

3D Pythagoras & Trigonometry

Question Paper 3

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Trigonometry
Sub-Topic	3D Pythagoras & Trigonometry
Booklet	Question Paper 3

Time Allowed: 65 minutes

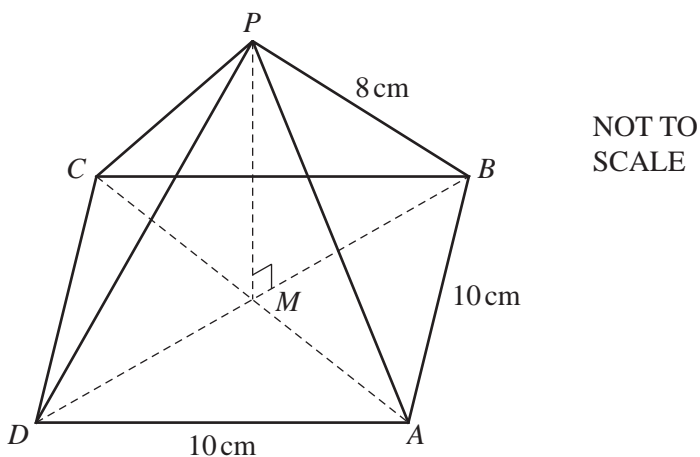
Score: /54

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1



The diagram represents a pyramid with a square base of side 10 cm.

The diagonals AC and BD meet at M . P is vertically above M and $PB = 8\text{ cm}$.

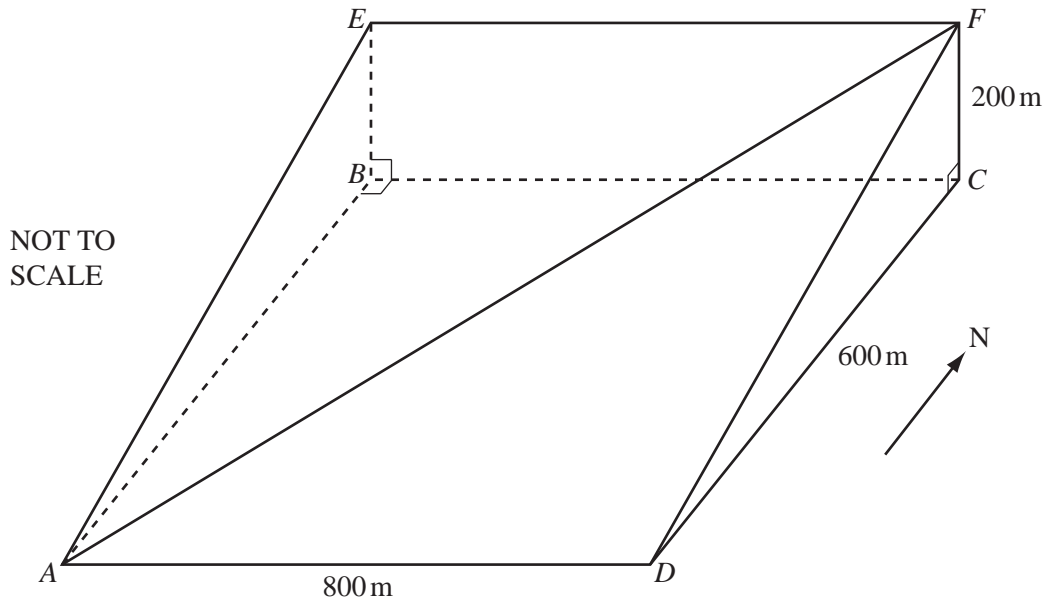
(a) Calculate the length of BD .

Answer(a) $BD = \dots\dots\dots \text{ cm}$ [2]

(b) Calculate MP , the height of the pyramid.

Answer(b) $MP = \dots\dots\dots \text{ cm}$ [3]

2



$ABCD$, $BEFC$ and $AEFD$ are all rectangles.
 $ABCD$ is horizontal, $BEFC$ is vertical and $AEFD$ represents a hillside.
 AF is a path on the hillside.
 $AD = 800\text{ m}$, $DC = 600\text{ m}$ and $CF = 200\text{ m}$.

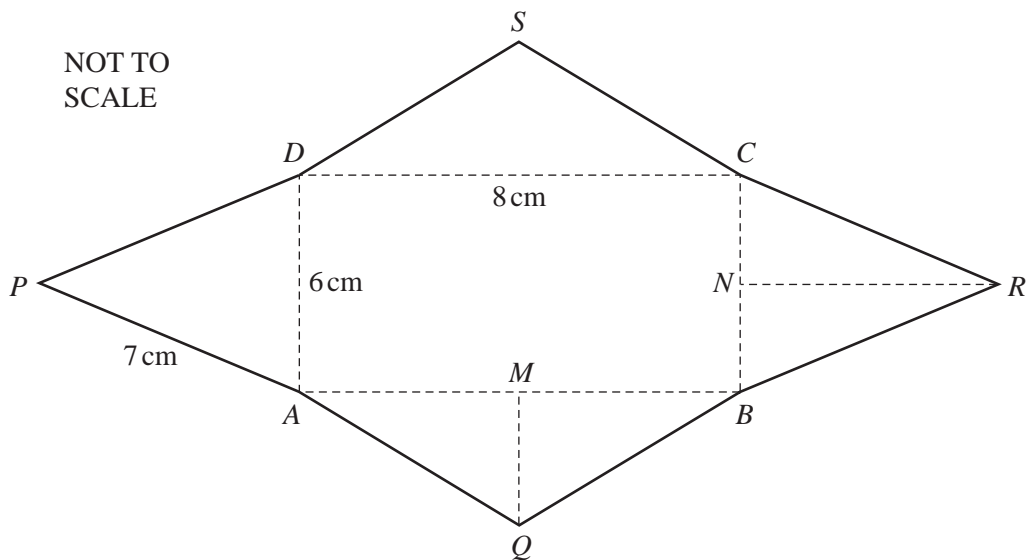
(a) Calculate the angle that the path AF makes with $ABCD$.

Answer(a) [5]

(b) In the diagram D is due south of C .
 Jasmine walks down the path from F to A in bad weather. She cannot see the path ahead.
 The compass bearing she must use is the bearing of A from C .
 Calculate this bearing.

Answer(b) [3]

3



The diagram above shows the net of a pyramid.

The base $ABCD$ is a rectangle 8 cm by 6 cm .

All the sloping edges of the pyramid are of length 7 cm .

M is the mid-point of AB and N is the mid-point of BC .

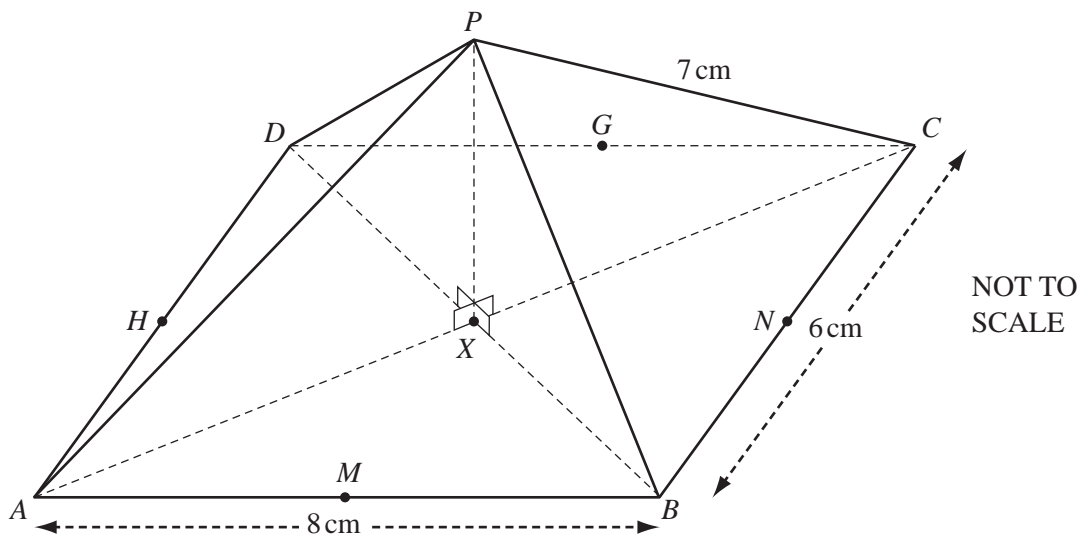
(a) Calculate the length of

(i) QM , [2]

(ii) RN . [1]

(b) Calculate the surface area of the pyramid. [2]

(c)

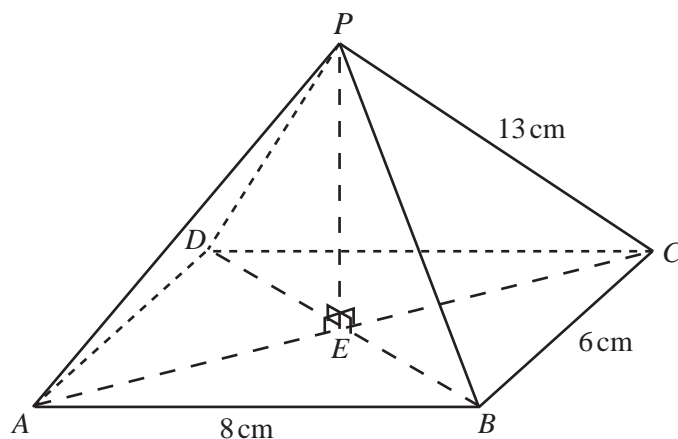


The net is made into a pyramid, with P , Q , R and S meeting at P .

The mid-point of CD is G and the mid-point of DA is H .

The diagonals of the rectangle $ABCD$ meet at X .

- (i) Show that the height, PX , of the pyramid is 4.90 cm, correct to 2 decimal places. [2]
- (ii) Calculate angle PNX . [2]
- (iii) Calculate angle HPN . [2]
- (iv) Calculate the angle between the edge PA and the base $ABCD$. [3]
- (v) Write down the vertices of a triangle which is a plane of symmetry of the pyramid. [1]



NOT TO SCALE

The diagram shows a pyramid on a horizontal rectangular base $ABCD$.

The diagonals of $ABCD$ meet at E .

P is vertically above E .

$AB = 8$ cm, $BC = 6$ cm and $PC = 13$ cm.

(a) Calculate PE , the height of the pyramid. [3]

(b) Calculate the volume of the pyramid.

[The volume of a pyramid is given by $\frac{1}{3} \times \text{area of base} \times \text{height}$.] [2]

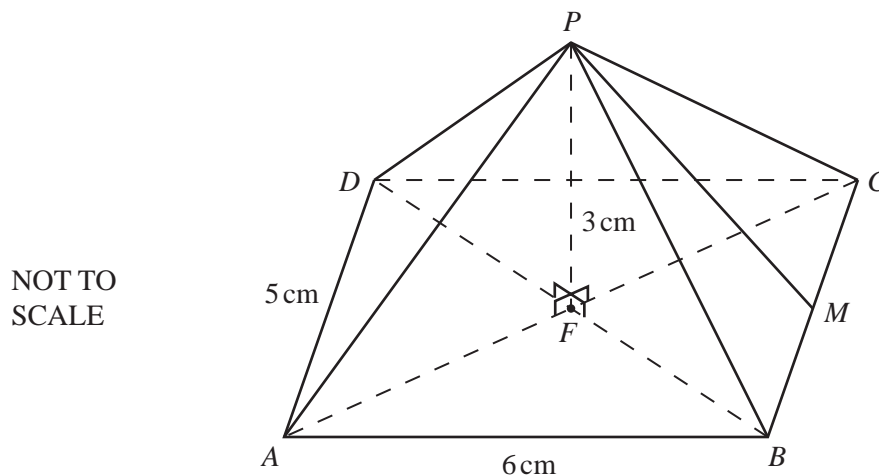
(c) Calculate angle PCA . [2]

(d) M is the mid-point of AD and N is the mid-point of BC . Calculate angle MPN . [3]

(e) (i) Calculate angle PBC . [2]

(ii) K lies on PB so that $BK = 4$ cm. Calculate the length of KC . [3]

5



The diagram shows a pyramid on a rectangular base $ABCD$, with $AB = 6$ cm and $AD = 5$ cm. The diagonals AC and BD intersect at F . The vertical height $FP = 3$ cm.

- (a) How many planes of symmetry does the pyramid have? [1]
- (b) Calculate the volume of the pyramid.
[The volume of a pyramid is $\frac{1}{3} \times \text{area of base} \times \text{height}$.] [2]
- (c) The mid-point of BC is M .
Calculate the angle between PM and the base. [2]
- (d) Calculate the angle between PB and the base. [4]
- (e) Calculate the length of PB . [2]