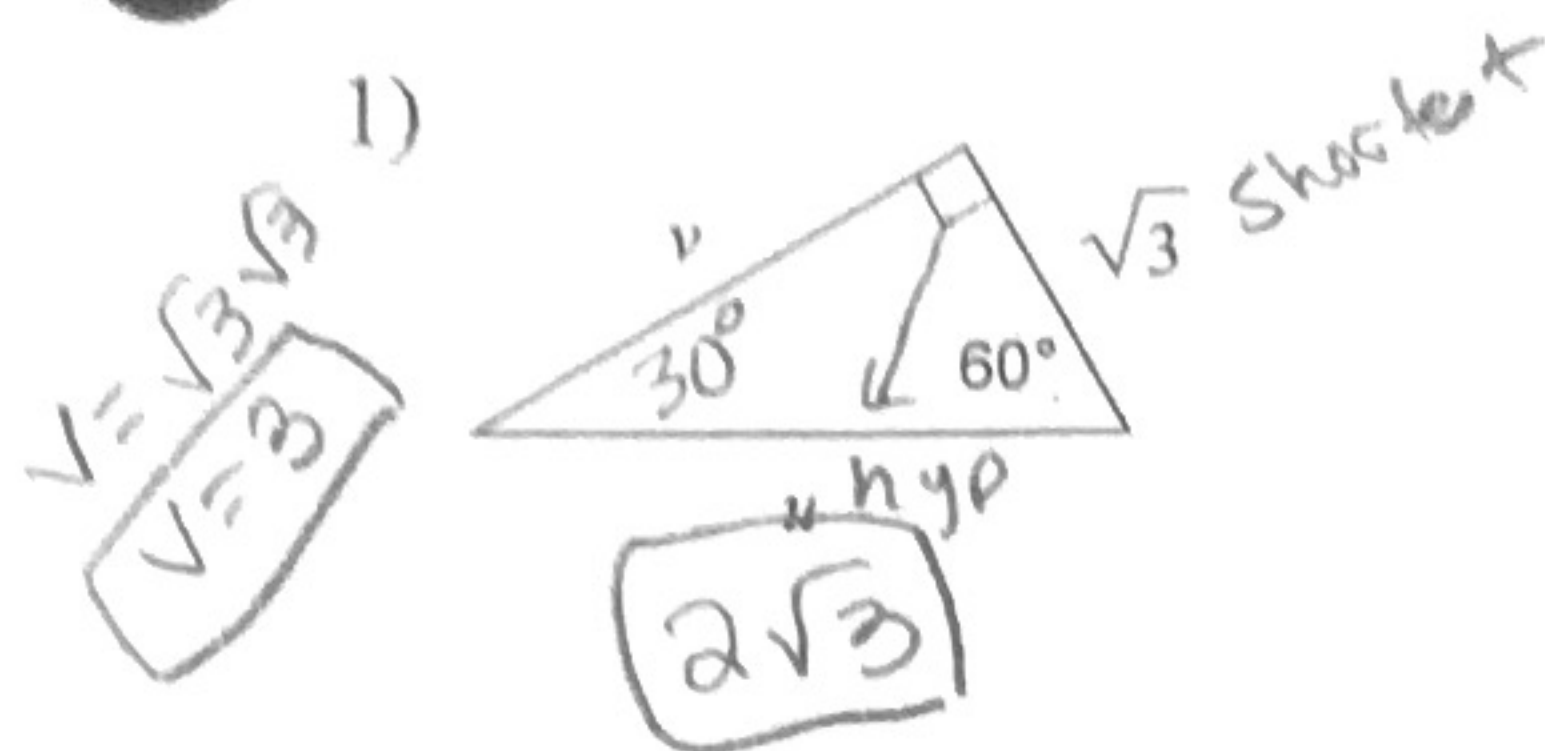
Triangle type 30-60



Triangle type 45-45

Worksheet C

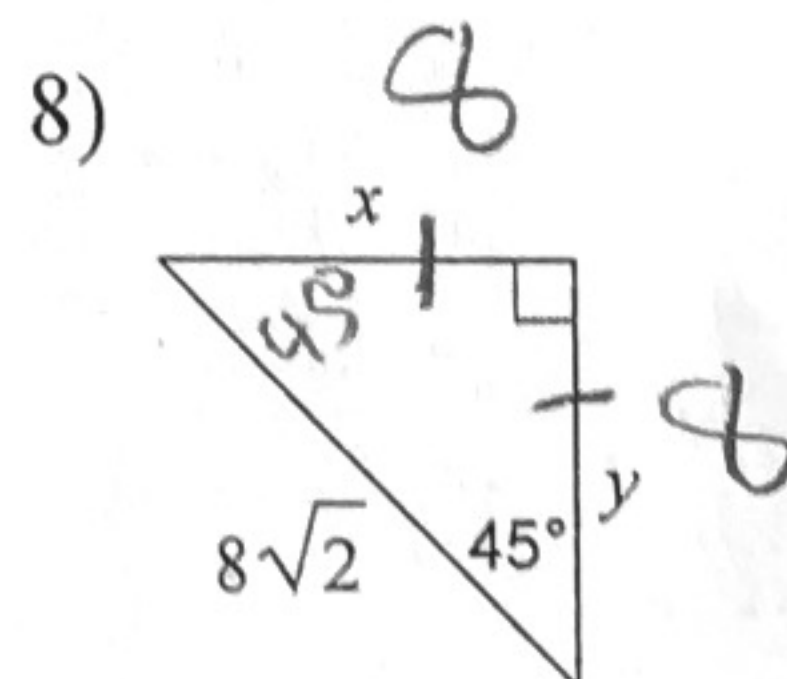
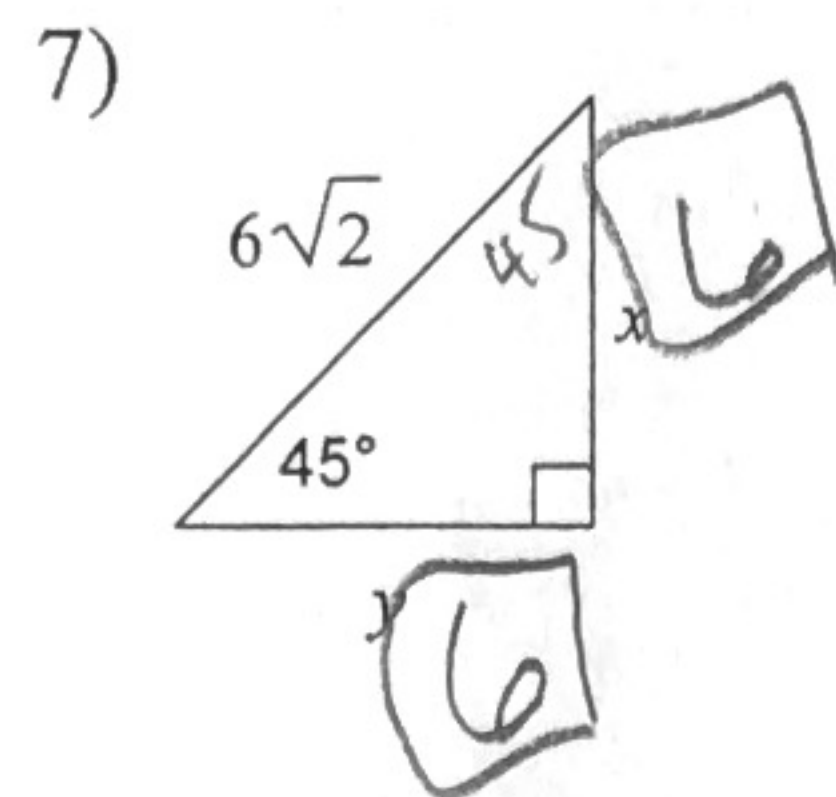
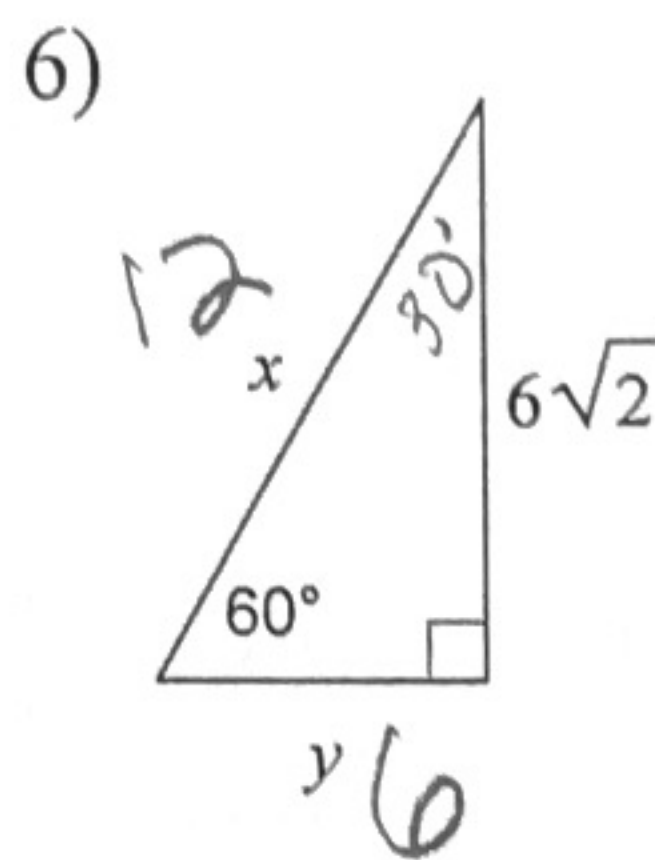
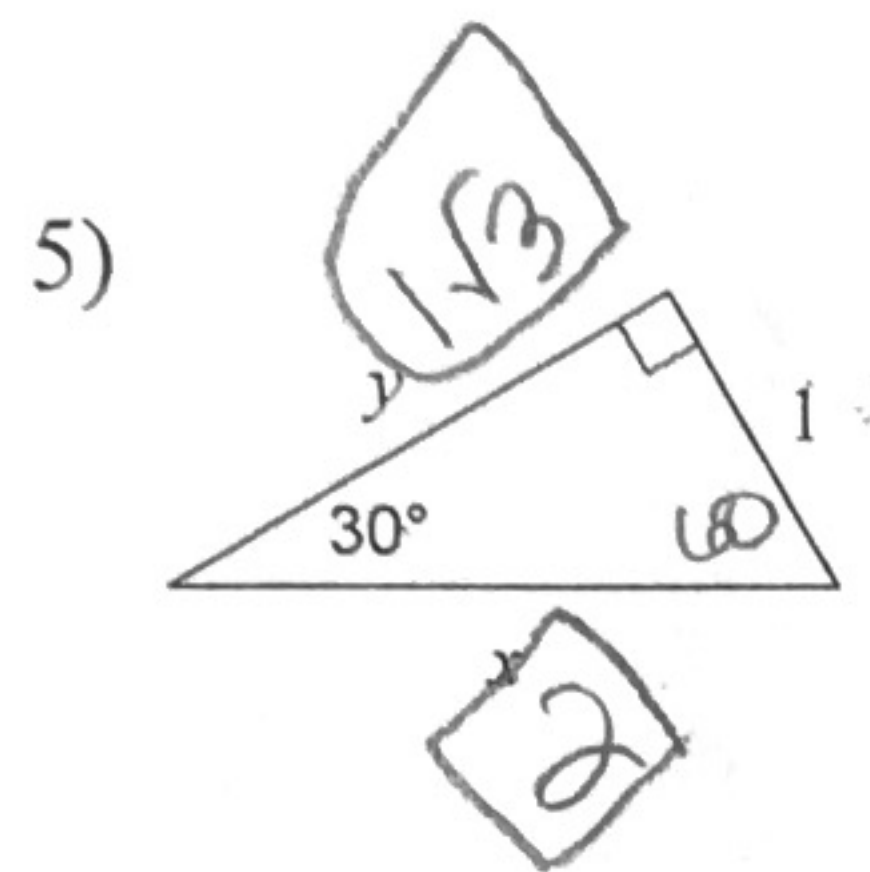
Find the missing side lengths. Leave your answers as radicals in simplest form.



Handwritten calculation:

$$y\sqrt{3} = 6$$

$$y = \frac{6}{\sqrt{3}}$$



Worksheet D

inclass

SOH CAH TOA

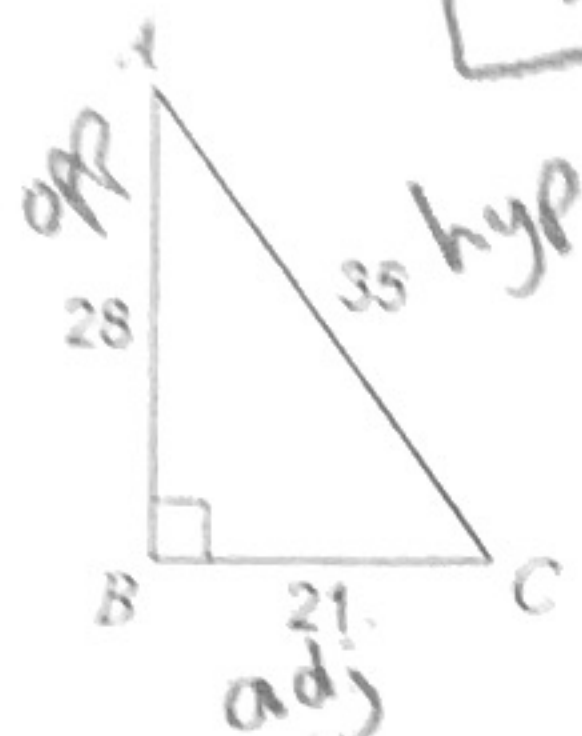
Date

Block

Find the value of each trigonometric ratio.

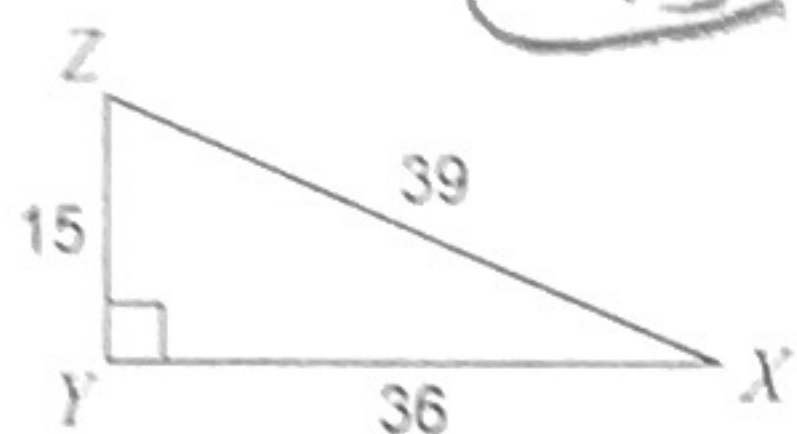
1)  $\cos C =$

$\frac{21}{35}$



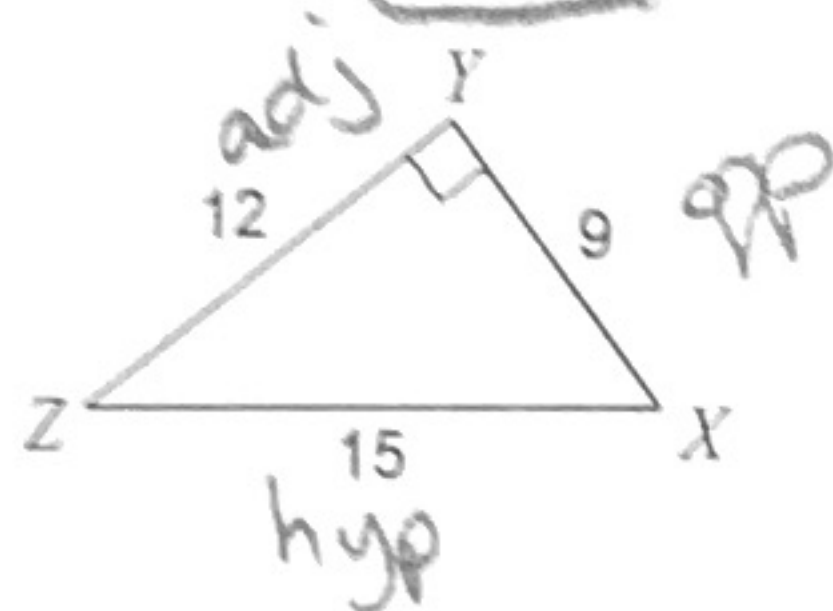
3)  $\tan Z$

$\frac{36}{15}$



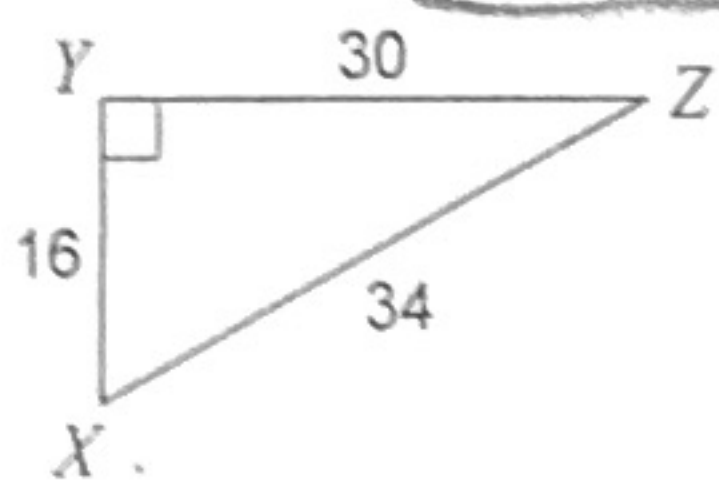
5)  $\tan Z$

$\frac{9}{12}$



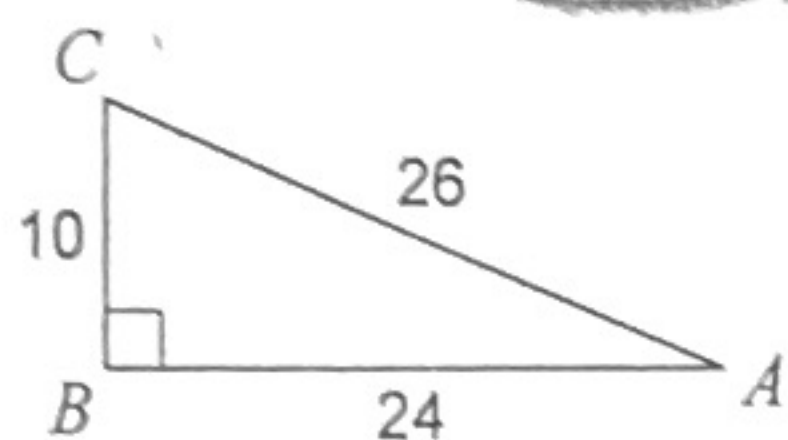
7)  $\sin X$

$\frac{30}{34}$



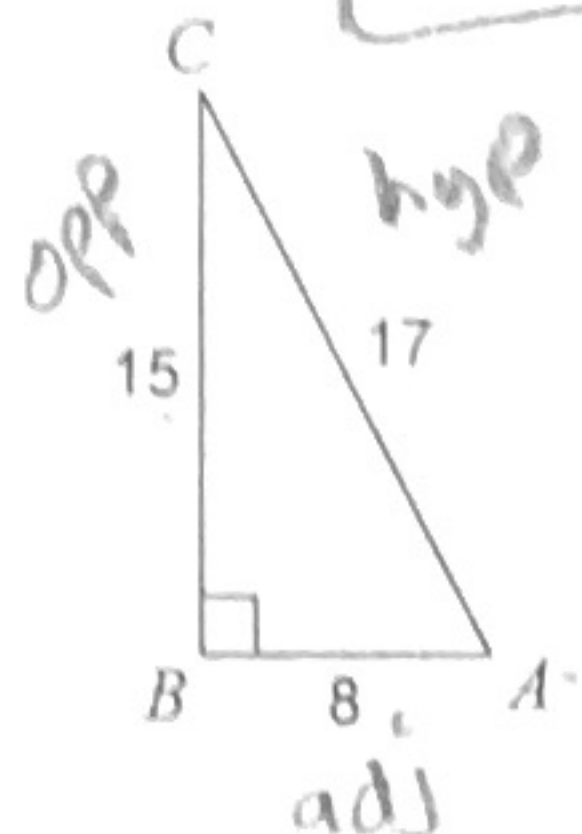
9)  $\sin C$

$\frac{24}{26}$



2)  $\sin A$

$\frac{15}{17}$



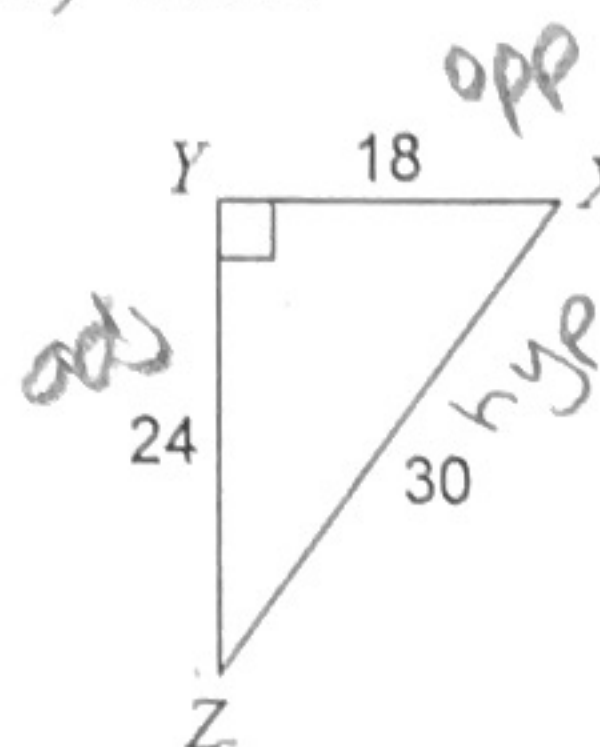
4)  $\cos A$

$\frac{8}{17}$



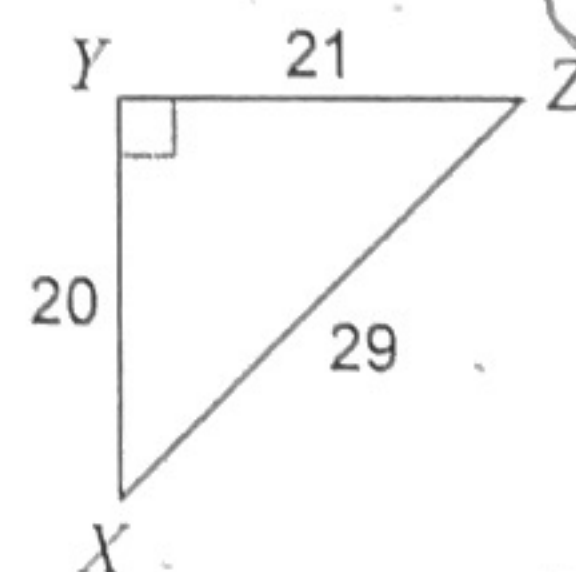
6)  $\sin Z$

$\frac{18}{30}$



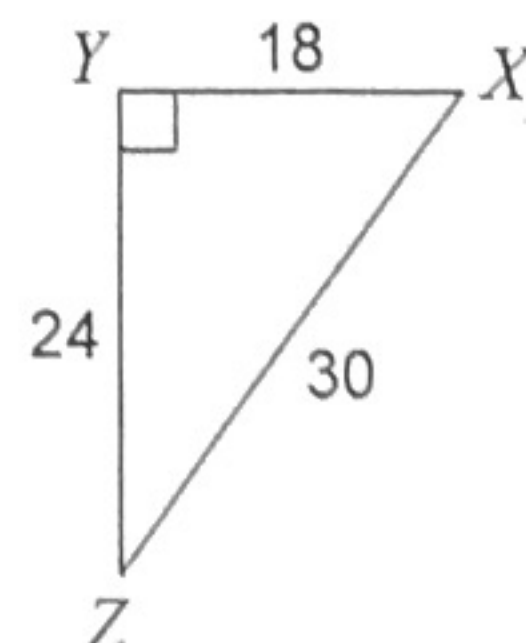
8)  $\sin X$

$\frac{21}{29}$



10)  $\sin X$

$\frac{24}{30}$



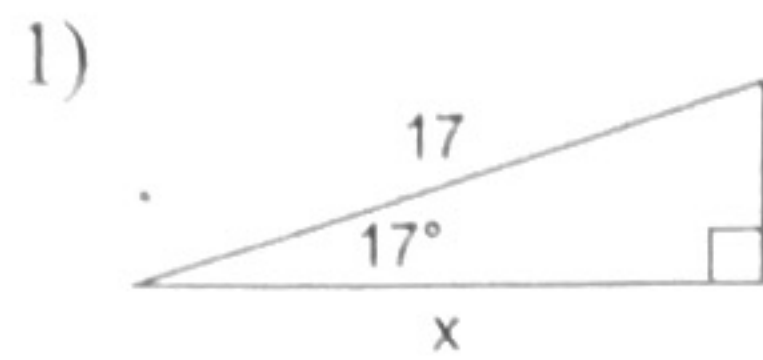
SOH CAH TOA

Worksheet E

Date \_\_\_\_\_

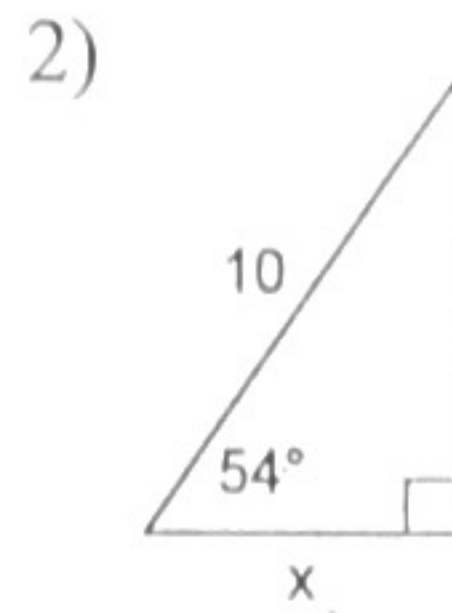
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Find the missing side. Round to the nearest tenth.



$$\cos 17 = \frac{x}{17}$$

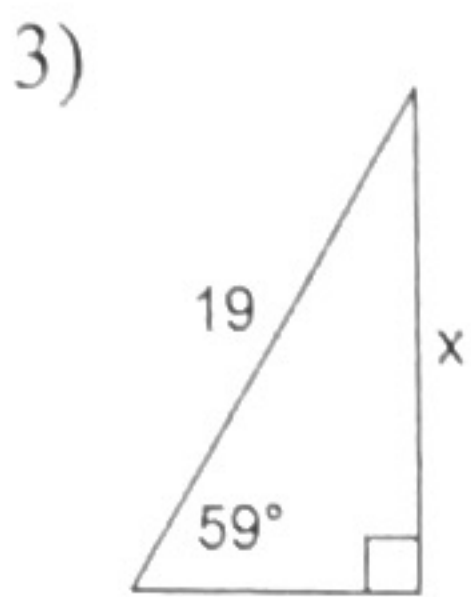
$$x = 16.26$$



$$\cos 54 = \frac{x}{10}$$

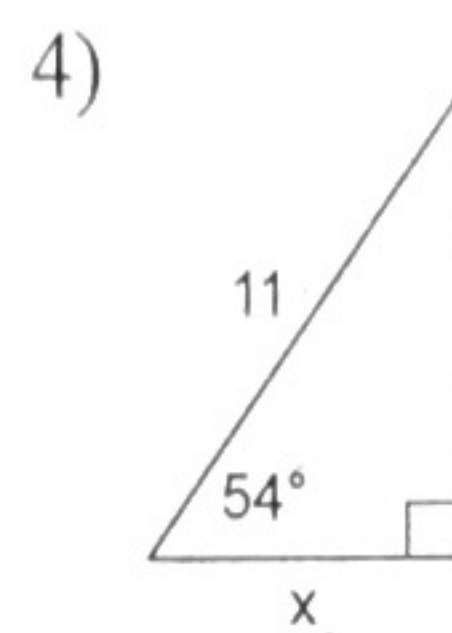
$$\frac{10}{1} \cdot 5878 = \frac{x}{10} \cdot \frac{10}{1}$$

$$x = 5.88$$



$$\sin 59 = \frac{x}{19}$$

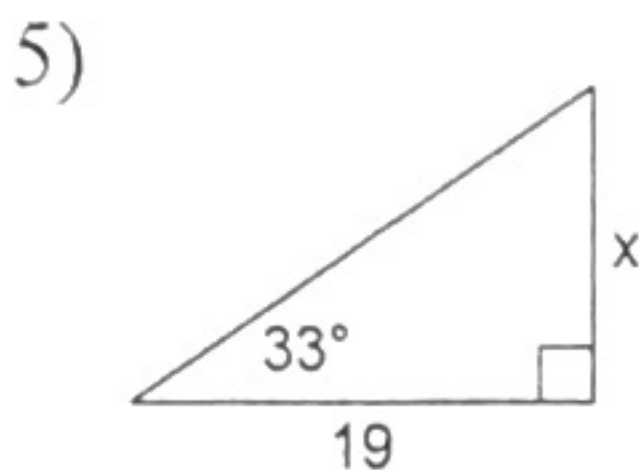
$$x = 16.29$$



$$\cos 54 = \frac{x}{11}$$

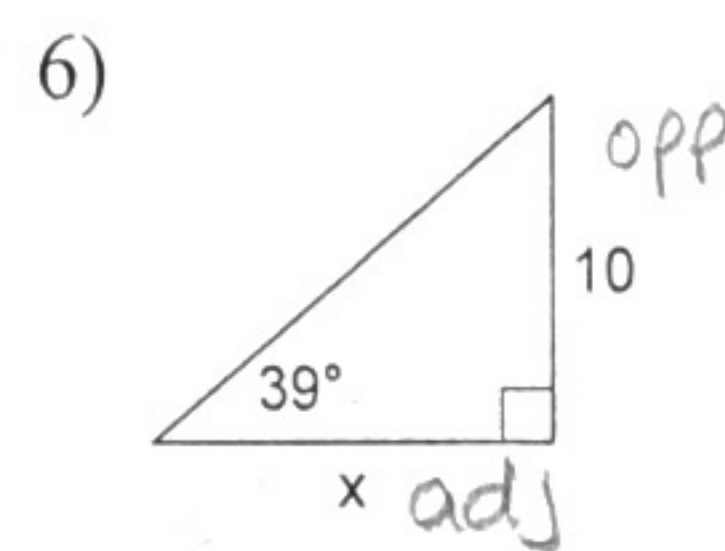
$$\frac{11}{1} \cdot 5878 = \frac{x}{11} \cdot \frac{11}{1}$$

$$x = 6.47$$



$$\tan 33 = \frac{x}{19}$$

$$x = 12.34$$

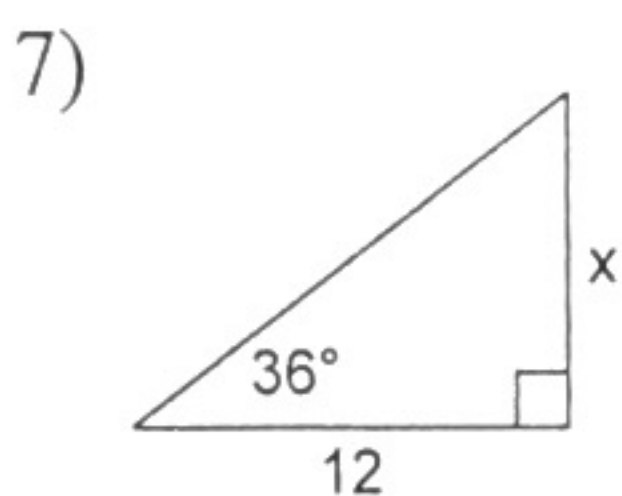


$$\tan 39 = \frac{10}{x}$$

$$\frac{x}{1} \cdot 8098 = \frac{10}{x} \cdot \frac{x}{1}$$

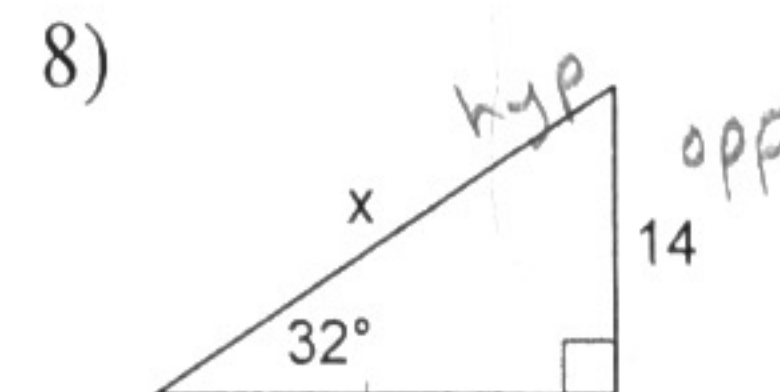
$$\begin{array}{r} .8098x = 10 \\ \hline .8098 \quad .8098 \end{array}$$

$$x = 12.35$$



$$\tan 36 = \frac{x}{12}$$

$$x = 8.72$$



$$\sin 32 = \frac{14}{x}$$

$$\frac{x}{1} \cdot 5299 = \frac{14}{x} \cdot \frac{x}{1}$$

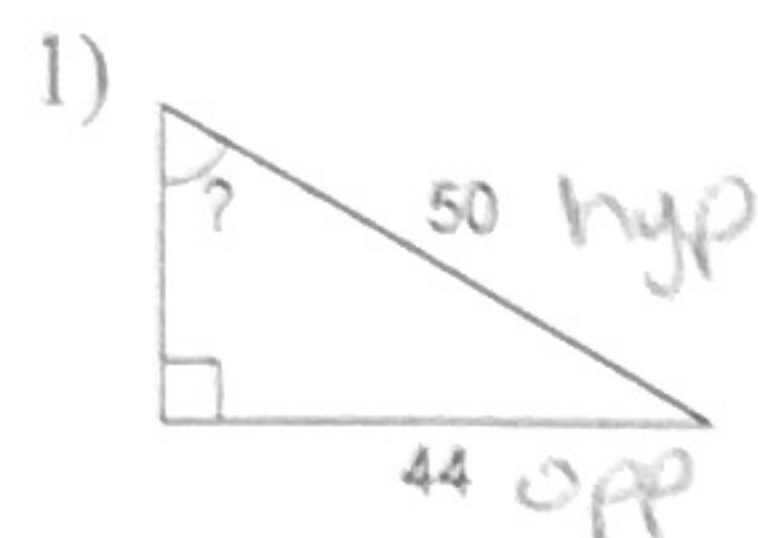
$$\begin{array}{r} .5299x = 14 \\ \hline .5299 \quad .5299 \end{array}$$

$$x = 26.42$$

- Steps
- ① choose trig function
  - ② write Equation
  - ③ Calculate
  - ④ Solve

Worksheet F

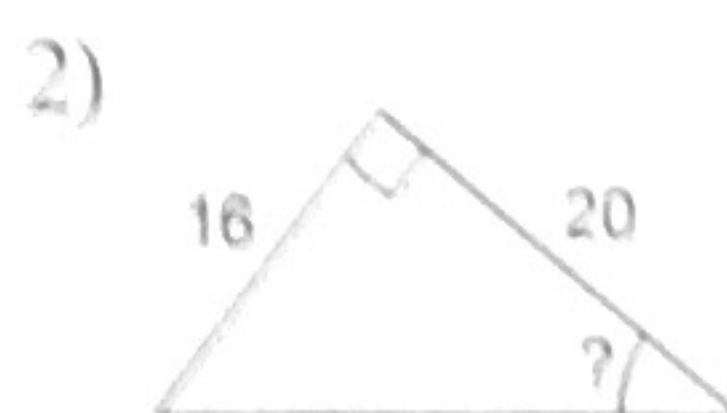
Find the measure of the indicated angle to the nearest degree.



$$\sin L = \frac{44}{50}$$

$$\sin^{-1}\left(\frac{44}{50}\right) = L$$

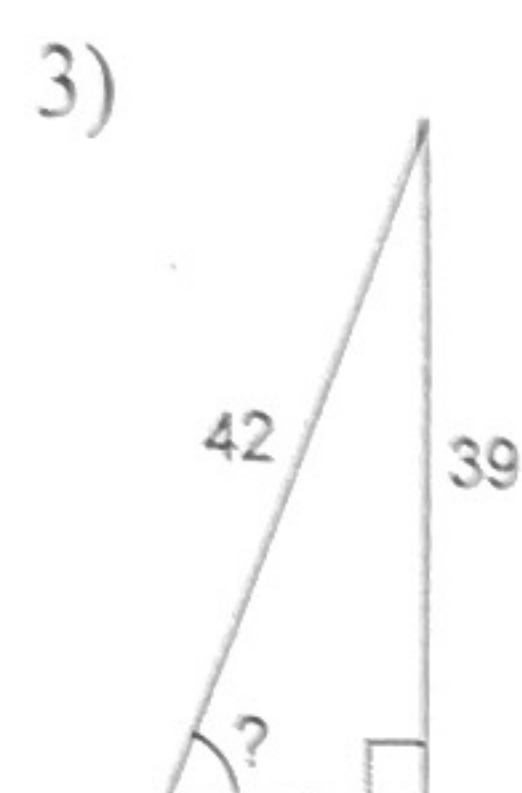
CHOOSE  
SOH  
CAH  
TOA  
 $L = 61.64^\circ$



$$\tan L = \frac{16}{20}$$

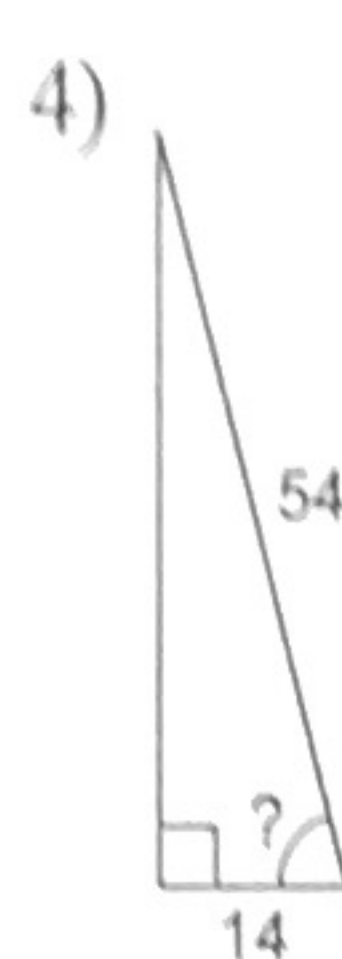
$$\tan^{-1}\left(\frac{16}{20}\right) = L$$

$$L = 38.66^\circ$$



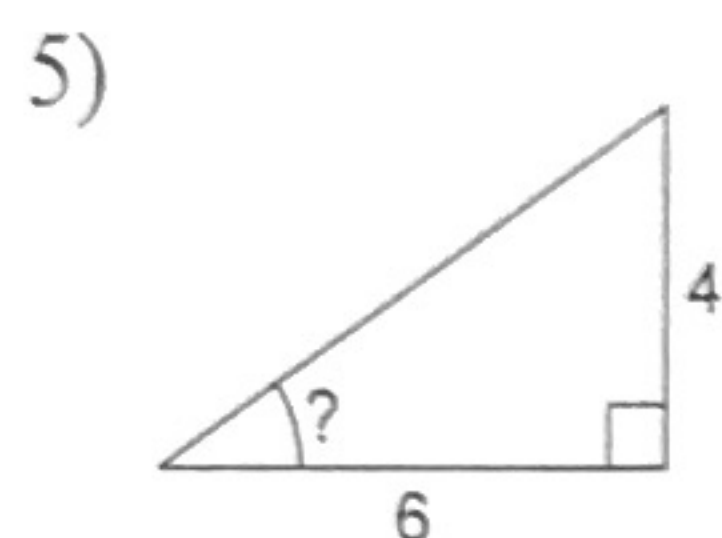
$$\sin L = \frac{39}{42}$$

$$L = 68.21^\circ$$



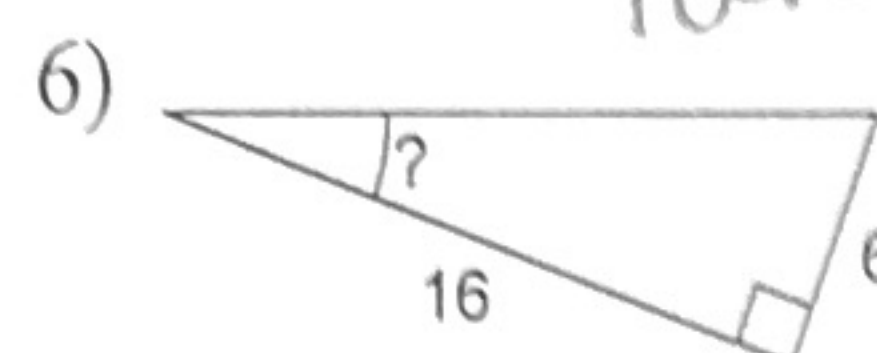
$\cos^{-1}$

$$L = 74.97^\circ$$



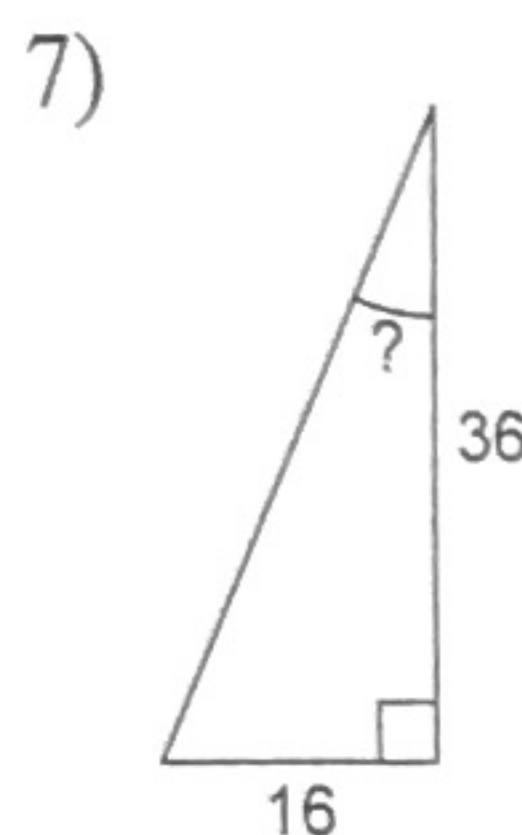
$\tan^{-1}$

$$L = 33.69^\circ$$



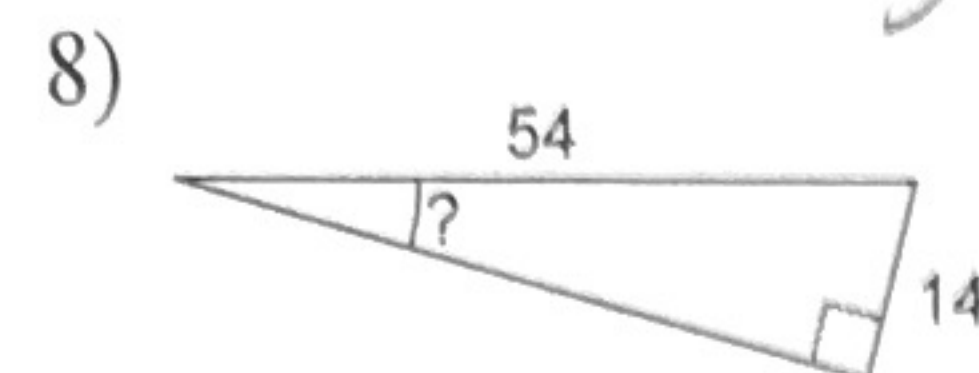
$\tan^{-1}$

$$L = 20.56^\circ$$



$\tan^{-1}$

$$L = 23.91^\circ$$



$\sin^{-1}$

$$L = 15.03^\circ$$