Name: *Answers*

Exam Style Questions

3D Trigonometry

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Answers

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
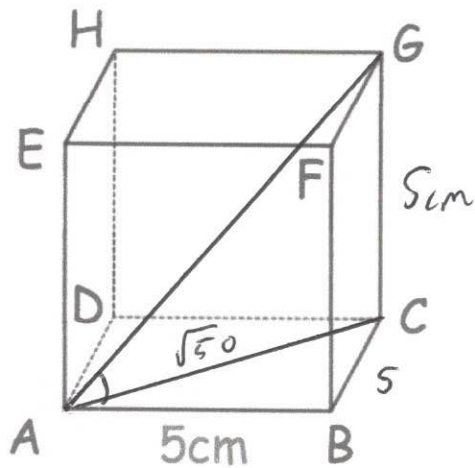4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 332

1. Shown is a cube with side length 5cm.

Calculate angle CAG.

$$AC^2 = AB^2 + BC^2$$
$$= 5^2 + 5^2$$
$$= 25 + 25$$
$$= 50$$
$$AC = \sqrt{50} = 5\sqrt{2}$$
$$= 7.07106\dots$$

$$\tan \theta = \frac{5}{\sqrt{50}}$$
$$\theta = 35.264\dots$$

35.26 to 2dp
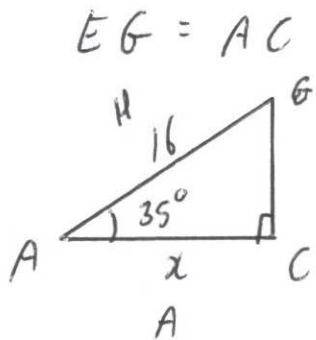
.......................°

(4)
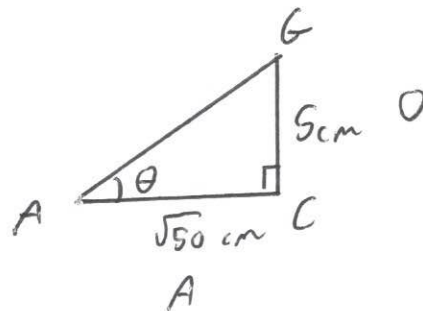
2. Shown below is a cuboid.
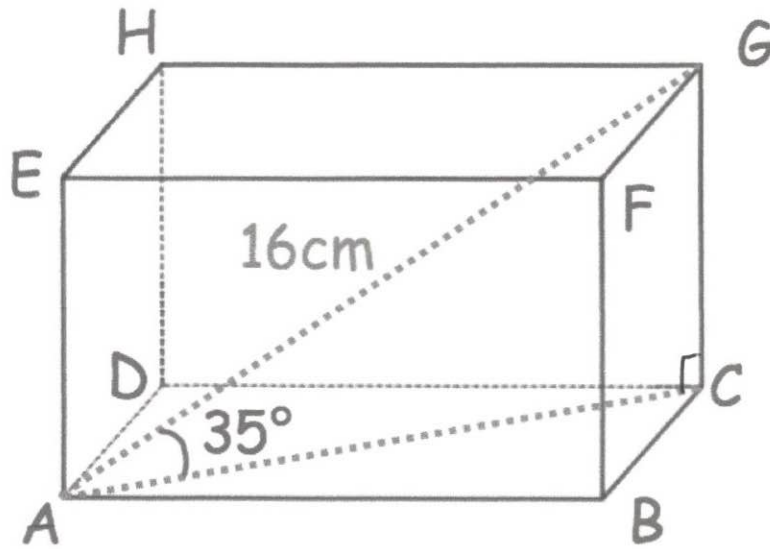
Length AG = 16cm
Angle CAG is 35°

Work out the length of EG.

$$EG = AC$$

$$AC = Cos(35) \times 16 = 13.1064..$$

$$\therefore EG = 13.1064...$$

to 1 dp

............13.1............cm

(3)

3. A tree is located in the corner of a rectangular field.

E

5m

B

15m

C

12m

A

D

15m
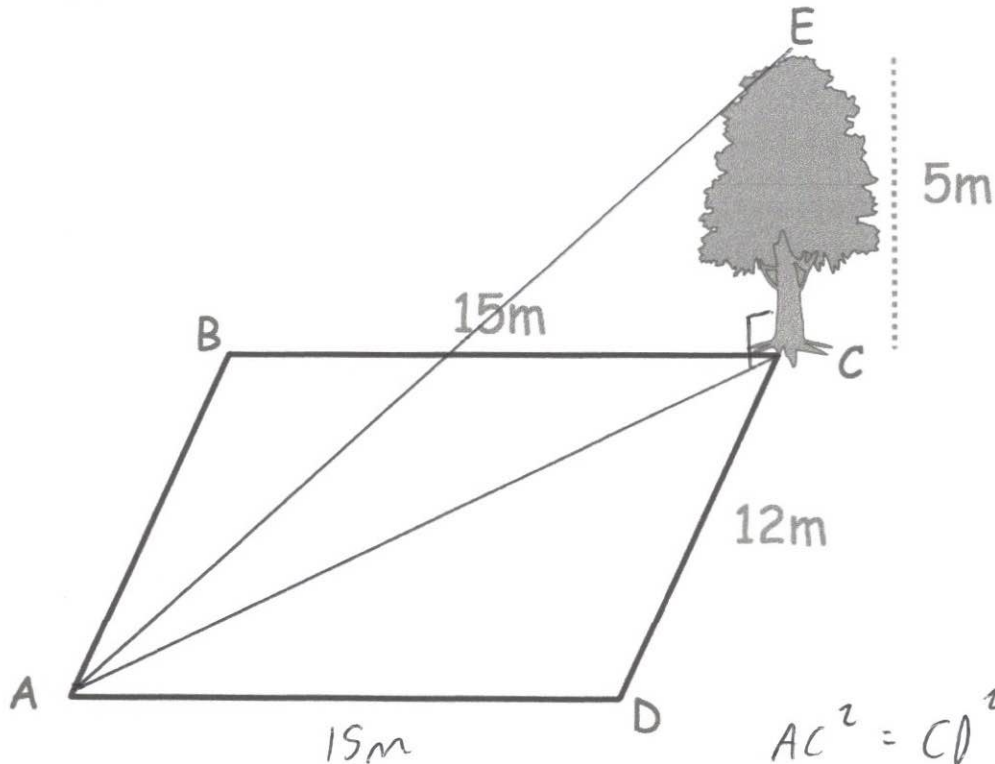
The field is 15 metres long and 12 metres wide.
The tree is 5 metres tall.

Calculate angle CAE.

E

5m

θ

A

$\sqrt{369}$

C
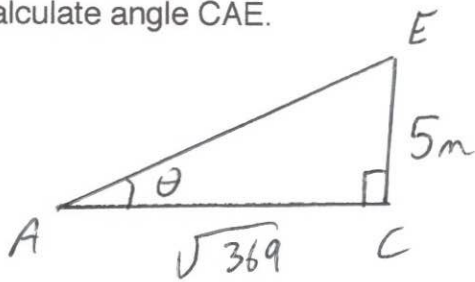
$AC^2 = CD^2 + AD^2$

$= 12^2 + 15^2$

$= 369$

$AC = \sqrt{369}$

$(19.209...)$

$\tan \theta = \dfrac{5}{\sqrt{369}}$

$\theta = 14.589..$

$\underline{14.6}°$

(4)

4. Shown below is a square based pyramid.
    The apex E is directly over the centre of the base.
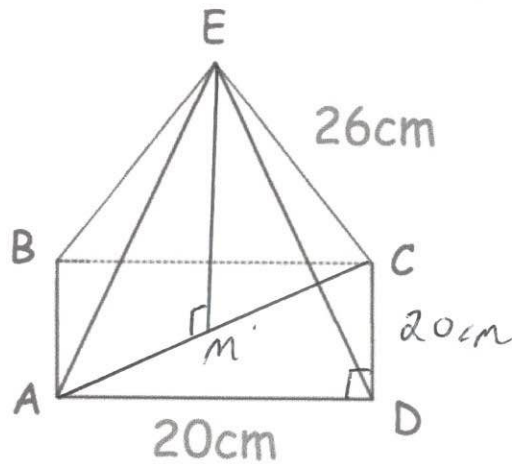
AD = 20cm
CE = 26cm

(a) Work out the length of AC

$$AC^2 = AD^2 + CD^2$$
$$= 20^2 + 20^2$$
$$= 400 + 400$$

$AC = \sqrt{800} = 20\sqrt{2}$
$AM = 10\sqrt{2}$

$AC = \sqrt{800} = 28.284...$

28.3 to 1 dp
...........................cm
(2)

(b) Calculate angle CAE

$$\cos\theta = \frac{10\sqrt{2}}{26}$$
$$= 57.0485$$

57.05 to 2 dp
...........................°
(2)

(c) Work out the height of the pyramid

height $(EM) = \sin(57.048...) \times 26$
$= 21.817...$

21.82 to 2 dp
...........................cm
(2)

(d) Calculate the volume of the pyramid

$$V = \frac{1}{3} A h$$
$$= \frac{1}{3} \times 20^2 \times 21.817...$$
$$= 2908.989897...$$

2908.99 to 2 dp
...........................cm³
(2)

5. Shown below is a rectangular based pyramid.
    The apex E is directly over the centre of the base.

E

10cm

B

C

y

5cm

A

D

8cm
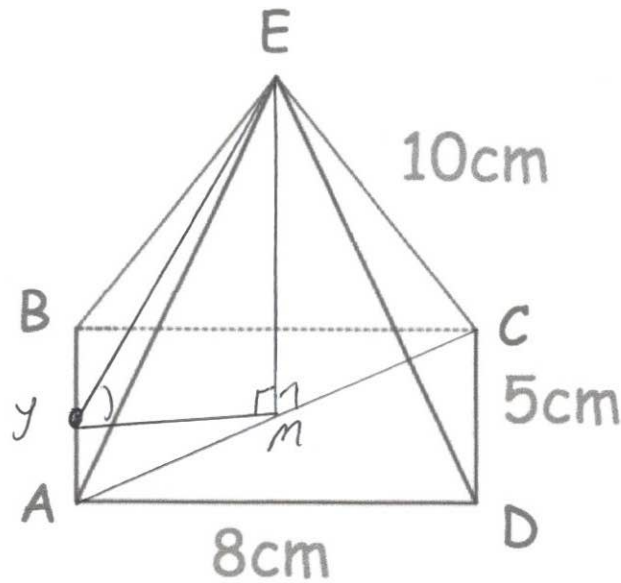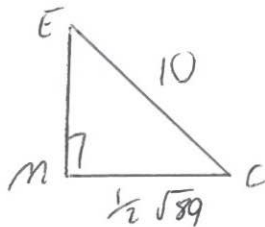
AD = 8cm
CD - 5cm
CE = 10cm

(a) Calculate the height of the pyramid

$AC^2 = 5^2 + 8^2 = 89$

$AC = \sqrt{89}$

$MC = \frac{1}{2}\sqrt{89}$

E

10

M

C

$\frac{1}{2}\sqrt{89}$

$EC^2 = ME^2 + MC^2$

$100 = ME^2 + \frac{89}{4}$

$ME^2 = \frac{311}{4}$

$ME = 8.81759\ldots$

$\underline{8.82}$ to 2 dp.
................cm
                    (4)

(b) Calculate angle between the face ABE and the base ABCD

E

8.82

y

θ

4

M

$\tan\theta = \frac{8.82}{4}$

$\theta = 65.6\ldots$

$\underline{65.6}$ to 1 dp.
................°
                    (3)