Discovering Maths in Global Landmarks

Around the world, there are many landmarks inspired by maths. The Great Pyramid in Giza is arguably the most famous example. It is estimated that the original height of the Great Pyramid was 146.7m. As a result of subsidence, however, its height is now 138.8m. The area of its base remains 53 084.16m^2.

a) Calculate the **original** volume of the Great Pyramid.

_____

_____

_____

_____m^3

b) Calculate the **current** volume of the Great Pyramid.

_____

_____

_____

_____m^3

c) Using your answers from the previous questions, calculate the percentage decrease in volume of the Great Pyramid. Give your answer correct to one decimal place.

_____

_____

_____

_____%

Q2) The Great Pyramid is a square-based pyramid. Calculate the diagonal of its base, giving your answer correct to one decimal place.

_____

_____

_____

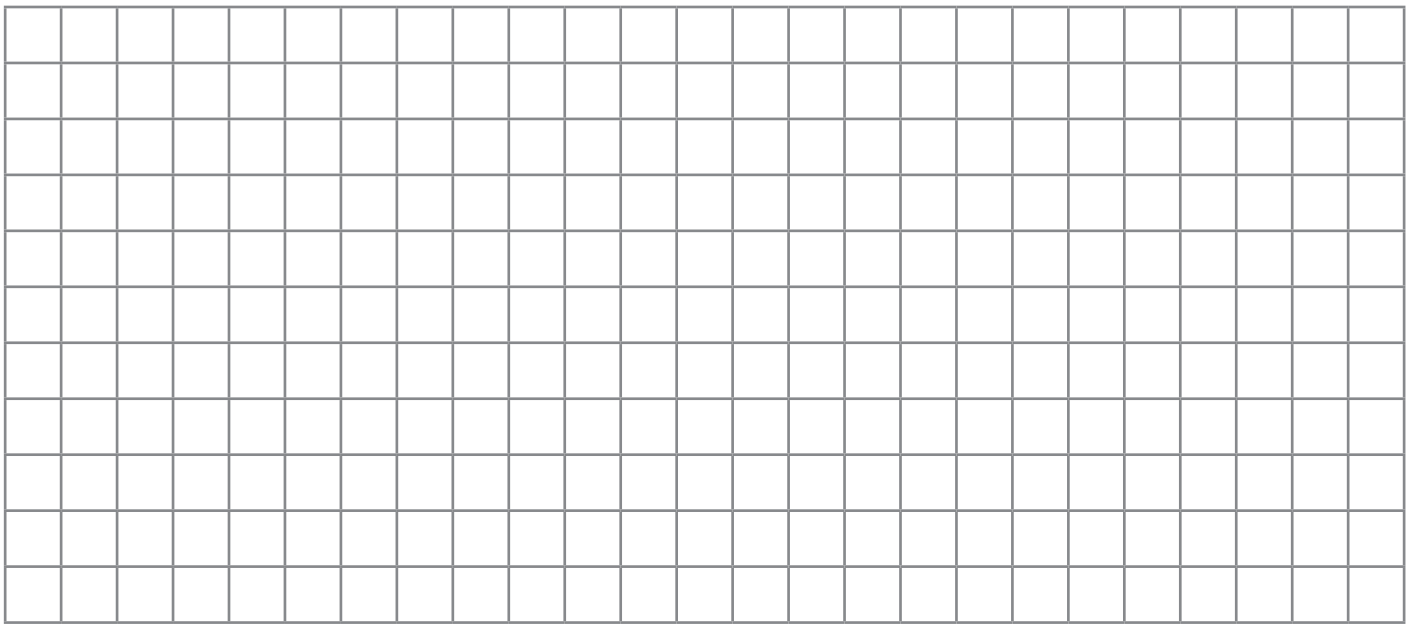
_____ 1d.p.

Q3) Approximately 2 300 000 blocks were used to build the Great Pyramid. Each block weighed approximately 2.3 metric tonnes. There are 1000kg in a metric tonne. Calculate the approximate density of the original pyramid. Write your answer correct to two decimal places and in standard form.

Hint: be careful with your units!

Q4) Draw the front elevation, side elevation and plan of the Great Pyramid.

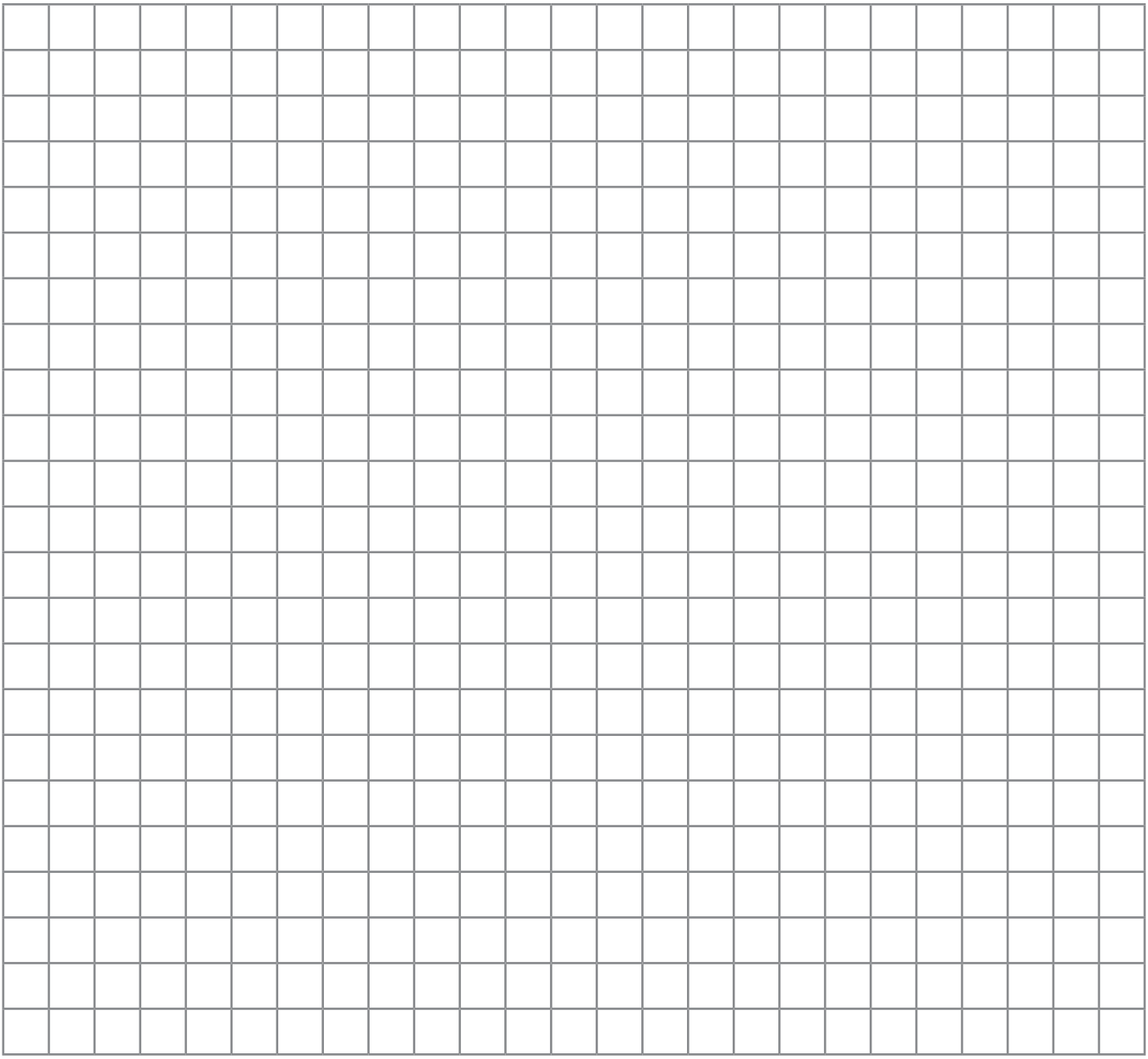
Hint: It is a square-based pyramid.



Extension

You might like to construct your own pyramids. You could do this by drawing the nets for each pyramid on a piece of card.

Sketch a net using squared paper.

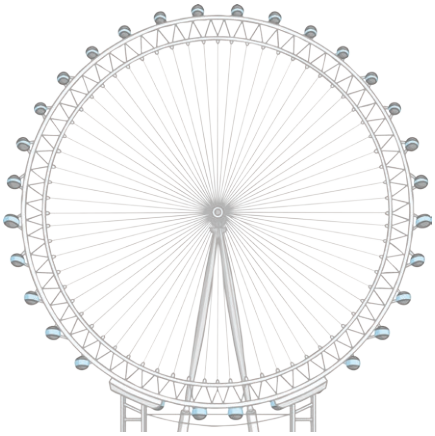


A Step Further

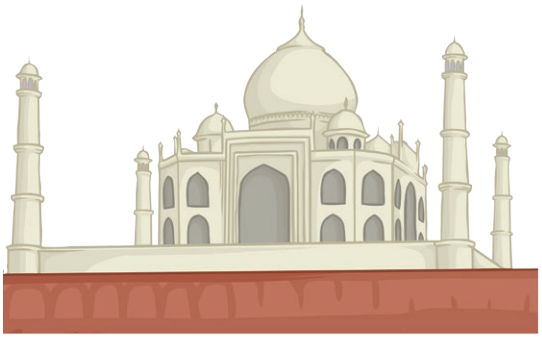
Research the sizes of the other pyramids and then have a go at producing accurate scale versions. Don't forget to use a scale to help you with your measurements.

Going Global

Here are some other global landmarks which incorporate maths.

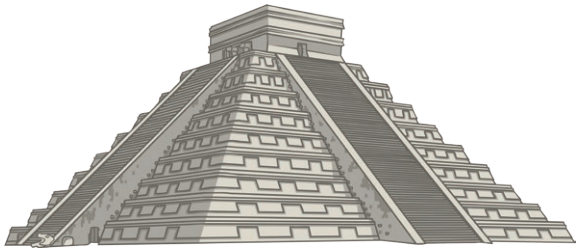


London Eye



Taj Mahal

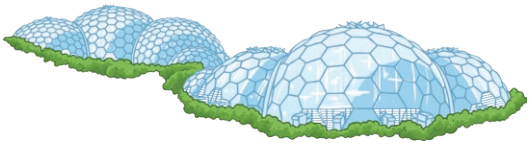
Gherkin



Chichen Itza

La Sagrada Familia

Eiffel Tower



Eden Project

Choose at least three of these monuments and research them. You might want to think about the size of them or how long it took to build them. Write 3 maths questions on each monument to give to your teacher. Don't forget to include the answers!

Answers

Around the world, there are many landmarks inspired by maths. The Great Pyramid in Giza is arguably the most famous example. It is estimated that the original height of the Great Pyramid was 146.7m. As a result of subsidence, however, its height is now 138.8m. The area of its base remains 53 084.16m^2.

a) Calculate the **original** volume of the Great Pyramid.

$$v = \frac{53\,084.16 \times 146.7}{3}$$

v = 2 595 815.424m^3

b) Calculate the **current** volume of the Great Pyramid.

$$v = \frac{53\,084.16 \times 138.8}{3}$$

v = 2 456 027.136m^3

c) Using your answers from the previous questions, calculate the percentage decrease in volume of the Great Pyramid. Give your answer correct to one decimal place.

2 595 815.424 - 2 456 027.136 = 139 788.288

$$\frac{139\,788.288}{2\,595\,815.424} \times 100 = 5.385139741$$

A percentage decrease of 5.4% to 1d.p.

Q2) The Great Pyramid is a square-based pyramid. Calculate the diagonal of its base, giving your answer correct to one decimal place.

√53 084.16 = 230.4

$230.4^2 + 230.4^2 = 106\,168.32$

√106 168.32 = 325.8m to 1d.p.

Q3) Approximately 2 300 000 blocks were used to build the Great Pyramid. Each block weighed approximately 2.3 metric tonnes. There are 1000kg in a metric tonne. Calculate the approximate density of the original pyramid. Write your answer correct to two decimal places and in standard form.

Hint: be careful with your units!

Mass of 1 block = 2.3 × 1000 = 2300kg

Total mass = 2300 × 2 300 000 = 5 290 000 000 kg

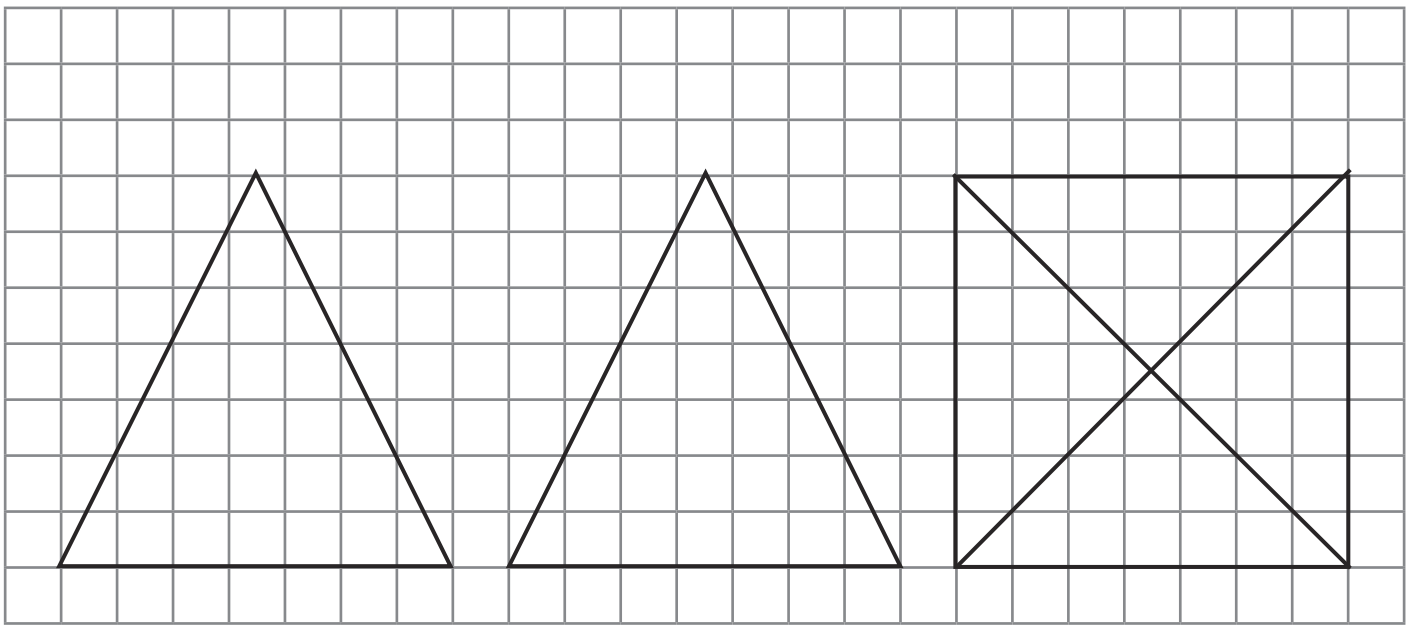
$d = \frac{m}{v}$

$\frac{5\ 290\ 000\ 000}{2\ 595\ 815.424}$ **= 2037.89528kg/m^3**

2.04×10^3kg/m^3

Q4) Draw the front elevation, side elevation and plan of the Great Pyramid.

Hint: It is a square-based pyramid.



Extension Answers

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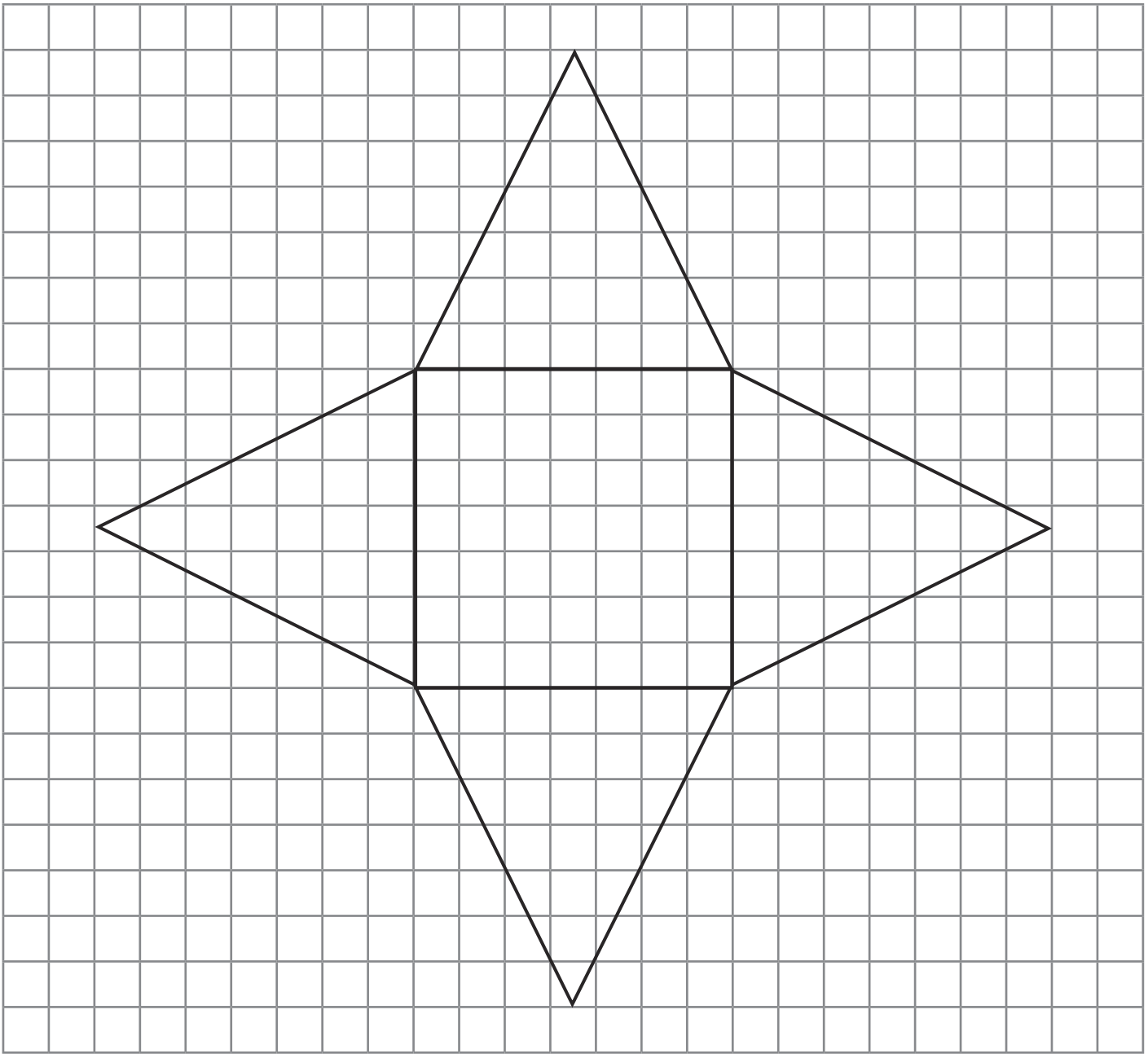

A Step Further

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