

TB(1B) Ch. 8 Areas and Volumes (I) Conventional Questions

1. [11-12 Standardized Test 2 Q4]

In **Figure 3**, $AC = 6$ cm, $BC = 3$ cm, $CD = 8$ cm, $IJ = 1$ cm and $JD = 3$ cm. AGD and IJD are straight lines. $CDEF$ is a parallelogram. $AC \perp BD$, $ID \perp BD$ and $GJ \perp ID$. Find the area of polygon $ABDEFG$. (4 marks)

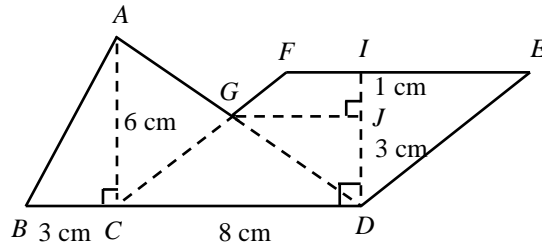


Figure 3

2. [11-12 Standardized Test 2 Q8]

Figure 6 shows a right prism with volume 357 cm^3 and total surface area 410 cm^2 .

- (a) Find its base area.
- (b) Find the value of y .

(2 marks)
(3 marks)

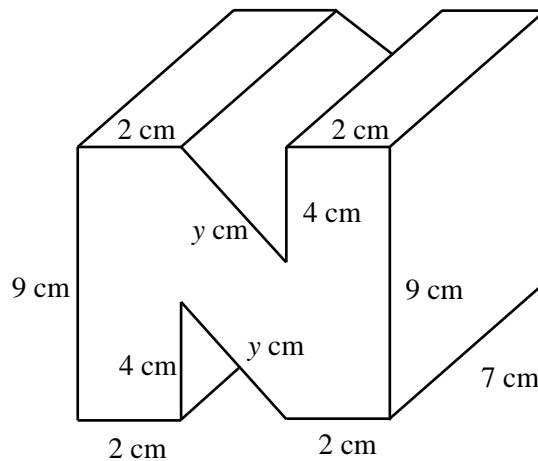


Figure 6

3. [11-12 Final Exam Q7]

(a) **Figure 3(a)** shows pentagon $ABFED$ which is divided by GF into two trapeziums $ABFG$ and $GFED$. GF intersects HC at I . If $\angle A = \angle AGF = \angle D = 90^\circ$, $AH = 12$ cm, $HB = 8$ cm, $AG = GD = 10$ cm, $DC = 13$ cm, $CE = 12$ cm and $GF = 18$ cm, find the area of the pentagon $HCEFB$. (3 marks)

(b) If pentagon $HCEFB$ is the base of a prism with a length of 20 cm as shown in **Figure 3(b)**, find the volume of the prism. (2 marks)

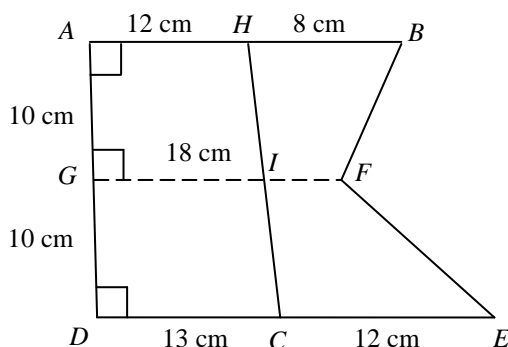


Figure 3(a)

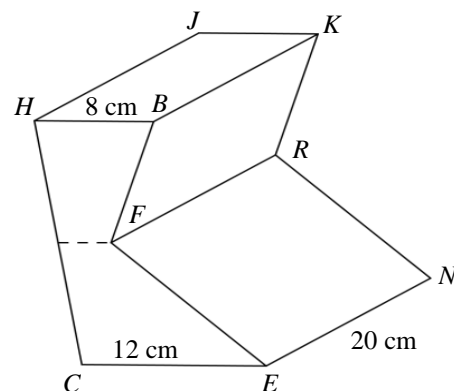
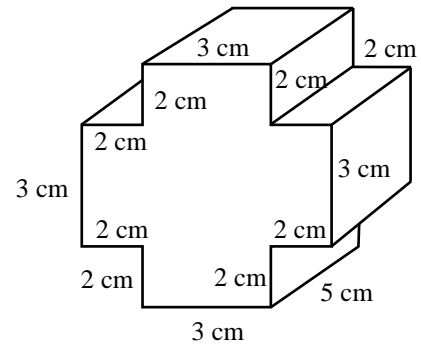


Figure 3(b)

4. [12-13 Standardized Test 2 Q2]



Figure

(b) Find the volume of the prism.

(2 marks)

5. [12-13 Standardized Test 2 Q7]

Figure 5a shows a rectangular open tank with an outer dimension of 20 m × 10 m × 10 m and the thickness of the wall is 1 m.

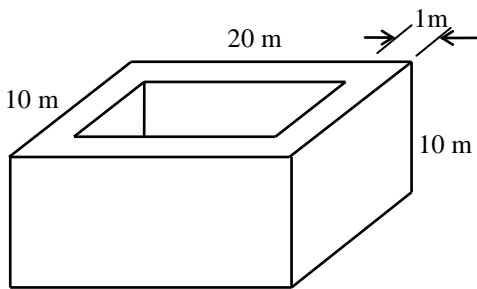


Figure 5a

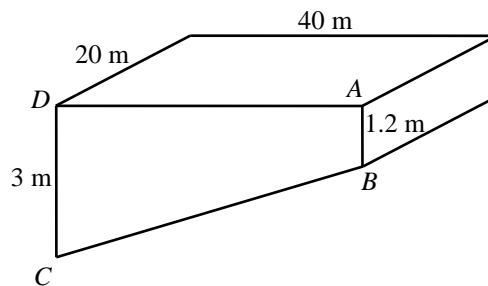


Figure 5b

(a) If the tank is fully-filled with water, find the volume of water.

(2 marks)

(b) If the water in the tank is all pumped to the swimming pool shown in Figure 5b in which trapezium ABCD is a uniform cross-section, find the depth of water measured along AB.

(3 marks)

6. [12-13 Final Exam Q11]

Figure 4a shows a container in the shape of a right prism with water inside. Figure 4b shows the same container put in an upright position. Find

(a) the volume of water in the container;

(3 marks)

(b) the height of water in the container in Figure 4b.

(2 marks)

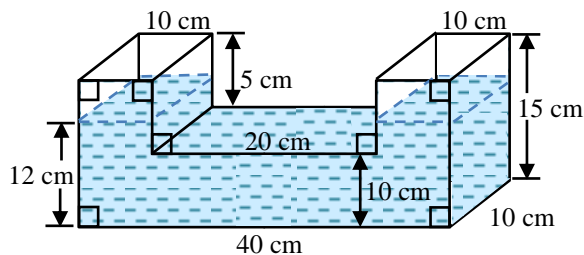


Figure 4a

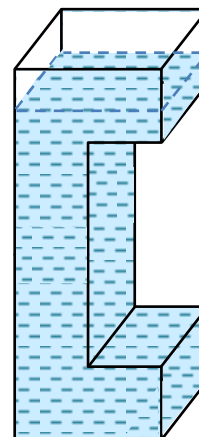


Figure 4b

7. [13-14 Standardized Test 2 Q2]

Find the total surface area of the right prism shown in

Figure 1. (2 marks)

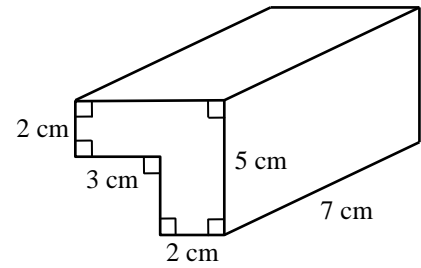


Figure 1

8. [13-14 Standardized Test 2 Q7]

Figure 6(a) shows a closed rectangular tank $ABCDHEFG$ of length 3 m, width 3 m and height 4 m. The tank is halfly filled with water.

(a) Find the volume of water in the tank. (1 mark)

(b) The tank is tilted and placed with edge AD on the table as shown in **Figure 6(b)**. If the deepest water level in the tank is 2.4 m, find the area of the water surface $BCHE$. (3 marks)

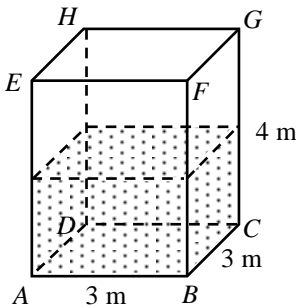


Figure 6(a)

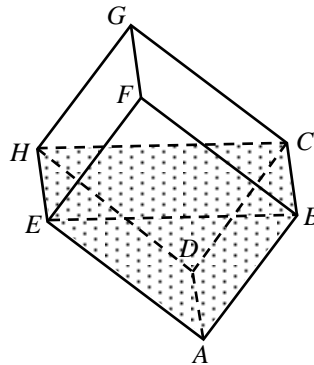


Figure 6(b)

9. [13-14 Final Exam Q10]

The hollow cube in **Figure 6** has sides 7 cm. $\triangle ABC$ is a right-angled triangle with $AB = 3$ cm, $BC = 4$ cm and $AC = 5$ cm. Find

(a) the volume of the hollow cube; (2 marks)

(b) the total surface area of the hollow cube. (3 marks)

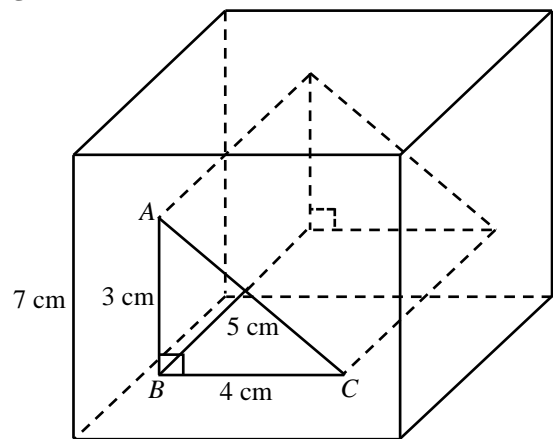


Figure 6

10. [14-15 Mid-Year Exam Q9]

Figure 1 shows a metallic trapezoidal prism with $AB = 3$ cm, $BC = 8$ cm, $DC = 6$ cm and $AE = 4$ cm.

(a) Find the area of triangle ACD . (1 mark)

(b) Find the volume of the prism. (2 marks)

(c) The metallic prism is melted and recast into two identical rectangular prisms, each of length 5 cm and height 6 cm. Find the width of the rectangular prism. (2 marks)

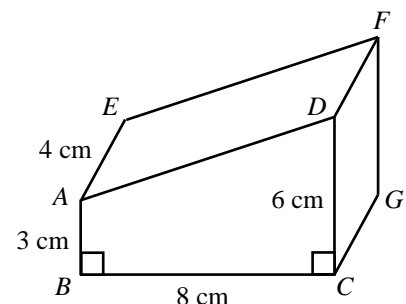


Figure 1

11. [14-15 Mid-Year Exam Q12]

The base area, the total surface area and the volume of a triangular prism are 24 cm^2 , 168 cm^2 and 120 cm^3 respectively.

- (a) Find the height of the prism. (2 marks)
- (b) The lengths of three sides of the triangular base are three consecutive even numbers. Find the length of the longest side. (2 marks)

12. [14-15 Final Exam Q9]

In **Figure 4(a)**, prism *A* is melted and recast into prism *B* as shown in **Figure 4(b)**.

- (a) Find the value of h . (2 marks)
- (b) Betty claims that the total surface area of prism *B* is greater than that of prism *A*. Do you agree? Explain briefly. (3 marks)

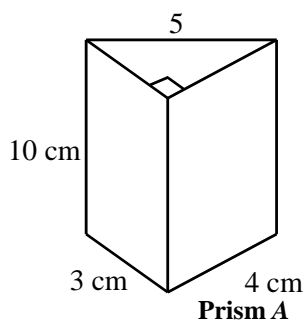


Figure 4(a)

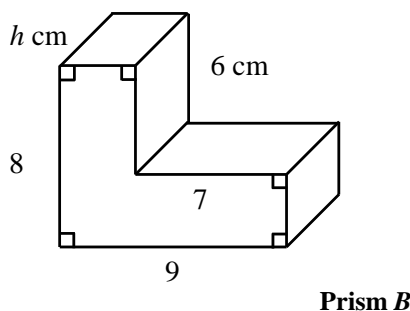


Figure 4(b)

13. [15-16 Mid-year Q10]

A shop has made a metal souvenir in the shape of a rectangular prism as shown in **Figure 2(a)**. All the surfaces of the souvenir will be painted with paints cost \$ 10 per cm^2 .

- (a) Find the cost of painting the souvenir in **Figure 2(a)**. (2 marks)
- (b) The shop used the same volume of metal to make another souvenir in the shape of a prism whose base is a trapezium as shown in **Figure 2(b)**.
 - (i) Find the value of h . (2 marks)
 - (ii) The shopkeeper claims that since both souvenirs have the same volume, the costs of painting both souvenirs are also the same. Do you agree? Explain your answer. (2 marks)

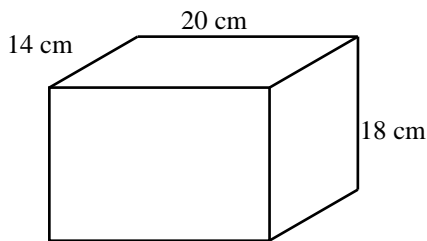


Figure 2(a)

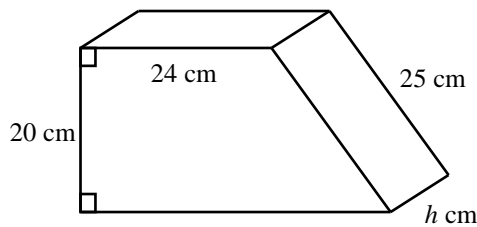


Figure 2(b)

14. [15-16 Mid-year Q13]

Figure 3(a) shows a rectangle $ABCD$ with a parallelogram $EFGH$ cut out.

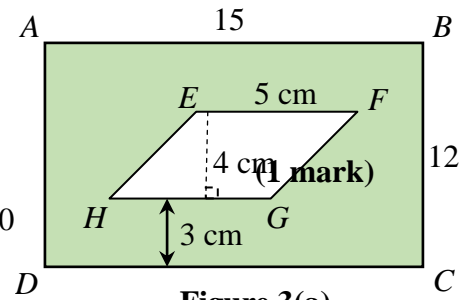


Figure 3(a)

- (a) Find the area of the shaded region in Figure 3(a).
- (b) Figure 3(b) shows a closed rectangular container with $1\,200\text{ cm}^3$ of water inside. A pillar, which is a prism with a parallelogram base, is fixed in the tank

so that the base of the container is the same as that shown in Figure 3(a).

The container is put in an upright position.

The heights of both the container and the pillar are 20 cm.

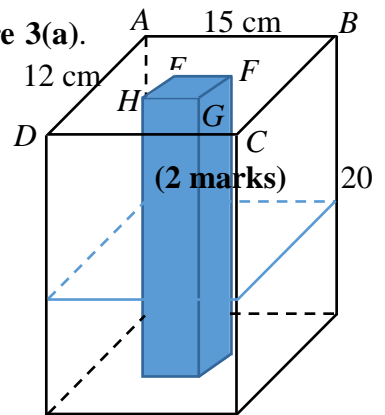


Figure 3(b)

- (i) Find the height of the water level.

- (ii) The container is now placed horizontally with CD on the ground, as shown in Figure 3(c). Find the height of water level.

(2 marks)

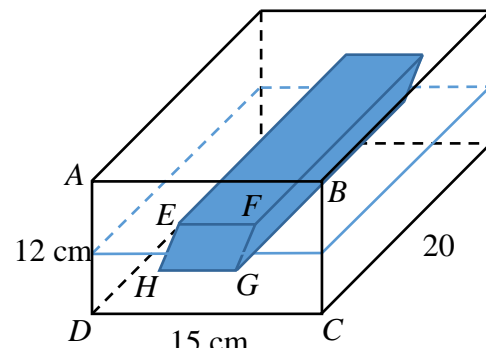


Figure 3(c)

15. [15-16 Final Exam, #11]

Figure 6(a) shows a closed rectangular tank with a square base $ABQP$. Each side of the square base is 12 cm and the height of the tank is 20 cm. The tank contains water of 8 cm in depth.

(a) Find the volume of water in the tank. **(1 mark)**

(b) The tank in **Figure 6(a)** is rotated about BQ as shown in **Figure 6(b)** so that $BCRQ$ becomes the base. Find the depth of water level after rotation. **(2 marks)**

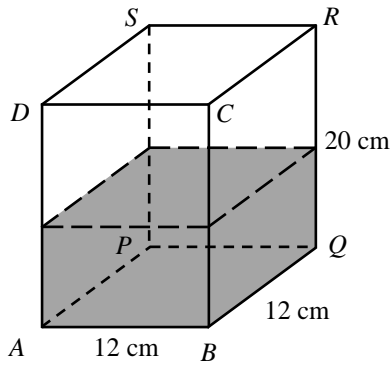


Figure 6(a)

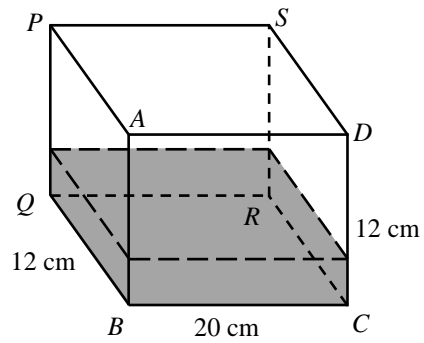


Figure 6(b)

(c) The tank is tilted so that AP remains on the horizontal ground as shown in **Figure 6(c)**. The deepest water level in the tank is 9.6 cm. Find the area of water surface $EBQF$. **(2 marks)**

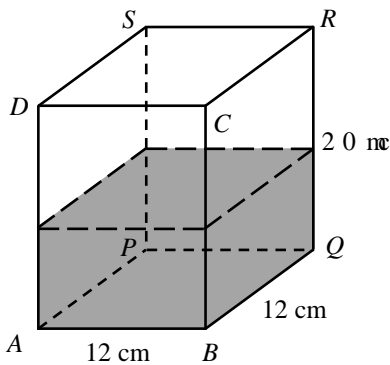


Figure 6(c)

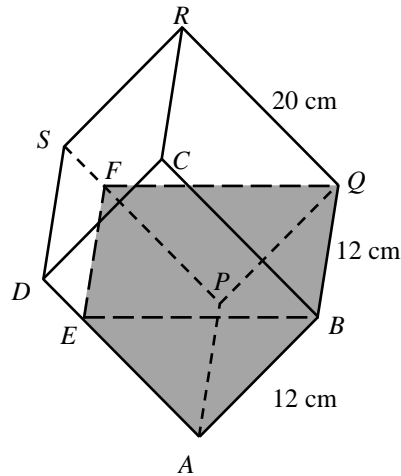


Figure 6(d)

~ End ~