Trigonometry – 2020 O Level Math D
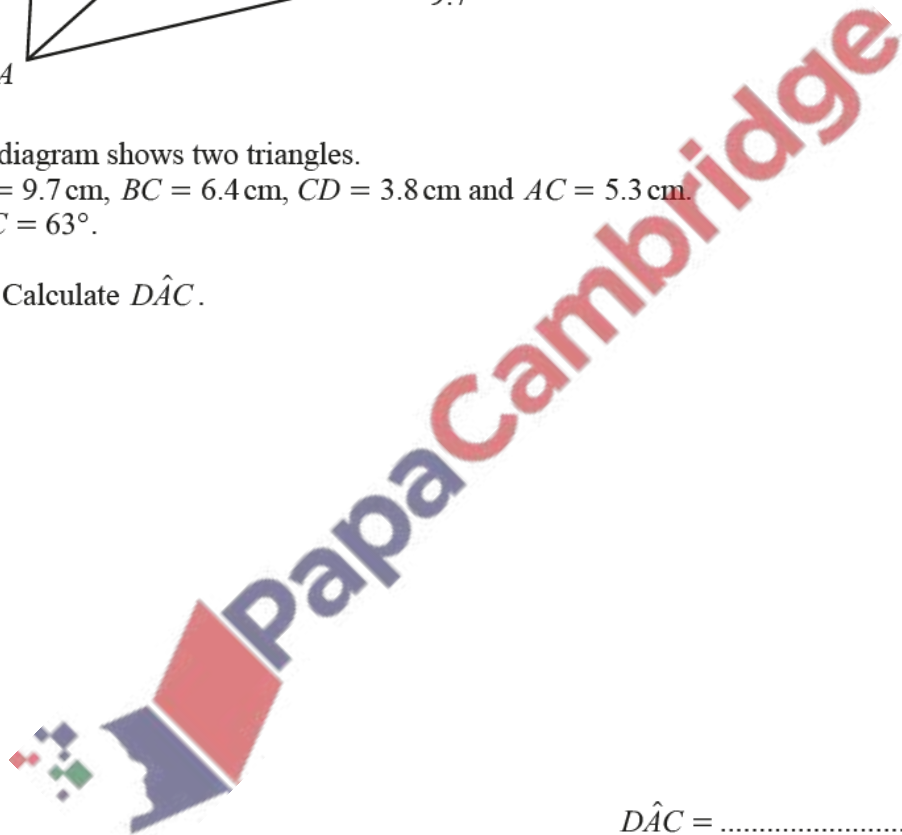
1. Nov/2020/Paper_21/No.3b

(b)

The diagram shows two triangles.
$AB = 9.7\,\text{cm}$, $BC = 6.4\,\text{cm}$, $CD = 3.8\,\text{cm}$ and $AC = 5.3\,\text{cm}$.
$A\hat{D}C = 63°$.

(i) Calculate $D\hat{A}C$.

$D\hat{A}C =$ .... [3]

(ii) Calculate $A\hat{B}C$.

$A\hat{B}C =$ .... [3]
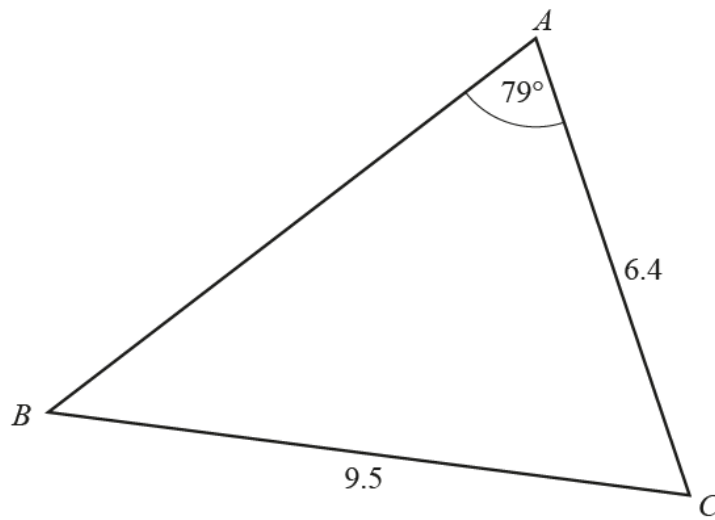
In triangle ABC, $AC = 6.4\,\text{cm}$, $BC = 9.5\,\text{cm}$ and $B\hat{A}C = 79°$.

(a) (i) Calculate $A\hat{B}C$.

$A\hat{B}C =$ .... [3]

(ii) Calculate the area of triangle ABC.

.... cm^2 [3]

2

(b)
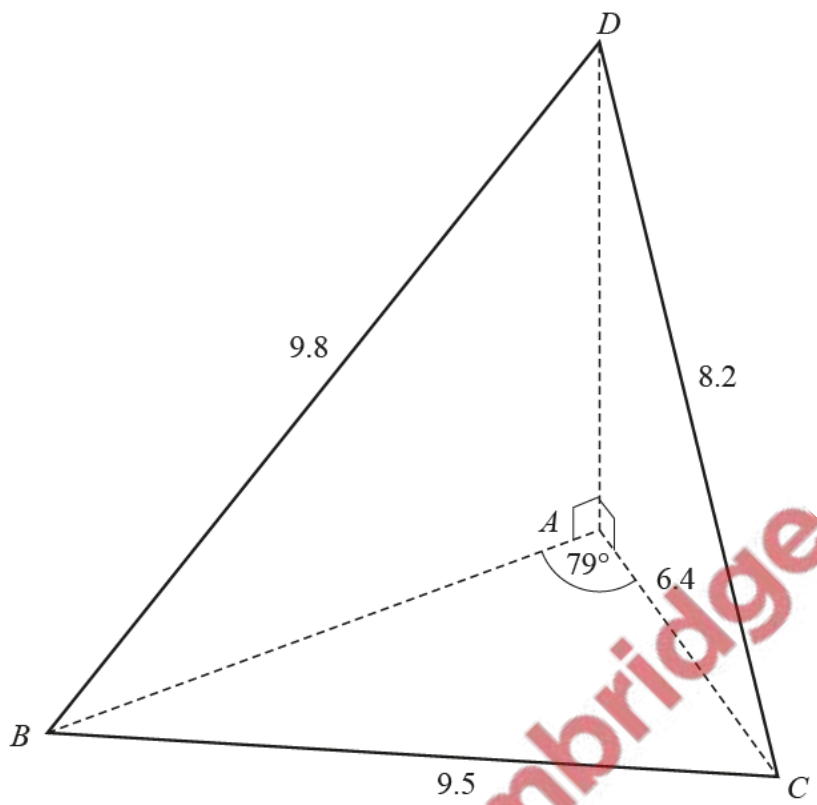
The same triangle ABC forms the horizontal base of a pyramid $ABCD$.
$BD = 9.8$ cm and $CD = 8.2$ cm.
$B\hat{A}D = C\hat{A}D = 90°$.

(i) Calculate $B\hat{D}C$.

$B\hat{D}C =$ .... [3]

(ii) Calculate the angle of elevation of D from C.

.... [2]

North

North

$\uparrow$

$\uparrow$

$\bullet B$

A

Scale: 1 cm to 10 km

The scale drawing shows the positions of town A and town B.

(a) Find the actual distance, in kilometres, of town A from town B.

.... km [1]

(b) Town C is on a bearing of 140° from town A and on a bearing of 235° from town B.

Mark the position of town C on the scale drawing. [2]
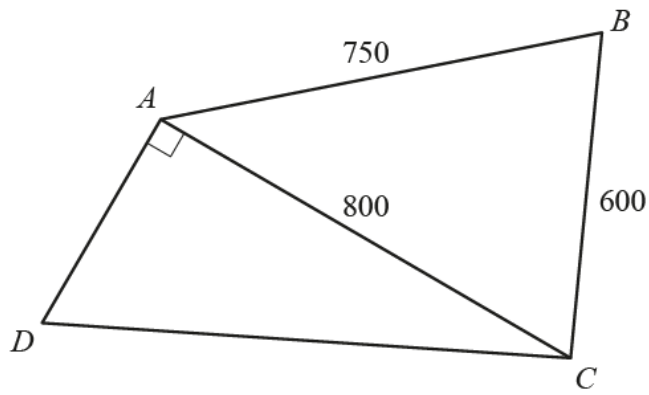
$ABCD$ is a field with $AB = 750\,\text{m}$ and $BC = 600\,\text{m}$.
Inside the field is a straight path, AC, of length $800\,\text{m}$ and $D\hat{A}C = 90°$.

(a) Show that $A\hat{C}B = 62.9°$, correct to 1 decimal place.

[3]

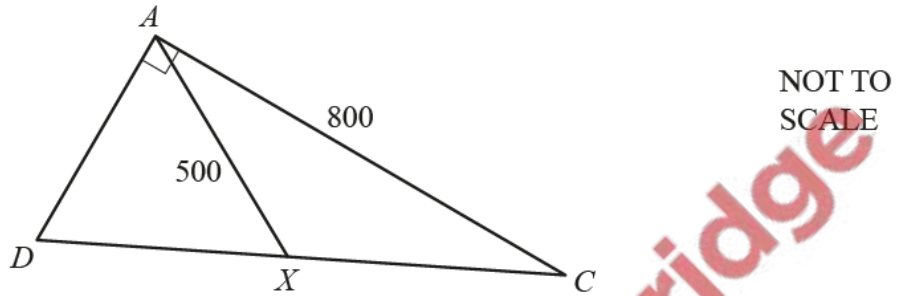**(b)** The area of the field is $375\,000\,\text{m}^2$.

Calculate AD.

$AD = $ .... m [4]

(c) Calculate $A\hat{C}D$.

$A\hat{C}D = $ .... [2]

(d) X is a point on DC and $AX = 500\,\text{m}$.

NOT TO SCALE

Calculate the obtuse angle $A\hat{X}C$.

$A\hat{X}C = $ .... [4]
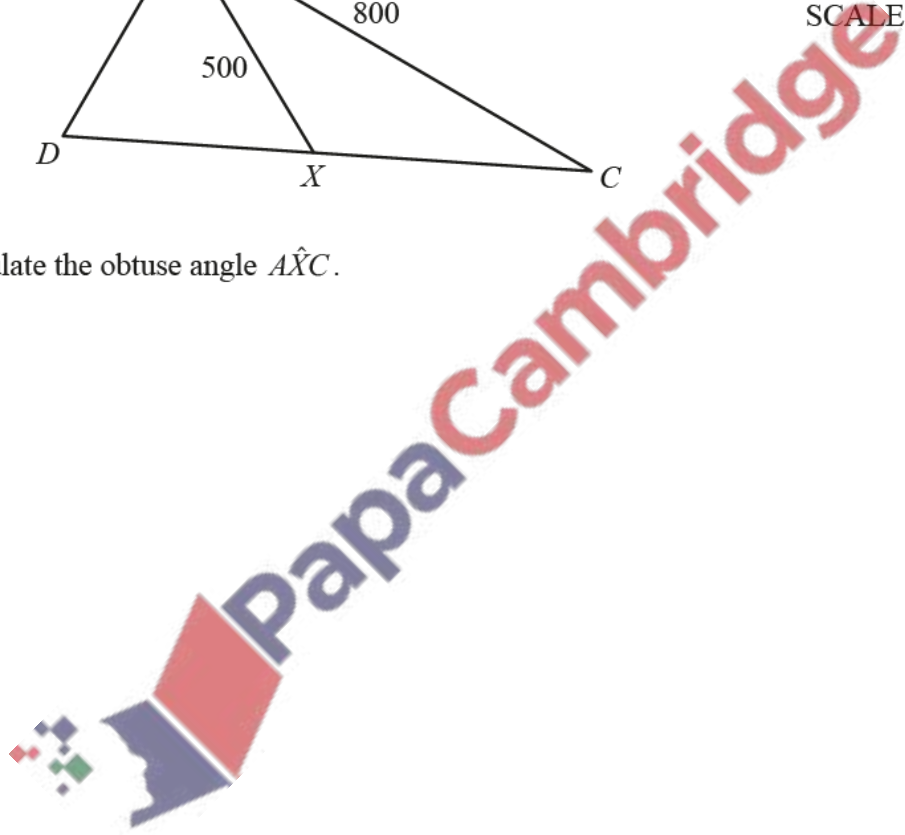
A light, L, is fixed on a building 8 m above the base, B, of the building.

(a)

NOT TO SCALE

Building
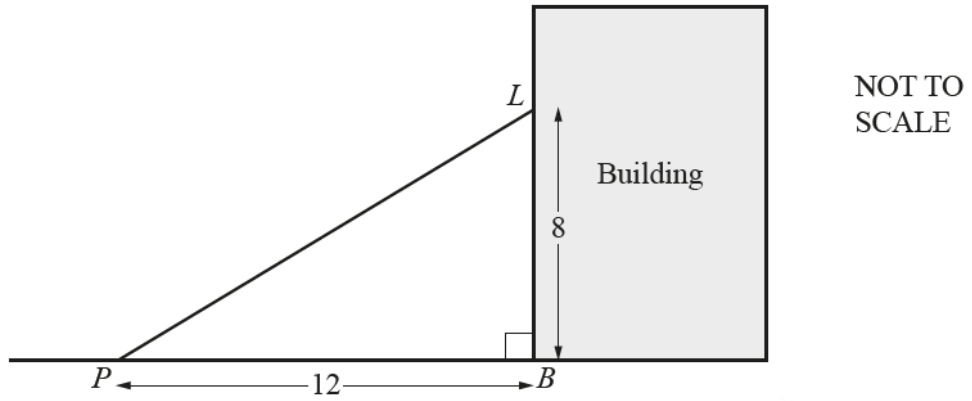
A point, P, is on the horizontal ground 12 m from B.

Calculate the angle of elevation of L from P.

.... [2]

(b)

NOT TO SCALE

Building
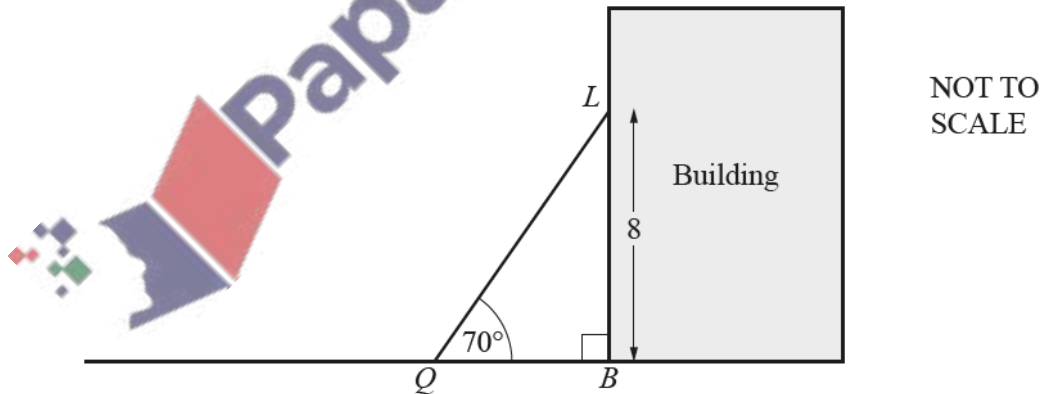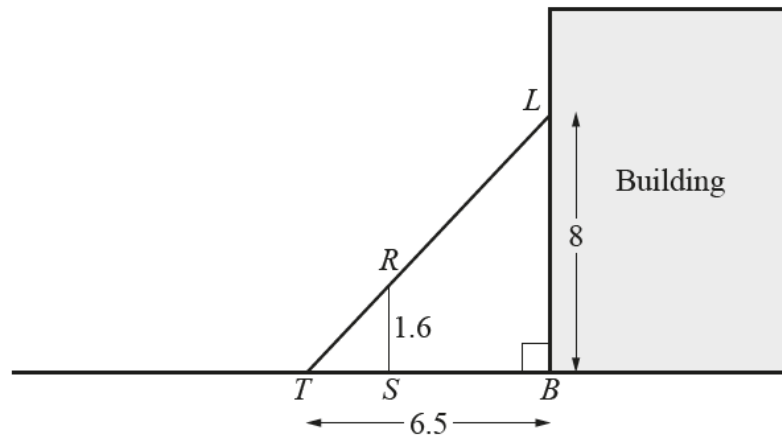
A ladder is placed on the ground at Q to reach the light, L.
The ladder makes an angle of 70° with the ground.

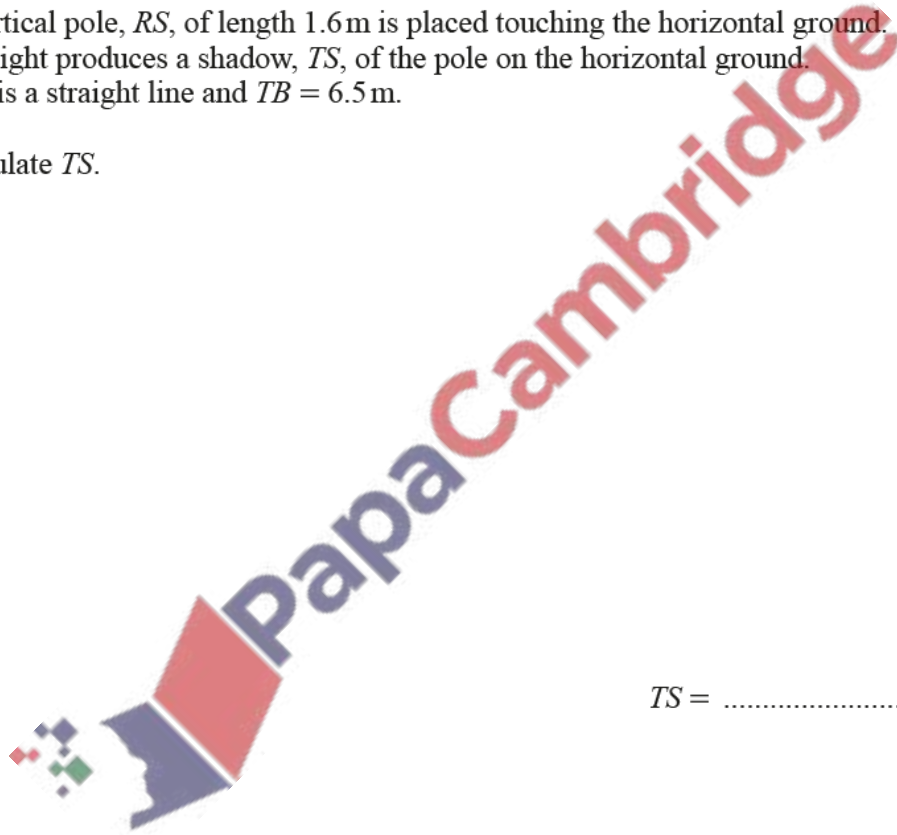Calculate QL.

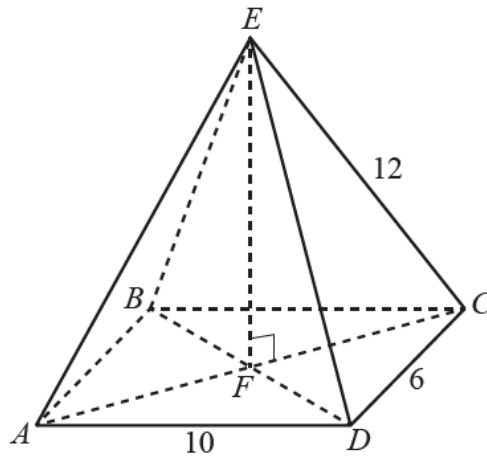$QL = $ .... m [2]

(c)

A vertical pole, *RS*, of length 1.6 m is placed touching the horizontal ground.
The light produces a shadow, *TS*, of the pole on the horizontal ground.
LRT is a straight line and *TB* = 6.5 m.

Calculate *TS*.

TS = ... m [2]

[Volume of pyramid = $\frac{1}{3}$ × base area × height]

$ABCDE$ is a rectangular-based pyramid.
AC and BD intersect at F.
EF is perpendicular to FC.

$AD = 10\,\text{cm}$, $DC = 6\,\text{cm}$ and $EC = 12\,\text{cm}$.

(a) Show that $EF = 10.5\,\text{cm}$, correct to 1 decimal place.
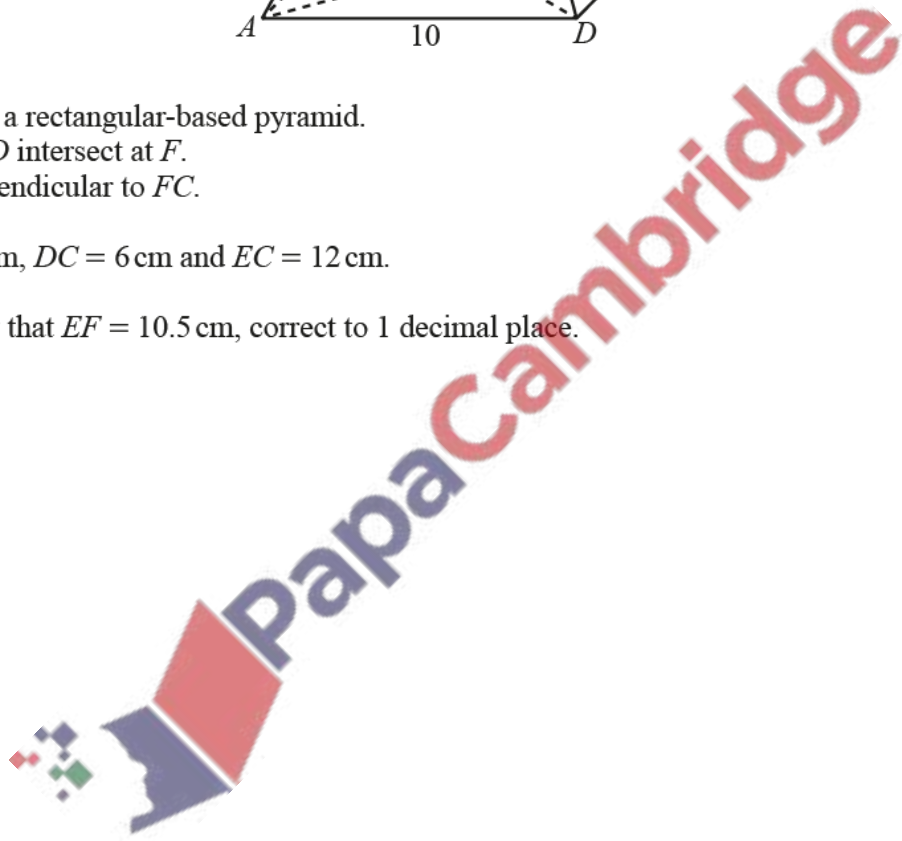
[4]

(b) Find the volume of the pyramid.

.... cm^3 [2]

9

(c) Calculate $D\hat{E}C$.

$D\hat{E}C =$ .... [3]

(d) Calculate the area of triangle DEC.

....cm^2 [2]