Form Three Mathematics Test (2023–2024)

Ch.7 Areas and Volumes (III) Solutions

Class: F . 3 ( )

Name: _____ ( )

Time Allowed: 25 minutes

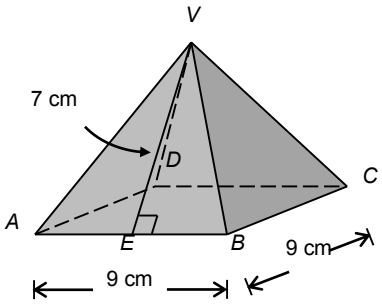
Date: 15/12/2023

Mark	**/31**	**Class Average**	
Parent's Signature:			

Unless specified, the figures are not necessary drawn to scale.

Section A: Multiple Choice (10 marks)

1. In the figure, *VABCD* is a regular pyramid. *ABCD* is a square of side 9 cm. The height *VE* of $\triangle VAB$ is 7 cm. Find the total surface area of the pyramid.

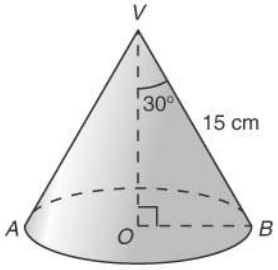


A. 126 cm^2
B. 207 cm^2
C. 252 cm^2
D. 351 cm^2

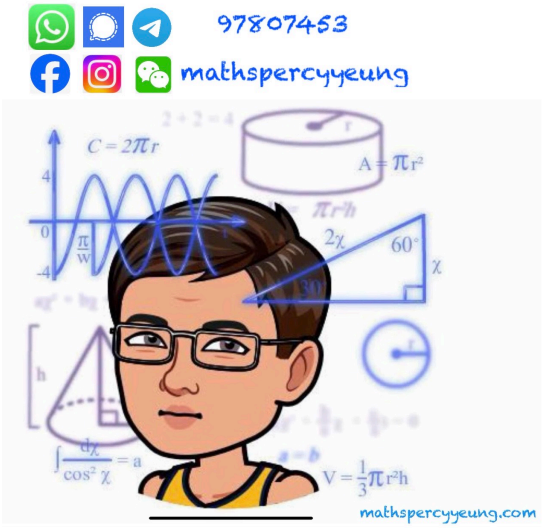
2. If the base radius of a right circular cone is increased by 10% and the height of the cone is increased by 20%, find the percentage increase in the volume of the cone.

A. 30%
B. 32%
C. 40%
D. 45.2%

3. The figure shows a right circular cone *VAB* with slant height 15 cm and $\angle OVB = 30°$. If the cone is cut along *BV* to form a sector, find the angle of the sector.

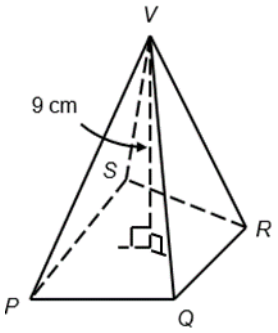
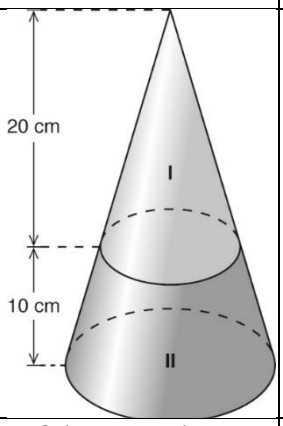
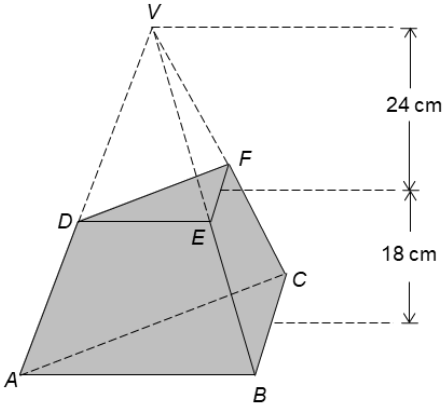
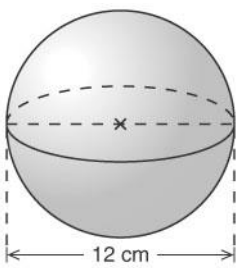


A. 108°
B. 120°
C. 150°
D. 180°



Section B: Short Questions (6 marks)

No steps are required in this section.

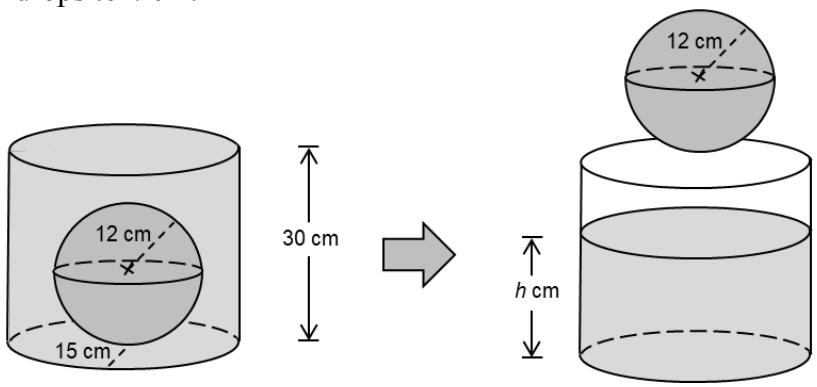
	Question	Answer
1.	In the figure, the base area of pyramid *VPQRS* is 36 cm^2. If the height of the pyramid is 9 cm, find the volume of the pyramid. 	
2.	Write down the ratios of the followings. (a) Volume of smaller cone (I) : Volume of the larger cone (I&II) (b) Volume of the smaller cone (I) : Volume of the frustum (II) (c) Curved surface are of the smaller cone (I): Curved surface area of the frustum (II) 	
3.	The slant height of a right circular cone is 33 cm. If the curved surface area of the cone is 198π cm^2, find its base radius.	
4.	The figure shows a frustum *ABCFDE*. The upper base and the lower base of the frustum are triangles of areas 160 cm^2 and 490 cm^2 respectively. The height of pyramid *VDEF* is 24 cm and the height of the frustum is 18 cm. Find the volume of the frustum. 	
5.	The figure shows a sphere.  (a) Find the volume of the sphere. (b) Find the surface area of the sphere.	

Section C: Long Questions (17 marks)

6. If 2 solid metal right circular cones with base radius 22 cm and height 6 cm are melted and recast into a solid sphere, find the radius of the sphere.

(4 marks)

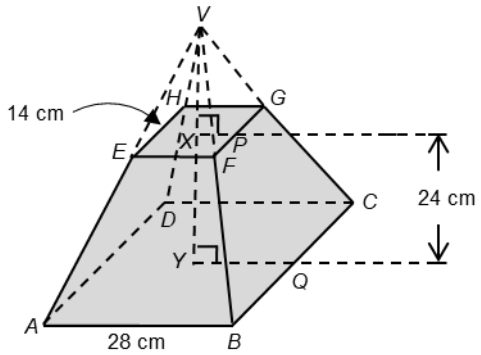
7. A solid sphere of radius 12 cm is put into a right circular cylindrical vessel of base radius 15 cm and height 30 cm. Water is then poured into the vessel until it is filled up. Then the sphere is taken away and the depth of water drops to h cm.



(a) Find the volume of the sphere in terms of π.

(b) Find the value of h. (4 marks)

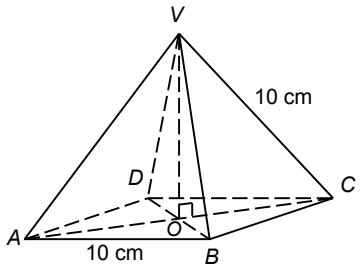
8. The figure shows a frustum *ABCDHEFG*. Both the upper base and the lower base of the frustum are squares. *VX* and *VY* are the heights of pyramids *VEFGH* and *VABCD* respectively. *P* and *Q* are the mid-points of *FG* and *BC* respectively.



(a) Find the height of pyramid *VEFGH*.
(b) Find the volume of the frustum.

(4 marks)

9. The figure shows a regular pyramid *VABCD* with a square base *ABCD*.



(a) Find the height *VO* of the pyramid.
(b) Find the volume of the pyramid. (5 marks)

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