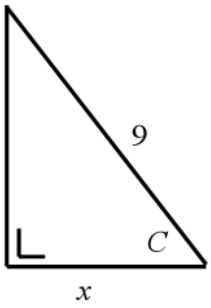
2005

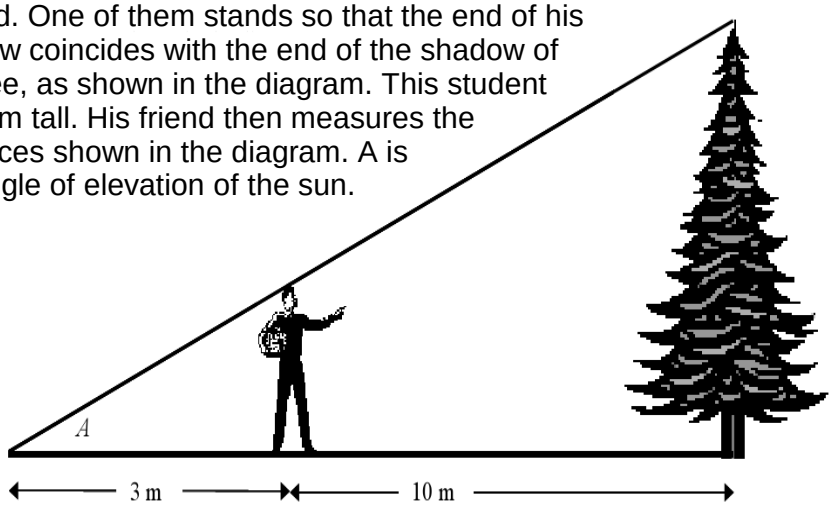
Question 5

Q5 (a) Given that $\cos C = \frac{2}{3}$,

find the value of x.



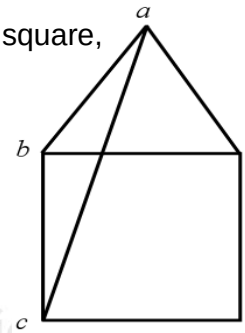
(b) Some students wish to estimate the height of a tree standing on level ground. One of them stands so that the end of his shadow coincides with the end of the shadow of the tree, as shown in the diagram. This student is 1.6 m tall. His friend then measures the distances shown in the diagram. A is the angle of elevation of the sun.



(i) Find A, correct to the nearest degree.

(ii) Find the height of the tree correct to one decimal place.

(c) The diagram shows an equilateral triangle and a square, each of side 6.
a is joined to c.



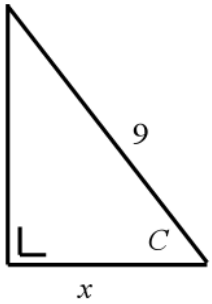
(i) Find $|\angle abc|$ and $|\angle bac|$.

(ii) Find |ac|, correct to one decimal place.

Solution

Q5 (a) Given that $\cos C = \frac{2}{3}$,

find the value of x.



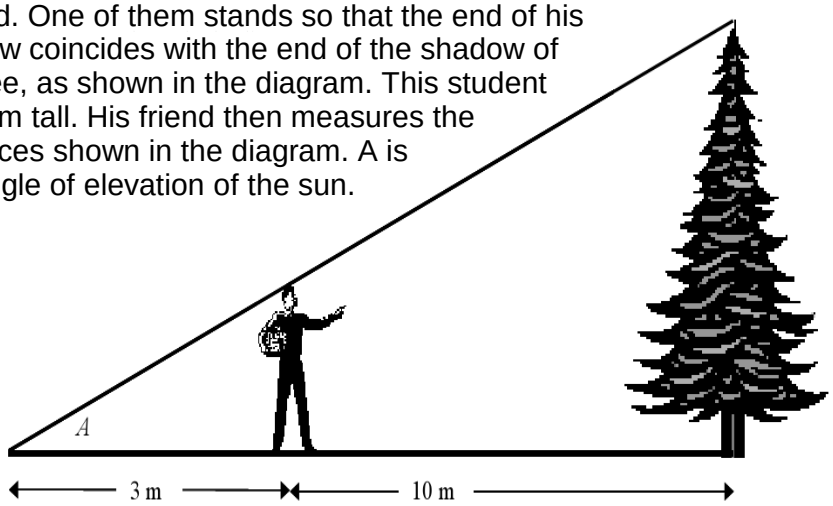
$$\cos C = \frac{2}{3} = \frac{x}{9}$$

$$\frac{2}{3} = \frac{x}{9}$$

$$18 = 3x$$

$$x = 6$$

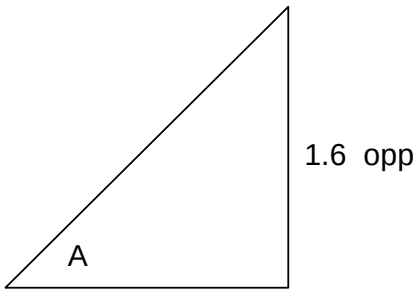
(b) Some students wish to estimate the height of a tree standing on level ground. One of them stands so that the end of his shadow coincides with the end of the shadow of the tree, as shown in the diagram. This student is 1.6 m tall. His friend then measures the distances shown in the diagram. A is the angle of elevation of the sun.



(i) Find A, correct to the nearest degree.

(ii) Find the height of the tree correct to one decimal place.

(i)



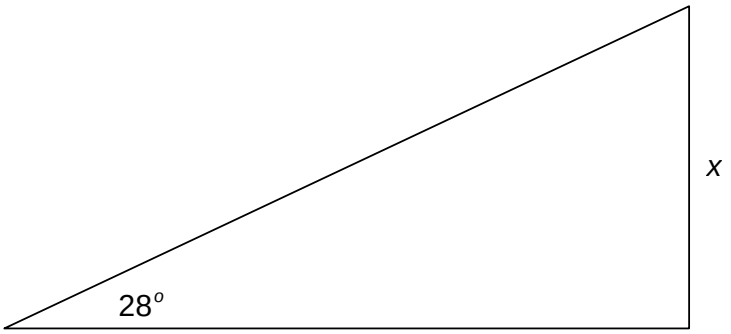
$$\tan A = \frac{opp}{adj}$$

$$\tan A = \frac{1.6}{3}$$

$$\tan A = 0.53333$$

$$A = 28^o$$

(ii)



13 cm

$$\tan A = \frac{opp}{adj}$$

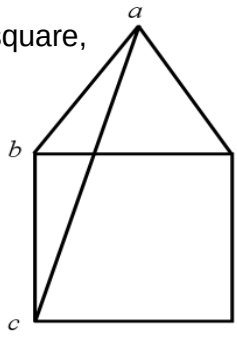
$$\tan 28^0 = \frac{x}{13}$$

$$13(0.53333) = x$$

$$x = 6.93$$

$$x = 6.9 \text{ m}$$

(c) The diagram shows an equilateral triangle and a square, each of side 6.
a is joined to c.



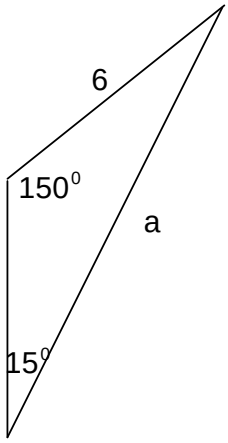
(i) Find $|\angle abc|$ and $|\angle bac|$.

(ii) Find |ac|, correct to one decimal place.

(i) $|\angle abc| = 150^0$

$|\angle bac| = 15^0$

(ii)



$$\frac{a}{\sin 150} = \frac{6}{\sin 15}$$

$$\frac{a}{0.5} = \frac{6}{0.2588}$$

$$\frac{a}{0.5} = 23.18$$

$$a = 11.59$$

$$a = 11.6$$