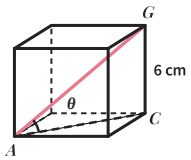
Pythagoras and trigonometry in 3D

ANSWERS

1

The diagonal of the base AC is 8 cm.
Find the angle θ between AG and the base.
Give your answer to 1 decimal place.



$\tan\theta =$ 6 ÷ 8

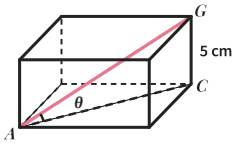
$\theta =$ 36.9°

36.9°

Answer

2

The diagonal of the base AC is 12 cm.
Find the angle θ between AG and the base.
Give your answer to 1 decimal place.



$\tan\theta =$ 5 ÷ 12

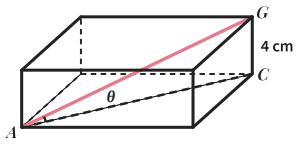
$\theta =$ 22.6°

22.6°

Answer

3

The diagonal of the base AC is 15 cm.
Find the angle θ between AG and the base.
Give your answer to 1 decimal place.



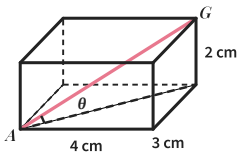
$\theta =$ 14.9°

14.9°

Answer

4

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



$AC^2 =$ $4^2 + 3^2$ = 25

$AC =$ 5 cm

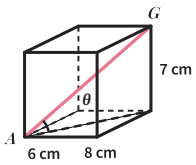
$\tan\theta =$ 2 ÷ 5 $\theta =$ 21.8°

21.8°

Answer

5

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



$AC^2 =$ $6^2 + 8^2$ = 100

$AC =$ 10 cm

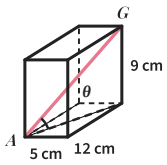
$\tan\theta =$ 7 ÷ 10 $\theta =$ 35.0°

35.0°

Answer

6

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



$AC^2 =$ $5^2 + 12^2$ = 169

$AC =$ 13 cm

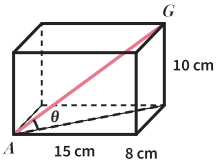
$\tan\theta =$ 9 ÷ 13 $\theta =$ 34.7°

34.7°

Answer

7

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



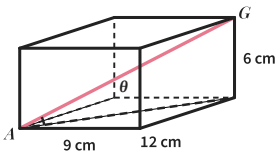
$\tan\theta =$ 10 ÷ 17 $\theta =$ 30.5°

30.5°

Answer

8

A cuboid is 9 cm by 12 cm by 6 cm tall.
Mia says the angle between AG and the base is $\tan^{-1}(6 \div 12) = 26.6°$. Explain her mistake and find the angle.



she used an edge, not AC: AC = 15, $\tan\theta$ = 6 ÷ 15

21.8°

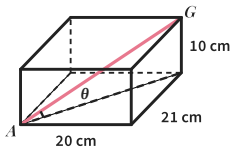
Answer

Pythagoras and trigonometry in 3D *further practice*

ANSWERS

9

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



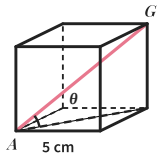
$AC = \sqrt{841} = 29$, $\tan\theta = 10 \div 29$

19.0°

Answer

10

A cube has edges of 5 cm. Find the angle θ between the diagonal AG and the base.



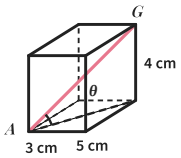
$AC = \sqrt{50} = 7.07$, $\tan\theta = 5 \div 7.07$

35.3°

Answer

11

Find the angle θ between the diagonal AG and the base $ABCD$. Give your answer to 1 decimal place.



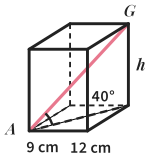
$AC = \sqrt{34} = 5.83$, $\tan\theta = 4 \div 5.83$

34.4°

Answer

12

The diagonal AG makes an angle of 40° with the base. Find the height h.



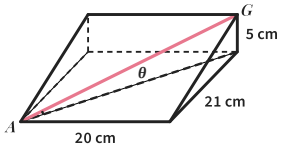
$AC = 15$, $h = 15 \tan 40°$

12.6 cm

Answer

13

A ramp has a rectangular base 20 cm by 21 cm. The back edge is 5 cm high.
Find the angle θ between AG and the base.



$AC = 29$, $\tan\theta = 5 \div 29$

9.8°

Answer

14

A shoebox is 30 cm long, 16 cm wide and 12 cm tall. A straw rests from a bottom corner to the opposite top corner.
Find the angle the straw makes with the bottom of the box.

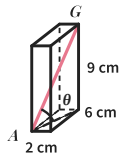
$AC = 34$, $\tan\theta = 12 \div 34$

19.4°

Answer

15

Find the length of AG and the angle θ it makes with the base.



$AC = \sqrt{40}$, $AG = \sqrt{(40 + 81)} = 11$,
$\sin\theta = 9 \div 11$

11 cm, 54.9°

Answer

16

Two boxes have the same base. Box B is taller than box A. Is the angle between AG and the base bigger in box B? Explain.

AC is the same, the height is bigger, so $\tan\theta$ = height ÷ AC is bigger

Yes

Answer