Similar 3D Shapes

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(1) Explain the difference between the words 'similar' and 'congruent' in maths.

(2) True or false? When a shape is enlarged to give a similar shape, the angles also increase in size.

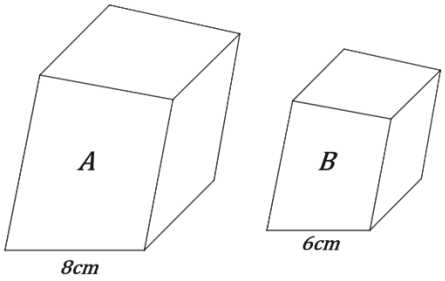
(3) Complete the table below using the 'LAV' method for scale factors for a,b,c and d.

	(a)	(b)	(c)	(d)
L	2		1.25	
A		9		
V				125

(4) The ratio of the side lengths of two mathematically similar solids is $1:2$. Explain why the area scale factor is $1:4$ and the volume SF is $1:8$

(5) The area scale factor of two similar 3D shapes is $16:25$. Find the ratios of linear and volume scale factors of the shapes.

(6) The diagram shows two similar 'wonky prisms' below.

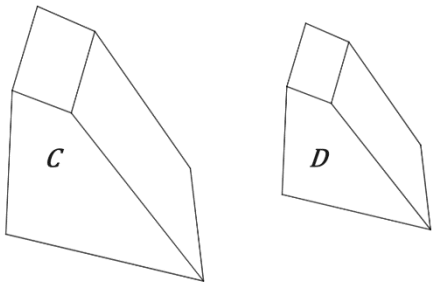


A table with LAV has been completed for you for $\boldsymbol{A}$ **to** $\boldsymbol{B}$**.**

L	0.75
A	0.75^2
V	0.75^3

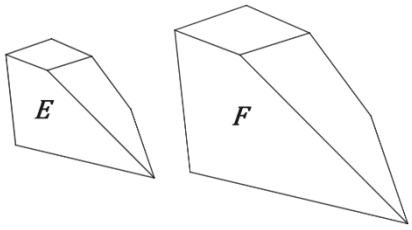
The surface area of A is $300cm^2$.
The volume of B is $80cm^3$.
(a) Find the volume of A
(b) Find the surface area of B

(7) C and D shown below are mathematically similar solids.



The height of C is $20cm$.
The height of D is $16cm$.
The volume of C is $120cm^3$
The area of D is $40cm^2$.
(a) Find the volume of D.
(b) Find the area of C.

(8) Solids D and E are mathematically similar.

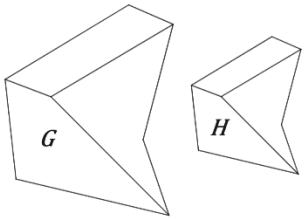


E has area $30mm^2$.
F has area $67.5mm^2$.
Complete the table below using this information.

Shape	Height	Area	Volume
E	$3mm$		
F			$50mm^3$

(9) The volume scale factor of two similar shapes is in the ratio $8:125$.
(a) Find the length scale factor as a ratio.
(b) Find the area scale factor as a ratio.

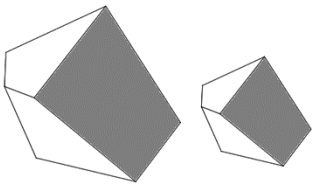
(10) Two similar GOLD solids G and H are shown below.



Gold costs $£20/cm^3$.
The height of the G is one and a half times that of H.
The cost to make H is $£640$.
Find the cost to make G.

(11) Two similar tanks are filled with water at a rate of $2m^3/s$. One tank is $12m$ long and the other $20m$ long. The smaller tank takes 15 minutes to fill. Find the time taken for the larger tank to fill in minutes and seconds.

(12) The similar solids show below have volumes of $800cm^3$ and $\frac{6400}{27}cm^3$ respectively.



One face of each solid is painted. The face of the larger solid cost $£3.50$ to paint. What is the cost of painting the face of the smaller solid?

(13) The ratio of the volume of similar solids A and B is such that $A:B$ is $8p^4q^{10}:1000pq^{19}$.
Find a simplified expression
(a) For the linear ratio.
(b) For the area ratio.