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Variation using a Maths GCSE question

Year 11 (Higher)

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Overview

This document contains…

A set of connected questions that link to a past GCSE question

Points to consider when using this resource

Each variation of the exam question should be considered as part of a learning journey. Teachers may wish to consider models and images to support students to access the problems.

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Year 11 H: variation: Edexcel 2018 P3 Q13

Similar shapes

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Prior knowledge to review

- Multiplication strategies
- Surds
- Length , area and volume scale factors
- Surface area
- Volume

A

B

Here are two similar solid shapes

height of shape **A** : height of shape **B** = 2 : 1

The surface area of shape **B** is 20 cm^2

Work out the surface area of shape **A**

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Solution

A

B

Here are two similar solid shapes

height of shape **A** : height of shape **B** = 2 : 1

The surface area of shape **B** is 20 cm^2

Work out the surface area of shape **A**

Linear scale factor = 2 : 1
Area scale factor = $2^2 : 1^2 = 4 : 1$
Surface area A:B = 80 : 20

The surface area of shape **A** is 80 cm^2

A

B

Here are two similar solid shapes

surface area of shape **A** : surface area of shape **B** = 1 : 16

The height of shape **B** is 20 cm

Work out the height of shape **A**

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Solution

A

B

Here are two similar solid shapes

surface area of shape **A** : surface area of shape **B** = 1 : 16

The height of shape **B** is 20 cm

Work out the height of shape **A**

Area scale factor = 1 : 16 = $1^2 : 4^2$
Linear scale factor = 1 : 4
Height A:B = 5 : 20

The height of shape **A** is 5 cm

Here are two similar solid shapes

width of shape **A** : width of shape **B** = 3: 4

The volume of shape **B** is 32 cm^3

Work out the volume of shape **A**

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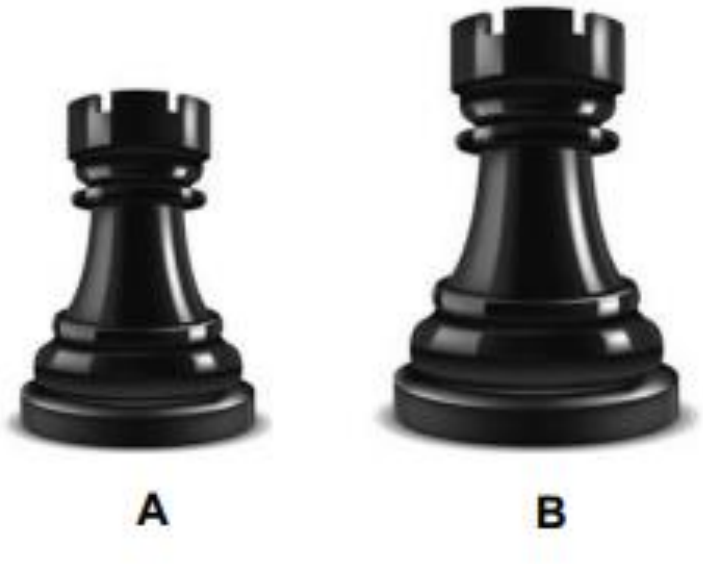
Solution



Here are two similar solid shapes

width of shape **A** : width of shape **B** = 3: 4

The volume of shape **B** is 32 cm^3

Work out the volume of shape **A**

Linear scale factor = 3 : 4

Volume scale factor = $3^3 : 4^3 = 27 : 64$

Volume A : Volume B = 13.5 : 32

The volume of shape **A** is 13.5 cm^3

A

B

Here are two similar solid shapes

surface area of shape **A** : surface of shape **B** = 16 : 9

The volume of shape **B** is 5.4 cm^3

Work out the volume of shape **A**

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Solution

A

B

Here are two similar solid shapes

surface area of shape **A** : surface of shape **B** = 16 : 9

The volume of shape **B** is 5.4 cm^3

Work out the volume of shape **A**

Area scale factor A : B = 16 : 9

Linear scale factor A :B = $\sqrt{16}$: $\sqrt{9}$ = 4 : 3

Volume scale factor A:B = $4^3 : 3^3$ = 64: 27

27 ÷ 5.4 = 5

So volume of **A** is 64 ÷ 5 = 12.8 cm^3

A

B

Here are two similar solid shapes

surface area of shape **A** : surface of shape **B** = 7 : 1

The volume of shape **B** is 15 cm^3

Work out the volume of shape **A**

Give your answer to 3 significant figures

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Solution

A

B

Here are two similar solid shapes

surface area of shape **A** : surface of shape **B** = 7 : 1

The volume of shape **B** is 15 cm^3

Work out the volume of shape **A**

Give your answer to 3 significant figures

Area scale factor A : B = 7 : 1

Linear scale factor A :B = $\sqrt{7}$: $\sqrt{1}$

Volume scale factor A:B = $(\sqrt{7})^3 : (\sqrt{1})^3 = 7\sqrt{7} : 1$

(Vol) A : (Vol) B = $7\sqrt{7} : 1 = (15 \times 7\sqrt{7}) : (15 \times 1)$

So $7\sqrt{7} \times 15 = 277.80388\ldots. = 278\ cm^3$ to 3 sig figs

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Edexcel : H : 2018: P3: Q13 (3 marks)

Here are two similar solid shapes.

surface area of shape **A** : surface area of shape **B** = 3 : 4

The volume of shape **B** is 10 cm^3

Work out the volume of shape **A**.
Give your answer correct to 3 significant figures.

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Edexcel : H : 2018: P3: Q13 (3 marks)

Solution

Here are two similar solid shapes.

surface area of shape **A** : surface area of shape **B** = 3 : 4

The volume of shape **B** is 10 cm³

Work out the volume of shape **A**.
Give your answer correct to 3 significant figures.

Area scale factor A :B = 3 : 4

Linear scale factor A :B = $\sqrt{3}$: $\sqrt{4}$

Volume scale factor A:B = $(\sqrt{3})^3 : (\sqrt{4})^3 = 3\sqrt{3} : 8$

Since 8 x 1.25 = 10 (volume of B is 10cm³)

Then $3\sqrt{3}$ x 1.25 = 6.49519.... = 6.50 cm³ to 3 sig figs

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For further details on the full range of services available please contact us using the following email:

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