

TB(2B) Ch. 11 Areas & Volumes (II) Conventional Questions

1. [13-14 Final Exam #11]

Four identical metal cylinders of base radii 2 cm and height h cm are melted and recast into a new cylinder of the same height.

- (a) Find the volume of the new cylinder in terms of π and h . (1 mark)
- (b) Peter claims that the total surface area of the new cylinder is larger than that of the original four metal cylinders. Do you agree? Explain your answer. (3 marks)

2. [13-14 Final Exam #12]

In **Figure 4**, sector AOB with radius 1 cm and sector COD with radius 2 cm have a common centre O . AOD and OBC are straight lines. If the perimeter of sector AOB is equal to that of sector COD , find θ . (3 marks)

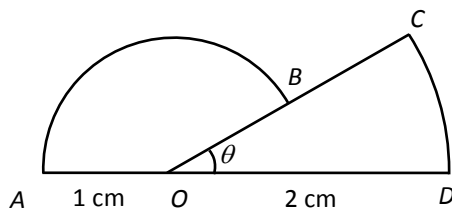


Figure 4

3. [13-14 Final Exam #13]

In **Figure 5(a)**, rectangle $ABCD$ with dimensions a cm \times b cm is inscribed in a circle with diameter d cm. In **Figure 5(b)**, four semi-circles are then constructed with their diameters to be each of the four sides of the rectangle. Show that the total area of the shaded regions is ab cm². (4 marks)

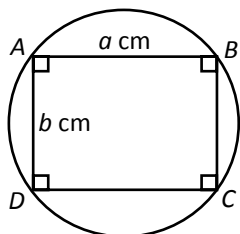


Figure 5(a)

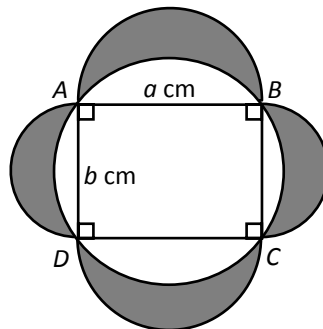


Figure 5(b)

4. [14-15 Final Exam #14]

In **Figure 5**, the sector OAD is cut from the sector OBC . It is given that $\angle BOC = 120^\circ$, $OD = 2r$ cm, $DC = r$ cm and the perimeter of shaded region $ABCD$ is $(6 + 10\pi)$ cm. Find the area of the shaded region $ABCD$. (3 marks)

(Give the answer in terms of π .)

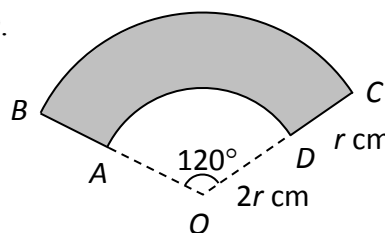


Figure 5

5. [15-16 Final Exam #8]

It is given that a cylindrical tank of base diameter 8 cm and height 20 cm contains some water.

- (a) Find the curved surface area of the tank. (2 marks)
- (b) If the volume of water in the tank is $240\pi \text{ cm}^3$, find the height of the water level. (2 marks)
- (c) Write down the percentage increase of the capacity of the tank if the base diameter and the height are both increased by 10%. (1 mark)

6. [15-16 Final Exam #15]

Figure 7 shows a metallic prism. It has a cross-section of a sector with radius r and height h .

The angle subtended by the arc of the sector is 60° . There is a cylinder with same radius and of height k . It is given that the total surface areas of the prism and the cylinder are the same. Janice claims that k is less than half of h . Do you agree? Explain your answer. (3 marks)

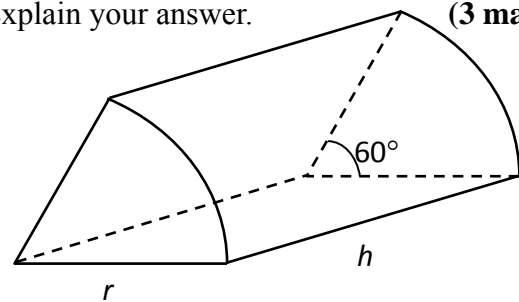


Figure 7

7. [16-17 Final Exam #12]

Figure 4 shows a slice of a cake in shape of a prism with sector OAB as its uniform cross-section. It is known that the angle at centre O is 45° and the radius of the sector is 8 cm. If the volume of the cake is $80\pi \text{ cm}^3$,

- (a) find the height of the cake. (2 marks)
- (b) The slice of the cake is then cut into two equal parts such that the angle at centre of each section becomes 22.5° . Find the total surface area of the two smaller slices of the cake, including their bases. (2 marks)

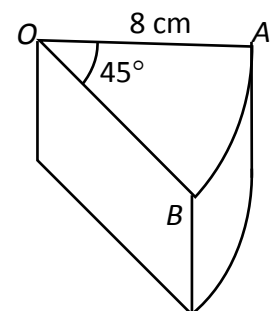


Figure 4

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