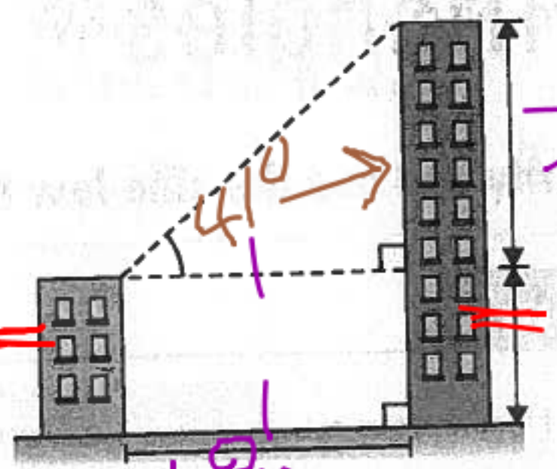
SOHCAHTOA

4. Two buildings are 18 m apart along the ground. The shorter building is 10 m high. From its roof, Sandra must move her head 41° to see the top of the other building. What is the height of the taller building?

- Show where the 18 m, 10 m, and 41° go on the diagram.



$\tan 41° = \frac{O}{A}$

$\tan 41° = \frac{x}{18}$

$x = 18 \tan 41°$

$x = 15.6\text{m}$

- The height of the taller building is made up of two parts. Show which part you need to find on the diagram.

- Use your diagram to write an expression for the total height of the taller building.

10 ___ + 15.6 = 25.6m is the height of the taller bldg

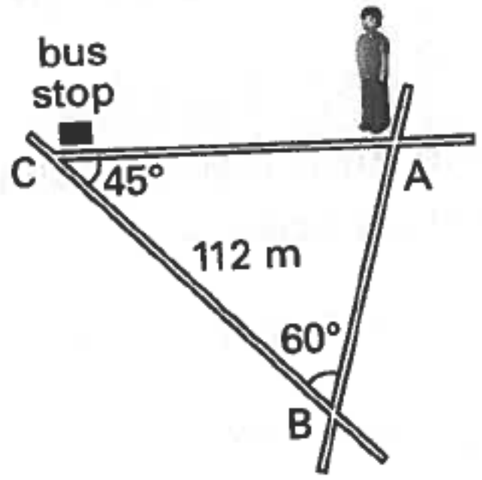
- Use trigonometric ratios to write an equation to find *h*.

Hint

$\sin A = \frac{\text{opposite}}{\text{hypotenuse}}$

$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}}$

5. The bus stop near Tom's house is at the intersection of three streets as shown. How far is Tom from the bus stop?



Hint

The angles in a triangle add up to 180°.

- First, calculate $\angle A$.

$\angle A + \angle B + \angle C = 180°$

$A + 60° + 45° = 180°$

$A + 105 = 180$

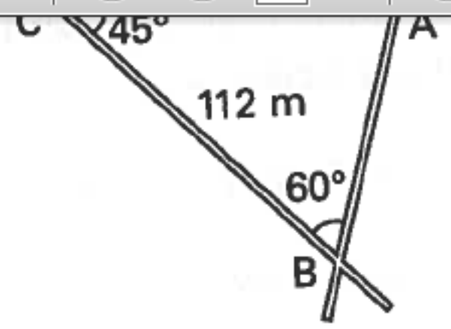
$A = 180 - 105$

$A = 75°$

- Use the sine law to calculate side *b*. Round to the nearest metre.

$\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{\quad}{\quad} = \frac{\quad}{\quad}$



Hint

The angles in a triangle add up to 180°.

- First, calculate $\angle A$.

$$\angle A + \angle B + \angle C = 180°$$

$$\_\_\_ + \_\_\_ + \_\_\_ = \_\_\_$$

$$\_\_\_\_\_ = \_\_\_$$

$$\_\_\_ = \_\_\_\_\_$$

$$\_\_\_ = \_\_\_$$

∴ Tom's house is 100.4 m from bus stop

- Use the sine law to calculate side b. Round to the nearest metre.

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

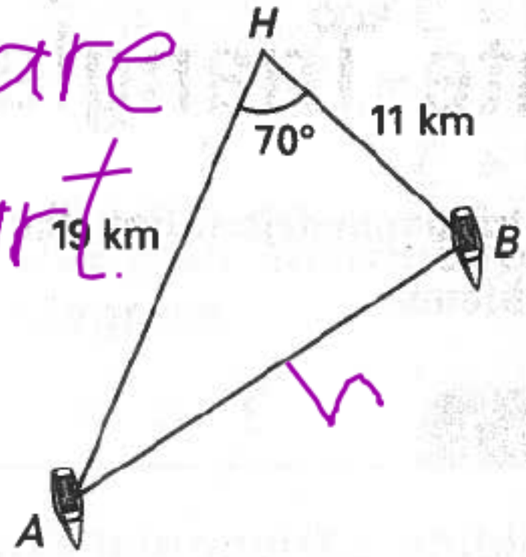
$$\frac{112}{\sin 75°} = \frac{b}{\sin 60°}$$

$$112 \times \frac{\sin 60°}{\sin 75°} = b$$

$$b = 100.4 \text{ m}$$

TURN

7. Two boats leave a harbour at the same time. The boats travel in different directions to reach their destinations as shown. How far apart are the boats?



The boats are 18.4 km apart.

$h^2 = a^2 + b^2 - 2ab(\cos H)$

$h^2 = 11^2 + 19^2 - 2(11)(19) \times \cos 70$

$h^2 = \sqrt{339}$

$h = 18.4$ km

- Complete the table below. Round your answer in the last column to the nearest hundredth.

a	b	$\angle H$	$2ab \cos H$

- Use your answers to fill in the blanks.

$$a^2 + b^2 - h^2 = 2ab \cos H$$

$$\_\_\_\_\_ + \_\_\_\_\_ - h^2 = \_\_\_\_\_$$

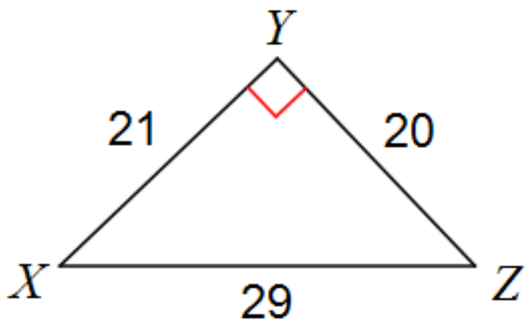
$$\_\_\_\_\_ + \_\_\_\_\_ - h^2 = \_\_\_\_\_$$

$$h^2 = \_\_\_\_\_ + \_\_\_\_\_ - \_\_\_\_\_$$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

SOH CAH TOA

1) $\sin X$



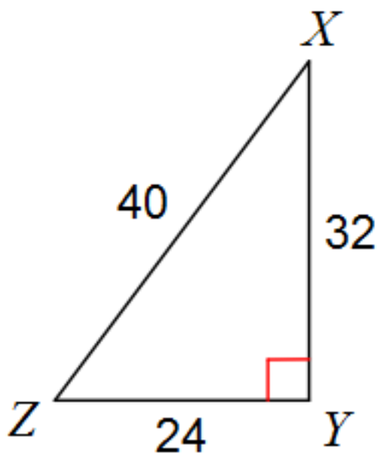
$\sin X = \frac{O}{H}$

$\sin X = \frac{20}{29}$

$\sin X = 0.6897$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

2) sin Z



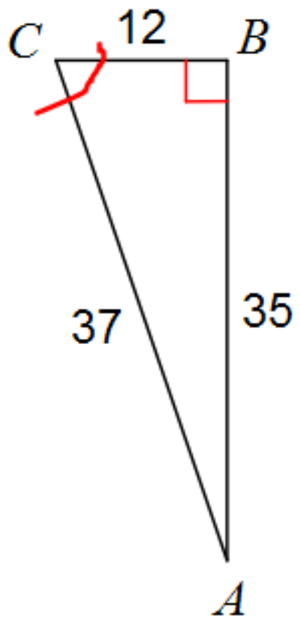
$\sin Z = \frac{O}{H}$

$\sin Z = \frac{32}{40}$

$\sin Z = 0.8000$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

3) cos C



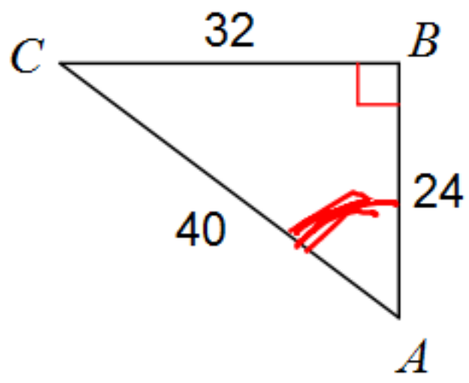
$\cos C = \frac{A}{H}$

$\cos C = \frac{12}{37}$

$\cos C = 0.3243$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

4) cos *A*



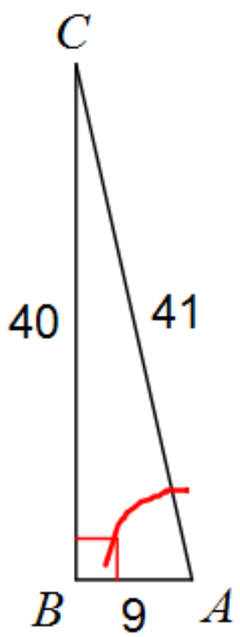
$\cos A = \frac{A}{H}$

$\cos A = \frac{24}{40}$

$\cos A = 0.6000$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

5) cos *A*



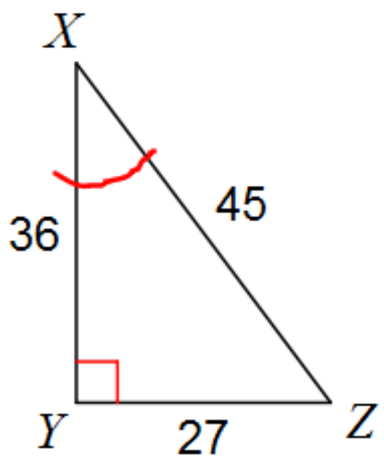
$\cos A = \frac{A}{H}$

$\cos A = \frac{9}{41}$

$\cos A = 0.2195$

Find the value of each trigonometric ratio to the nearest ten-thousandth. Show formula and work clearly.

6) tan X



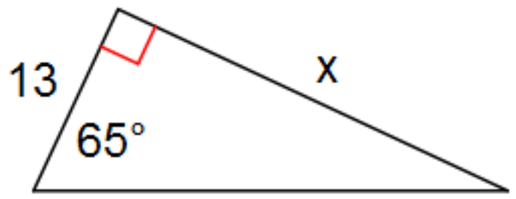
$\tan X = \frac{O}{A}$

$\tan X = \frac{27}{36}$

$\tan X = 0.7500$

Find the missing side. Round to the nearest tenth.

7)



$\tan 65 = \frac{O}{A}$

$\frac{\tan 65}{1} = \frac{x}{13}$

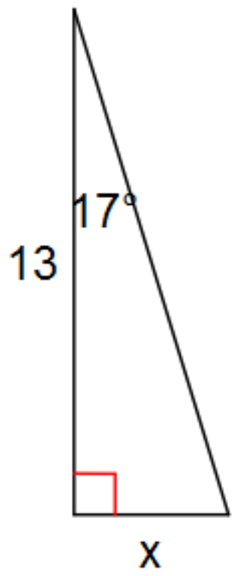
$x = 13 \tan 65$

$x = 27.87$

$x = 27.9$

Find the missing side. Round to the nearest tenth.

8)



$\tan 17^\circ = \frac{O}{A}$

$\tan 17^\circ = \frac{x}{13}$

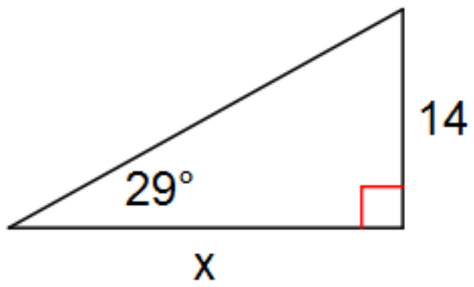
$x = 13 \tan 17$

$x = 3.97$

$x = 4.0$

Find the missing side. Round to the nearest tenth.

9)



$\tan 29^\circ = \frac{O}{A}$

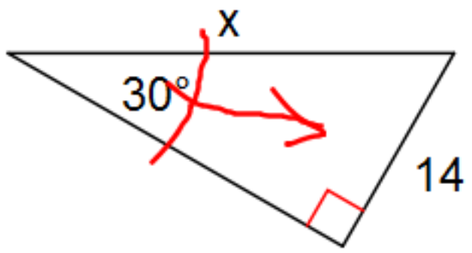
$\frac{\tan 29^\circ}{1} = \frac{14}{x}$

$\frac{x \tan 29^\circ}{\tan 29^\circ} = \frac{14}{\tan 29^\circ}$

$x = 25.3$ units

Find the missing side. Round to the nearest tenth.

10)



$$\sin 30^\circ = \frac{O}{H}$$

$$\frac{\sin 30^\circ}{1} = \frac{14}{x}$$

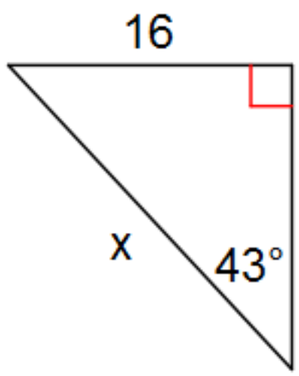
$$\frac{x \sin 30^\circ}{\sin 30^\circ} = \frac{14}{\sin 30^\circ}$$

$$x = \frac{14}{0.5}$$

$$x = 28$$

Find the missing side. Round to the nearest tenth.

11)



$\sin 43^\circ = \frac{O}{H}$

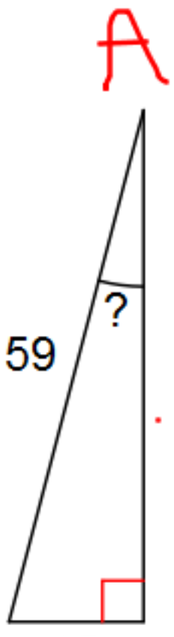
$\frac{\sin 43^\circ}{1} = \frac{16}{x}$

$\frac{x \sin 43^\circ = 16}{\sin 43^\circ \quad \sin 43^\circ}$

$x = 23.5$

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

13)



$\sin A = \frac{O}{H}$

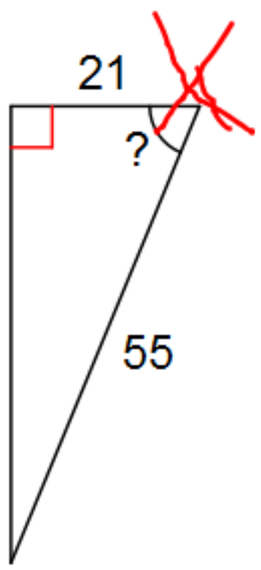
$\sin A = \frac{15}{59}$

$\sin A = 0.2542$ $\sin^{-1}$

$\angle A = 15°$

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

14)



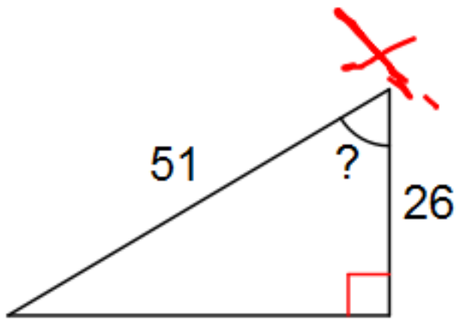
$\cos X = \frac{A}{H}$

$\cos X^{-1} = \frac{21}{55}$

$\angle X = 68^{\circ}$

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

15)



$\cos X = \frac{A}{H}$

$\cos X = \frac{26}{51}$

$\cos X = 0.5098$

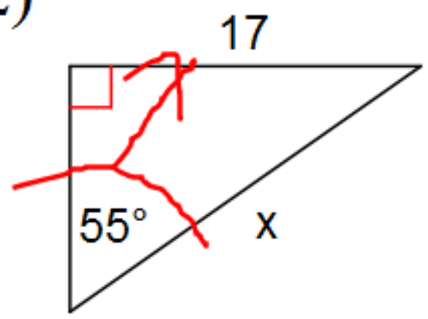
$\angle X = 53.2^\circ$

$\angle x = 53^\circ$

HW:
Finish this page

Find the missing side. Round to the nearest tenth.

12)



$\sin 55^\circ = \frac{O}{H}$

$\frac{\sin 55^\circ}{1} = \frac{17}{x}$

$\frac{x \sin 55^\circ}{\sin 55^\circ} = \frac{17}{\sin 55^\circ}$

$x = 20.8$