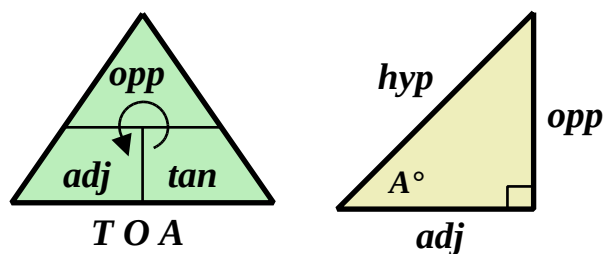


Lesson 5

Coordinate Geometry : Year 9

5.1 tan

Calculator needed !



$$\tan A^\circ = \frac{\text{opp}}{\text{adj}} \quad \text{which gives} \quad A^\circ = \arctan\left(\frac{\text{opp}}{\text{adj}}\right)$$

$$\text{opp} = \text{adj} \times \tan A^\circ$$

$$\text{adj} = \frac{\text{opp}}{\tan A^\circ}$$

Labelling

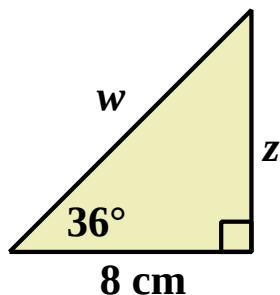
- First** *hyp* Look for the *right-angle*.
The *hypotenuse* does not touch the *right-angle*.
- Second** *opp* Look for the *angle-of-focus*.
The *opposite* does not touch the *angle-of-focus*.
- Third** *adj* The *adjacent* touches both the *right-angle*
and the *angle-of-focus*.

Theorem of Pythagoras

$$\begin{aligned} \text{hyp}^2 &= \text{opp}^2 + \text{adj}^2 \\ \text{opp}^2 &= \text{hyp}^2 - \text{adj}^2 & \text{adj}^2 &= \text{hyp}^2 - \text{opp}^2 \end{aligned}$$

5.2 Exercise

Question 1



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
(ii) Calculate z using the formula,

$$opp = adj \times \tan A^\circ$$

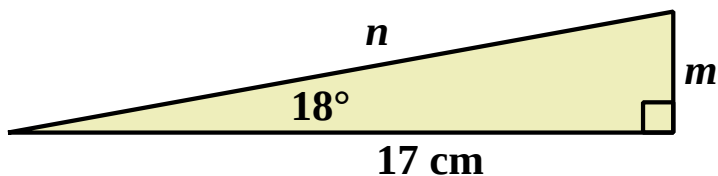
$$z = 8 \times \tan 36^\circ$$

$$z =$$

- (iii) Calculate w using the formula,

$$hyp^2 = opp^2 + adj^2$$

Question 2



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
(ii) Calculate m using the formula,

$$opp = adj \times \tan A^\circ$$

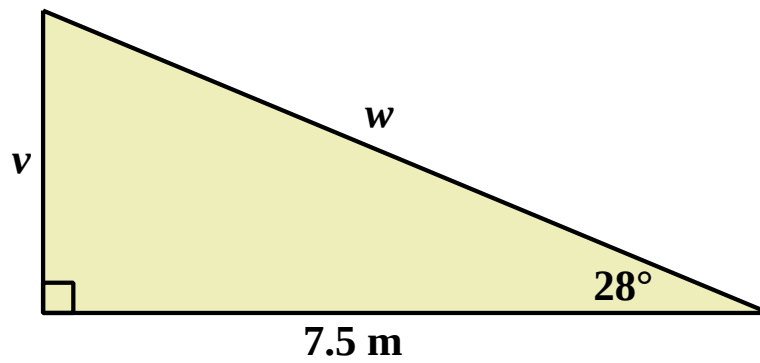
$$m = \text{_____} \times \tan 18^\circ$$

$$m =$$

- (iii) Calculate n using the formula,

$$hyp^2 = opp^2 + adj^2$$

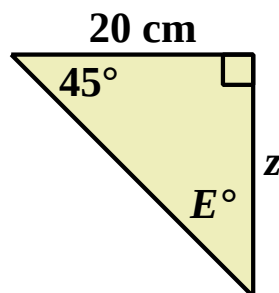
Question 3



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
(ii) Calculate v using the formula,
$$opp = adj \times \tan A^\circ$$

- (iii) Calculate w using the formula,
$$hyp^2 = opp^2 + adj^2$$

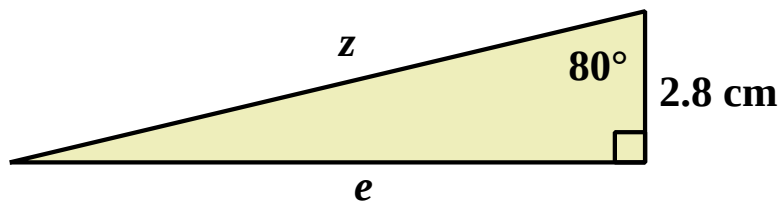
Question 4



Do **NOT** label the sides in this triangle !

- (i) Use the fact that the angles in a triangle sum to 180° to work out angle E .
(ii) It's now obvious what length z is !
Write down the length of z and explain why it was obvious.

Question 5



(i) Label the triangle sides *hyp*, *opp*, and *adj*.

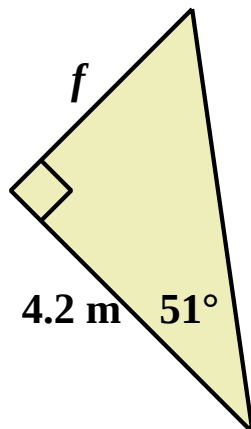
(ii) Calculate e using the formula,

$$opp = adj \times \tan A^\circ$$

(iii) Calculate z using the formula,

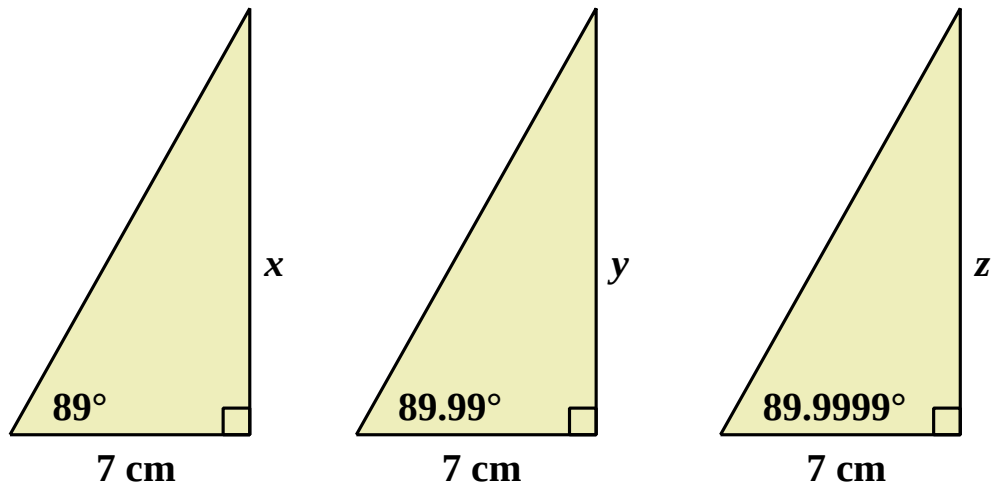
$$hyp^2 = opp^2 + adj^2$$

Question 6



Calculate the length of f .

Question 7



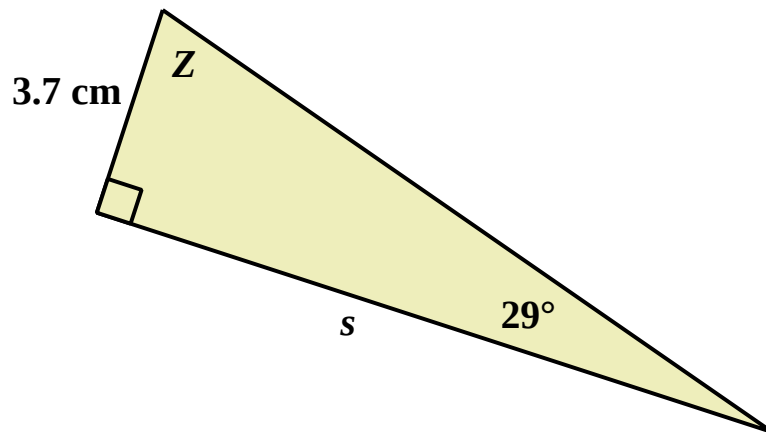
(i) Calculate x .

(ii) Calculate y .

(iii) Calculate z .

Can you explain what goes wrong if the angle is $89.999\ 999\ 999\ 999$?

Question 8

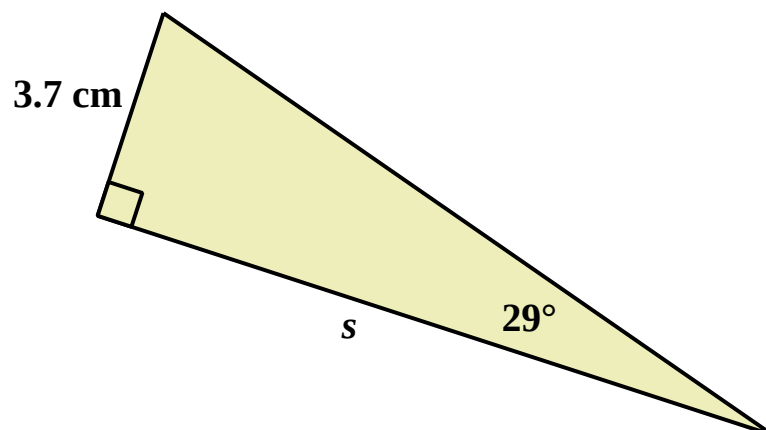


(i) Calculate **Z** using fact that the angles in a triangle add up to 180°

(ii) Cross out the 29° angle, and focus on angle **Z**.

(iii) Label the triangle sides *hyp*
opp : i.e opposite to **Z**
and *adj* : i.e. adjacent to **Z**

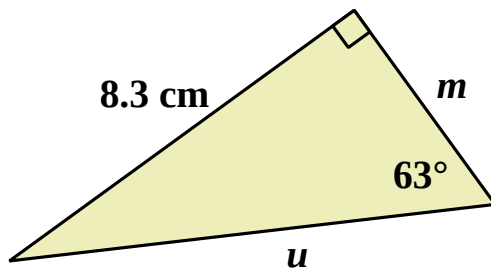
(iv) Calculate **s** using the formula,
$$opp = adj \times \tan Z^\circ$$



(v) Label the triangle sides *hyp*, *opp*, and *adj*.

(vi) Calculate **s** using the formula,
$$adj = \frac{opp}{\tan 29^\circ}$$

Question 9



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
(ii) Calculate m using the formula,

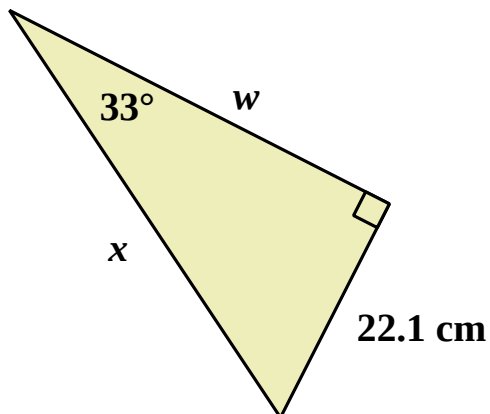
$$\text{adj} = \frac{\text{opp}}{\tan A^\circ}$$
$$m = \frac{8.3}{\tan 63}$$

$$m =$$

- (iii) Calculate u by using Pythagoras' theorem,

$$\text{hyp}^2 = \text{opp}^2 + \text{adj}^2$$

Question 10

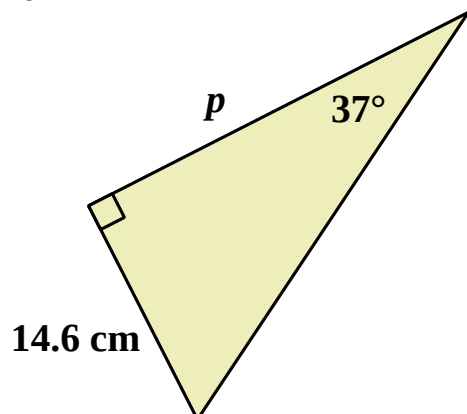


- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
(ii) Calculate w using the formula,

$$\text{adj} = \frac{\text{opp}}{\tan A^\circ}$$

- (iii) Calculate x by using Pythagoras' theorem.

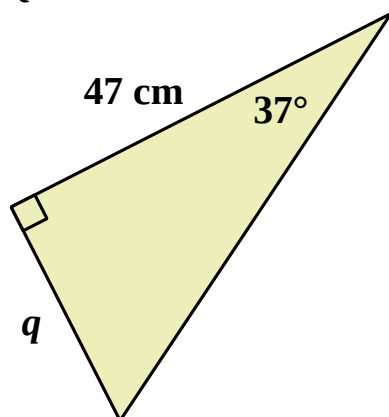
Question 11



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
- (ii) Calculate p using the correct formula,

$$\text{EITHER } opp = adj \times \tan A^\circ \quad \text{OR} \quad adj = \frac{opp}{\tan A^\circ}$$

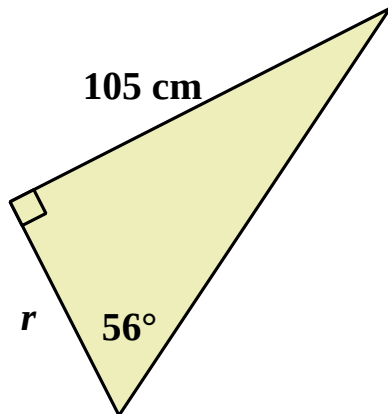
Question 12



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
- (ii) Calculate q using the correct formula,

$$\text{EITHER } opp = adj \times \tan A^\circ \quad \text{OR} \quad adj = \frac{opp}{\tan A^\circ}$$

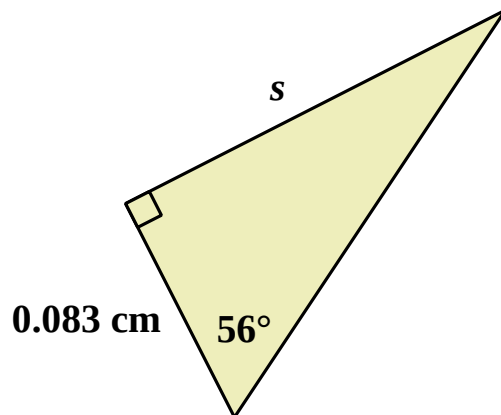
Question 13



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
- (ii) Calculate r using the correct formula,

$$\text{EITHER } opp = adj \times \tan A^\circ \quad \text{OR} \quad adj = \frac{opp}{\tan A^\circ}$$

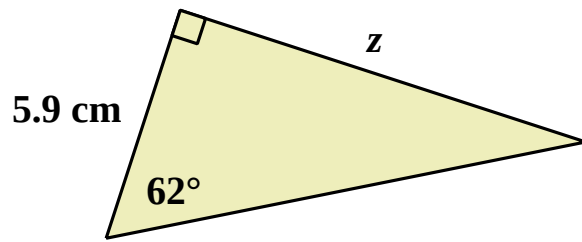
Question 14



- (i) Label the triangle sides *hyp*, *opp*, and *adj*.
- (ii) Calculate s using the correct formula,

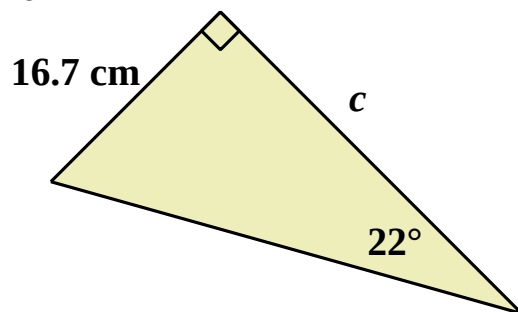
$$\text{EITHER } opp = adj \times \tan A^\circ \quad \text{OR} \quad adj = \frac{opp}{\tan A^\circ}$$

Question 15



Calculate z .

Question 16



Calculate c .

Question 17

Giving answers to three significant figures, calculate;

(i) $5 + 4 \times \tan 82^\circ$

(ii) $7 + \tan 45^\circ \times 2$

HINT : You will get a math error you forget to close your brackets.

You should have entered $7 + \tan (45) \times 2$

(iii) $2.7 + \tan 30^\circ \times 3$

(iv) $7.6 \times \tan 22^\circ + 68$

HINT : If will get a math error you forget to close your brackets.

You should have entered $7 \times \tan (22) + 68$

(v) $1.7 \times \tan 53^\circ + 37$

(vi)

$$\frac{66}{4 + \tan 13^\circ}$$

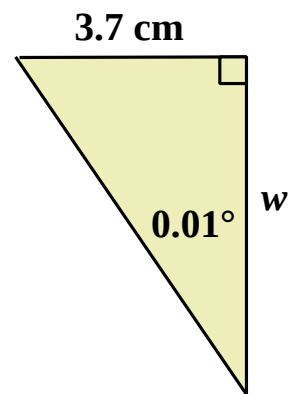
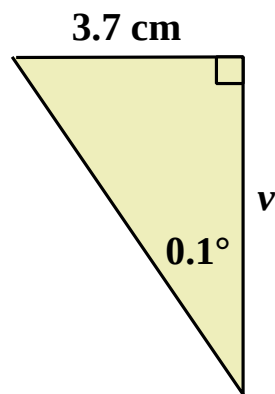
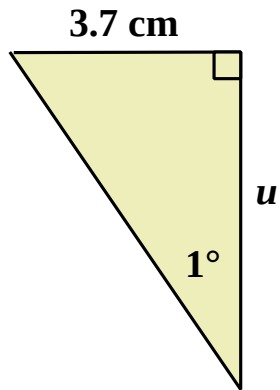
(vii)

$$\frac{28}{\tan 20^\circ - 20}$$

(viii)

$$\sqrt{\tan 45^\circ \times 5}$$

Question 18



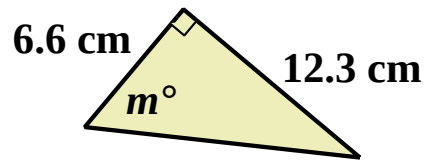
(i) Calculate u .

(ii) Calculate v .

(iii) Calculate w .

Can you explain what goes wrong if the angle is 0° ?

Question 19

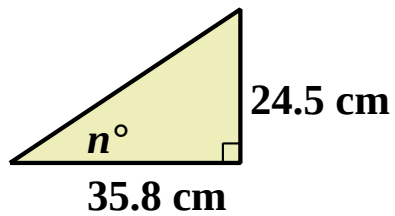


Label the triangle's sides, *hyp*, *opp* and *adj*.

Calculate angle m by using the formula;

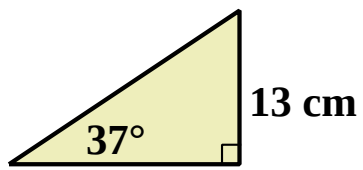
$$m = \arctan\left(\frac{opp}{adj}\right)$$

Question 20



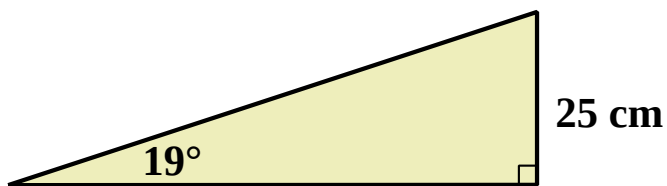
Calculate angle n .

Question 21



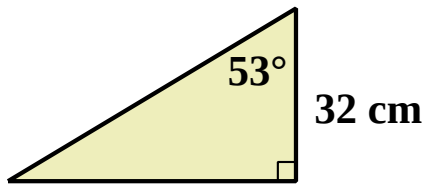
Find the perimeter of the triangle.

Question 22



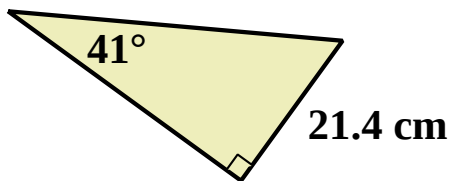
Find the perimeter of the triangle.

Question 23



Find the perimeter of the triangle.

Question 24



Find the perimeter of the triangle.

Question 25

This question is about plotting a graph of the $\tan$ function.

A°	0°	5°	10°	15°	20°	25°	30°	35°	40°
$\tan A^\circ$									

A°	45°	50°	55°	60°	65°	70°	75°	80°	85°
$\tan A^\circ$									

