TheTutor

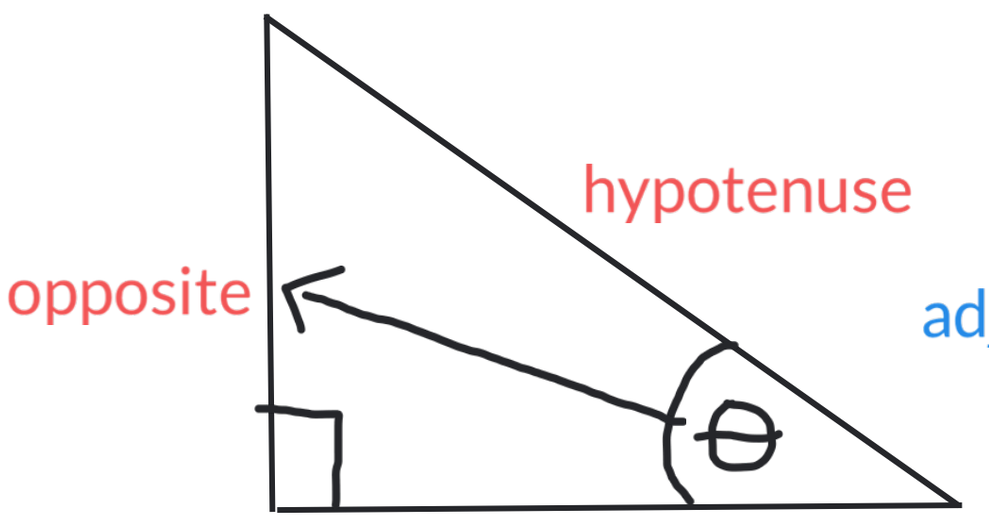
MATH · PHYSICS

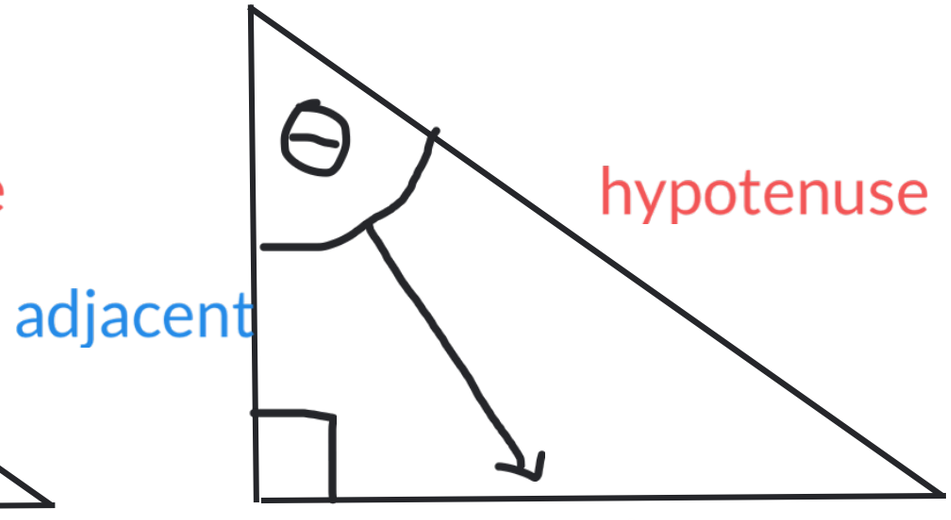
Live-Lecture

Math 1201 chapter 2

Trigonometry

Trigonometry





$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

SOH CAH TOA

Chapter 2 Trigonometry

Working with ONE triangle

Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given

Write out what is wanted

Choose from $\sin \frac{O}{H}$ $\cos \frac{A}{H}$ $\tan \frac{O}{A}$
(depending on your given and wanted info)

Want a side:

Cross multiply
Then solve for the wanted side

Want an angle:

Use the inverse
(shift function on your calculator)

TWO triangles side by side

TWO triangles on top of each other

1. What is the measure of $\angle X$ to the nearest degree if $\sin X = 0.1219$?

a) 7^o

b) 64^o

c) 26^o

d) 83^o

2nd

$\sin^{-1}$ Sin

$\cos^{-1}$ Cos

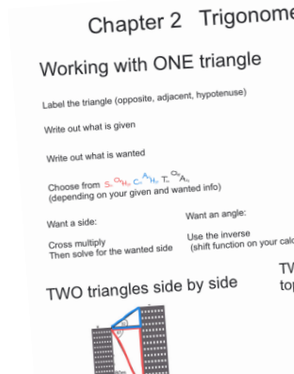
$\tan^{-1}$ tan

Want an angle:

Use the inverse
(shift function on your calculator)

$\sin X = 0.1219$

$X = \sin^{-1}(0.1219) = 7^o$


Chapter 2 Trigonome

Working with ONE triangle

Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given

Write out what is wanted

Choose from S O H, C A H, T O A
(depending on your given and wanted info)

Want a side:

Cross multiply
Then solve for the wanted side

Want an angle:

Use the inverse
(shift function on your calc

TWO triangles side by side

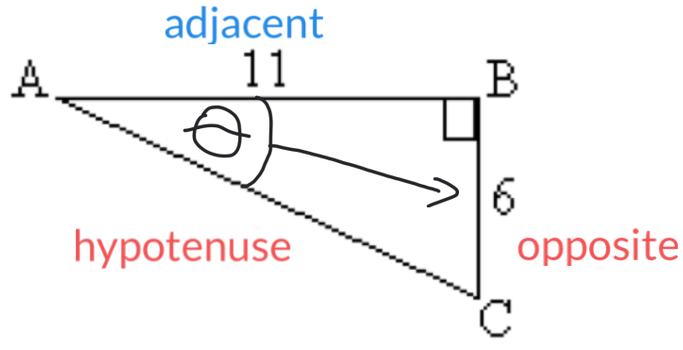
2. What is the measure of $\angle A$ to the nearest degree?

a) 61^o

b) 29^o

c) 40^o

d) 50^o



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

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

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$

Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given

Opp = 6

Adj = 11

Write out what is wanted

θ = ?

Choose from SOH CAH TOA
(depending on your given and wanted info)

Want an angle:

Use the inverse
(shift function on your calculator)

$\tan\theta = \frac{6}{11}$

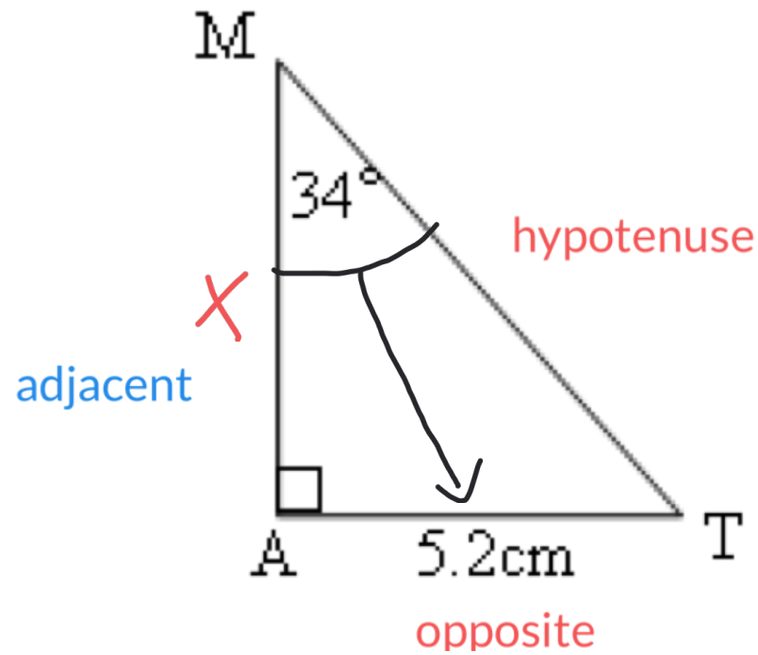
$\theta = \tan^{-1}\left(\frac{6}{11}\right)$

$\theta = \tan^{-1}(0.5454)$

$\theta = 28.6^\circ$

3. What is the length of MA to the nearest tenth?

a) 0.1 cm
b) 3.5 cm
c) 17.0 cm
d) 7.7 cm



Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given

Opp = 5.2
Θ = 34°

Write out what is wanted

Adj = x

Choose from $\sin\theta = \frac{Opp}{Hyp}$ $\cos\theta = \frac{Adj}{Hyp}$ $\tan\theta = \frac{Opp}{Adj}$
(depending on your given and wanted info)

Want a side:

Cross multiply
Then solve for the wanted side

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\tan 34 = \frac{5.2}{x}$$

$$x \cdot \tan 34 = 5.2$$

$$\frac{x \cdot \tan 34}{\tan 34} = \frac{5.2}{\tan 34}$$

$$x = 7.7$$

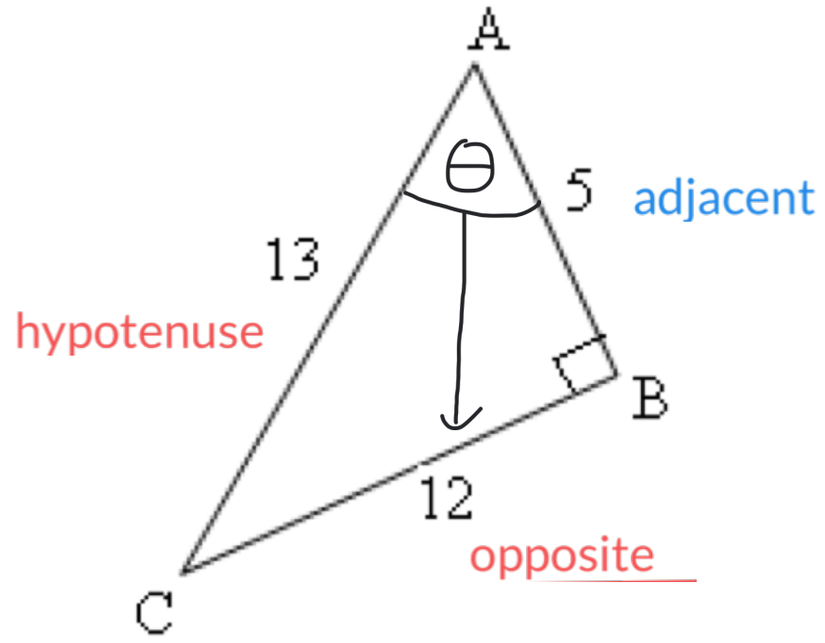
4. What is the correct ratio for $\sin A$?

a) $\frac{5}{12}$

b) $\frac{12}{13}$

c) $\frac{5}{13}$

d) $\frac{13}{12}$



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

$\sin\theta = \frac{12}{13}$

Label the triangle (opposite, adjacent, hypotenuse)

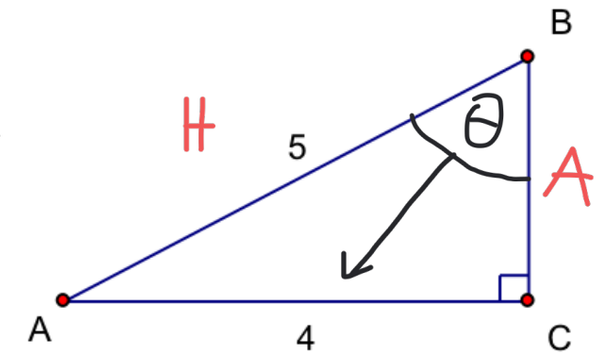
Write out what is given

Write out what is wanted

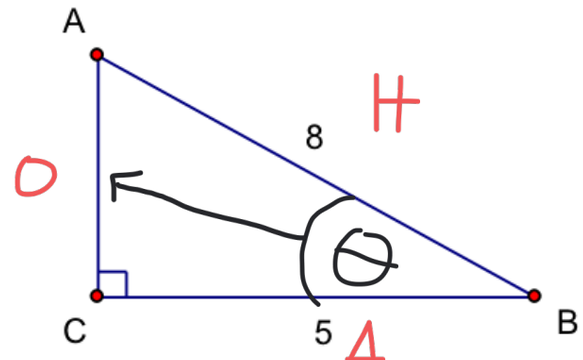
Choose from $\sin \frac{O}{H}$ $\cos \frac{A}{H}$ $\tan \frac{O}{A}$
(depending on your given and wanted info)

5. In which of the following triangles is cos B = 0.8?

a)

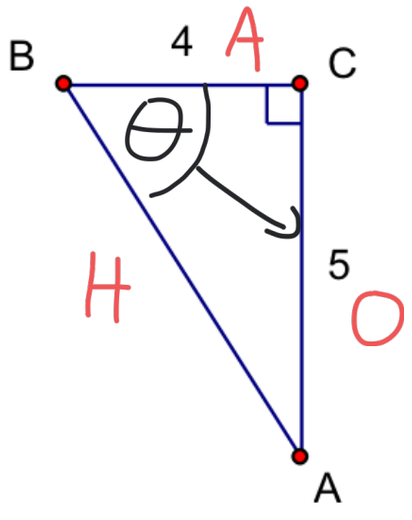


b)



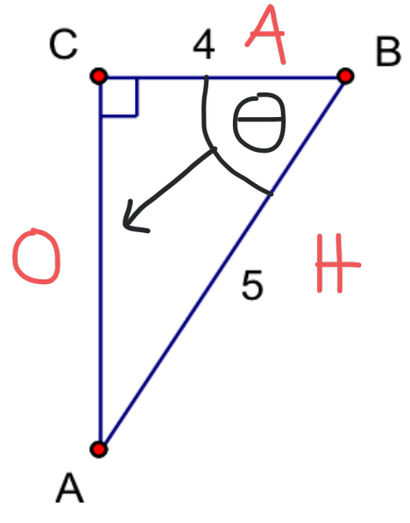
$\frac{5}{8} = 0.6$

c)



$\cos\theta = \frac{Adj}{Hyp}$

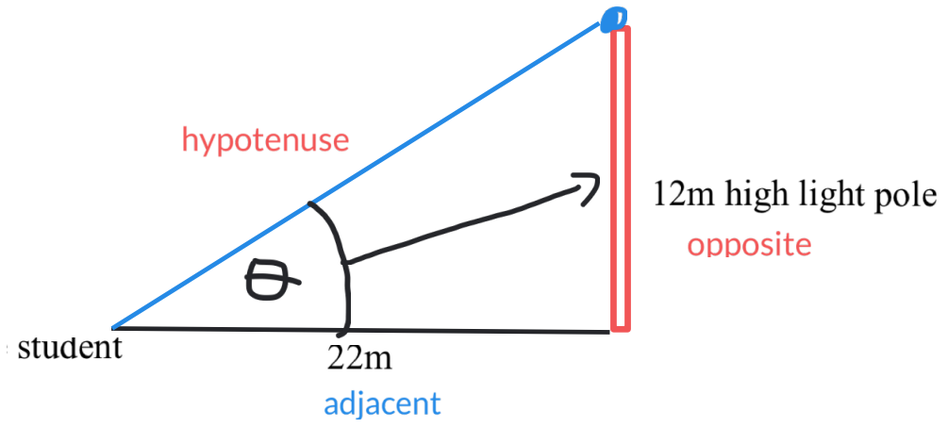
d)



$\frac{4}{5} = 0.8$

A student sees a bird on top of a 12m high light pole. The student is standing 22m from the base of the pole. At what angle must the student incline her camera to take a picture of the bird? (Give your answer to the nearest tenth.)

a) 33.1^o
b) 61.4^o
c) 56.9^o
d) 28.6^o



Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given $Opp = 12$, $Adj = 22$

Write out what is wanted $\theta = ?$

Choose from SOH CAH TOA
(depending on your given and wanted info)

Want an angle:

Use the inverse
(shift function on your calculator)

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$

$\tan\theta = \frac{12}{22}$

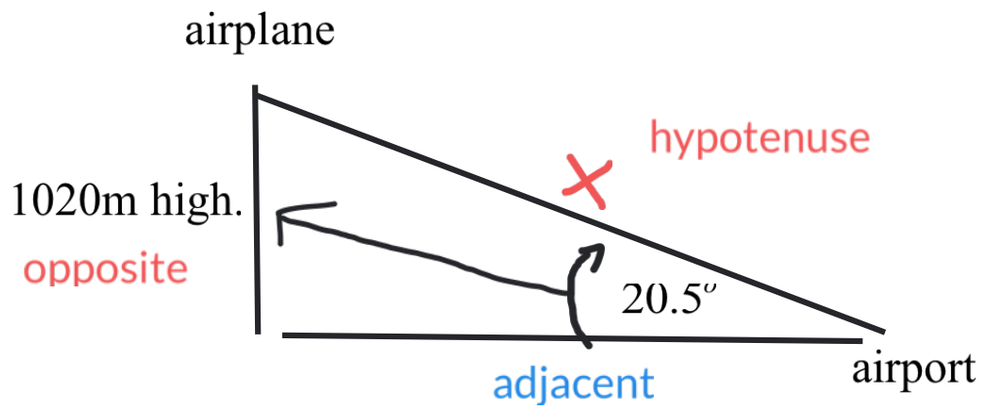
$\tan\theta = 0.5454$

$\theta = \tan^{-1}(0.5454)$

$\theta = 28.6^\circ$

An airplane approaches an airport. At a certain time, the plane is 1020m high. Its angle of elevation measured from the airport is 20.5^o . How far is the plane from the airport to the nearest meter?

a) 2728 m
b) 2913 m
c) 1089 m
d) 3 m



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

$\sin 20.5 = \frac{1020}{x}$

$x \cdot \frac{\sin 20.5}{\sin 20.5} = \frac{1020}{\sin 20.5}$

$x = 2913\text{m}$

Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given Opp = 1020, Θ = 20.5

Write out what is wanted Hyp = x

Choose from SOH CAH TOA
(depending on your given and wanted info)

Want a side:

Cross multiply
Then solve for the wanted side

9. Which of the following statements is true of the diagram below?

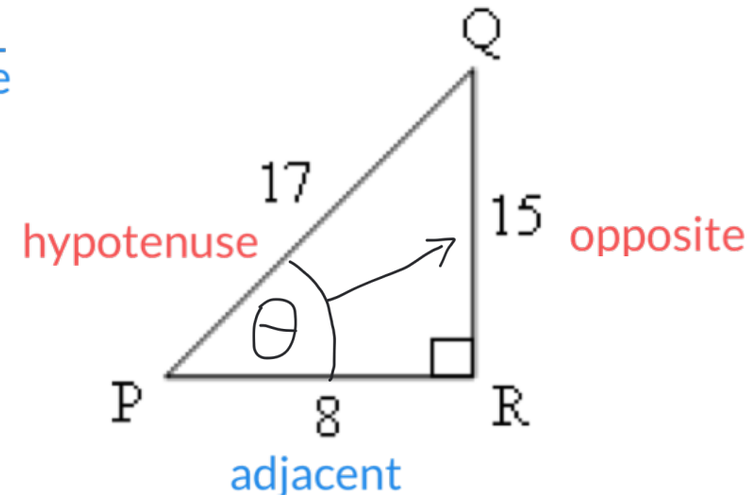
a) $\cos P = \frac{8}{15}$

b) $\tan Q = \frac{15}{8}$

c) $\sin P = \frac{8}{17}$

d) $\cos Q = \frac{15}{17}$

$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{8}{17}$



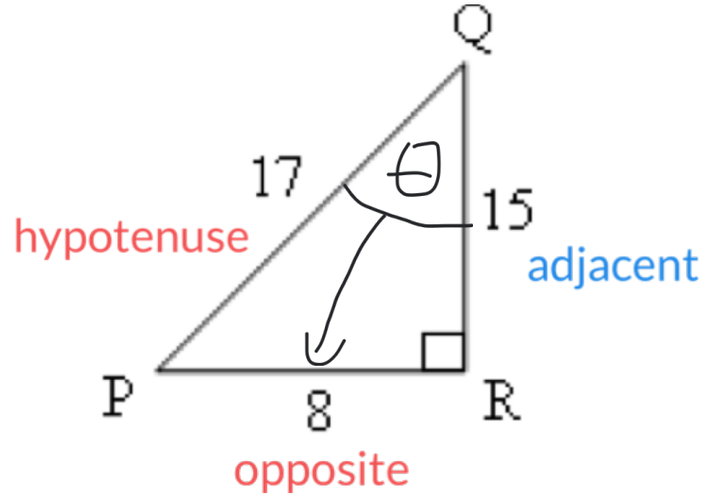
$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17}$

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

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

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15}$



$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17}$

Label the triangle (opposite, adjacent, hypotenuse)

Write out what is given

Write out what is wanted

10. Which of the following is not correct to the nearest hundredth?

a) $\sin 75^o = 0.97$

b) $\tan 37^o = 0.75$

c) $\tan 18^o = 0.23$

d) $\cos 46^o = 0.69$

$\sin 75^o =$ 0.97 ✓

$\tan 18^o =$ 0.32 ✗

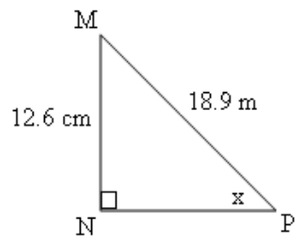
$\tan 37^o =$ 0.75 ✓

$\cos 46^o =$ 0.69 ✓

Constructed Response: Complete each of the following in the space provided. Be sure to show *all* workings for full credit. (28 marks)

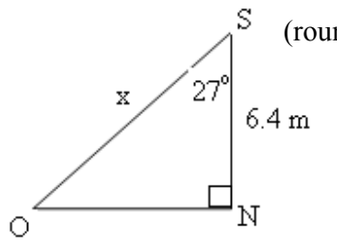
1. Find the value of x in each of the following diagrams. (11 marks)

a)



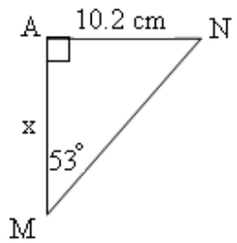
(round your answer to the nearest tenth)

b)



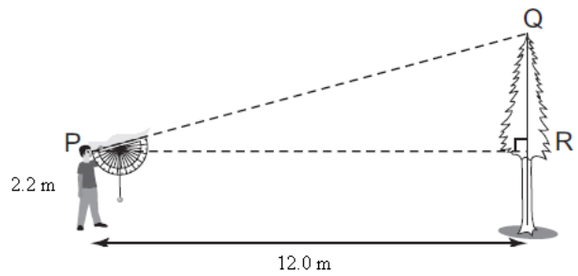
(round your answer to the nearest metre)

c)

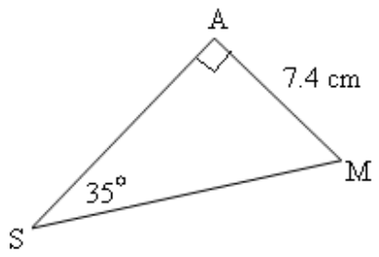


(round your answer to the nearest centimeter)

2. Thomas stood 12.0 m from the base of a tree. He used a clinometer to sight the top of the tree. The angle shown on the clinometer was 70°. Thomas held the clinometer 2.2 m above the ground. Determine the height of the tree to the nearest tenth of a metre. (4 marks)



3. Solve the following triangle. Give the side lengths to the nearest tenth of a centimeter and the angle measures to the nearest degree. (5 marks)



4. A traffic helicopter is patrolling the air. The chopper is 630m above a level highway. An accident is located at an angle of depression of 27^o from the chopper. How far along the highway is the accident? (round your answer to the nearest metre). Include a sketch. (3 marks)

5. A person stands at a window on the 9^{th} floor of an office building. He measures the angle of elevation to be $25°$ to the top of a nearby tower and an angle of depression to be $36°$ to the base of the tower. The person knows that he made the measurements 40 m above the ground. Determine the height of the tower to the nearest tenth of a metre.(5 marks)