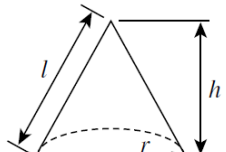
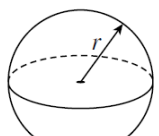
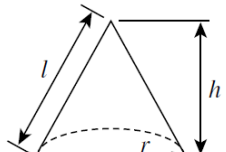
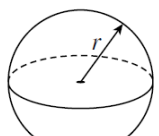
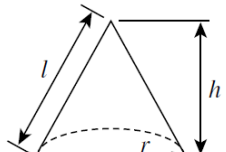
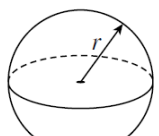
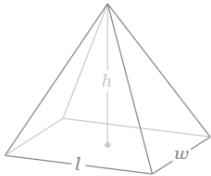
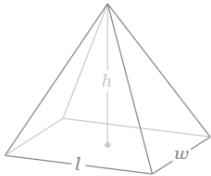
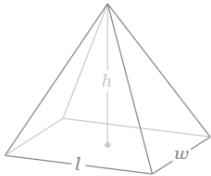


Guidance for tutors

Outcome	SLAV8	Student can consistently:	Find the surface area and volume of cones, spheres and pyramids.				
How the topic is examined	<ul style="list-style-type: none">Examinated through test paper questions.Questions are equally likely to appear on calculator and non-calculator papers.If a question appears on a non-calculator paper students may be expected to leave their answer in terms of π.Students could be asked to find:<ul style="list-style-type: none">The volume or surface area of a cone, sphere or pyramid.The volume of a compound solid made up of these shapes and those in SLAV5.A length of a cone, sphere or pyramid given information about the volume or surface area.Where students are required to find the volume or surface area of a cone, sphere or pyramid students will be provided with the formulae in the question.						
Prior knowledge	<ul style="list-style-type: none">Students should be confident with:<ul style="list-style-type: none">Four rules with fractions (NF1)Finding volume of shapes (SLAV5)Substituting into formulae (AEx8)Rearranging questions (AEx5)In addition questions involving this topic can have links to:<ul style="list-style-type: none">Pythagoras' theorem (SPT1)Trigonometry (SPT2 &3)						
Suggested tuition approaches	<ul style="list-style-type: none">Students should be able to use the following formulae to find the volume and surface area of cones, spheres and pyramids. <table><tr><th>Cone</th><th>Sphere</th></tr><tr><td><p>Volume = $\frac{1}{3}\pi r^2 h$</p><p>Curved surface area = $\pi r l$</p></td><td><p>Volume = $\frac{4}{3}\pi r^3$</p><p>Surface area = $4\pi r^2$</p></td></tr></table>			Cone	Sphere	<p>Volume = $\frac{1}{3}\pi r^2 h$</p> <p>Curved surface area = $\pi r l$</p> 	<p>Volume = $\frac{4}{3}\pi r^3$</p> <p>Surface area = $4\pi r^2$</p> 
Cone	Sphere						
<p>Volume = $\frac{1}{3}\pi r^2 h$</p> <p>Curved surface area = $\pi r l$</p> 	<p>Volume = $\frac{4}{3}\pi r^3$</p> <p>Surface area = $4\pi r^2$</p> 						

Guidance for tutors

	<table border="1"> <tr> <td></td><td></td></tr> <tr> <td colspan="2">Pyramid</td></tr> <tr> <td> <p>Volume = $\frac{1}{3}lwh$</p> <p>Surface area = $lw + l\sqrt{\left(\frac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\frac{l}{2}\right)^2 + h^2}$</p> </td><td>  </td></tr> </table> <ul style="list-style-type: none"> Students should be able to use these formulae with and without a calculator. Try to give answers in terms of π. If students are working with decimals try to avoid them rounding prematurely. Students should be able to rearrange the formulae to find a particular length if the volume or surface area is given. In a cone you can work out l, r or h as long as you know two of the values. This is done by using Pythagoras' theorem. 			Pyramid		<p>Volume = $\frac{1}{3}lwh$</p> <p>Surface area = $lw + l\sqrt{\left(\frac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\frac{l}{2}\right)^2 + h^2}$</p>	
Pyramid							
<p>Volume = $\frac{1}{3}lwh$</p> <p>Surface area = $lw + l\sqrt{\left(\frac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\frac{l}{2}\right)^2 + h^2}$</p>							
Common errors and misconceptions	<ul style="list-style-type: none"> Errors are made when using these formulae without a calculator, particularly when simplifying the final answer. Students forget to put units – particularly when answers are given in terms of π One mark is given for 'stating the units' of an answer – many students lose the mark because they forget to or state the wrong units. Students miss that they have to use Pythagoras' theorem in the cone to find a missing length. 						
Suggested resources	<ul style="list-style-type: none"> Questions <ul style="list-style-type: none"> http://www.cimt.org.uk/mepjamaica/unit14/StudentText.pdf (pp 11 - 14) https://corbettmaths.files.wordpress.com/2013/02/surface-area-sphere-pdf.pdf (SA sphere) https://corbettmaths.files.wordpress.com/2013/02/surface-area-of-a-cone-pdf.pdf (SA cone) https://corbettmaths.files.wordpress.com/2013/02/volume-of-a-cone-pdf.pdf (Volume cone) https://corbettmaths.files.wordpress.com/2013/02/volume-of-a-pyramid-pdf.pdf (Volume pyramid) https://corbettmaths.files.wordpress.com/2013/02/volume-of-a-sphere-exercise-361-pdf.pdf (Volume sphere) Past GCSE Questions <ul style="list-style-type: none"> https://keshgcsemaths.files.wordpress.com/2013/11/106_spheres-and-cones.pdf 						

Guidance for tutors

- Video tutorial
 - <http://corbettmaths.com/2013/03/03/volume-of-a-cone/>
 - <http://corbettmaths.com/2013/03/05/volume-of-a-pyramid/>
 - <http://corbettmaths.com/2013/03/03/volume-of-a-sphere/>