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

1. [13-14 Standardized Test 2 Q2]

Find the total surface area of the right prism shown in **Figure 1**. **(2 marks)**

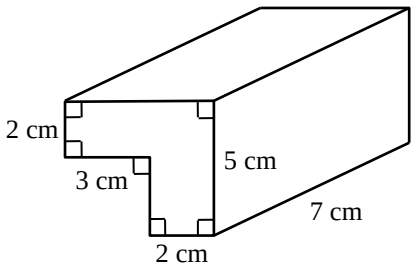


Figure 1

2. [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)**

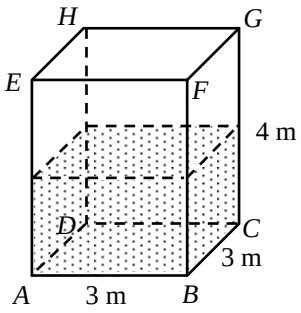


Figure 6(a)

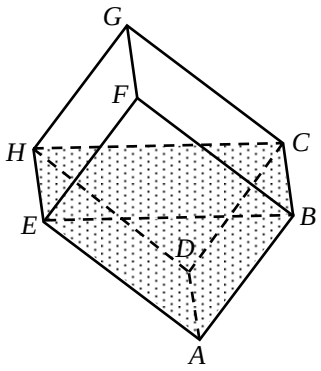


Figure 6(b)

3. [13-14 Final Exam Q10]

The hollow cube in **Figure 6** has sides 7 cm. ΔABC 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)**

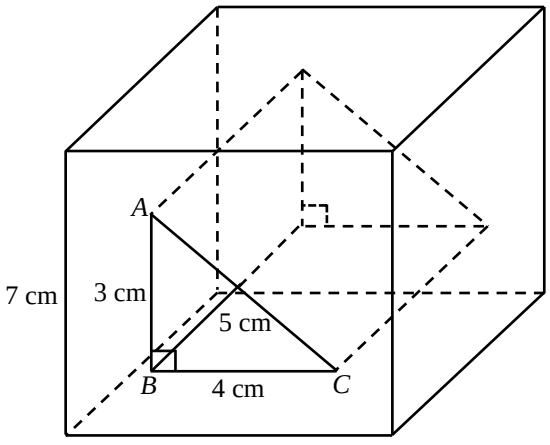


Figure 6

4. [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)**

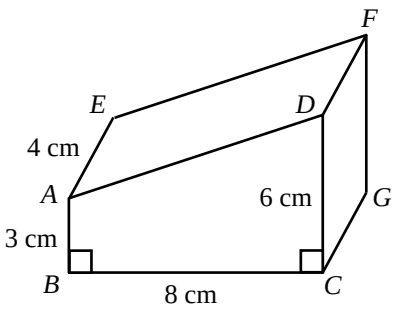


Figure 1

5. [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)**

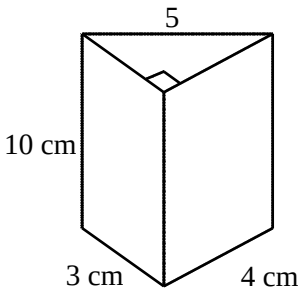
(b) The lengths of three sides of the triangular base are three consecutive even numbers. Find the length of the longest side. **(2 marks)**

6. [14-15 Final Exam Q9]

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

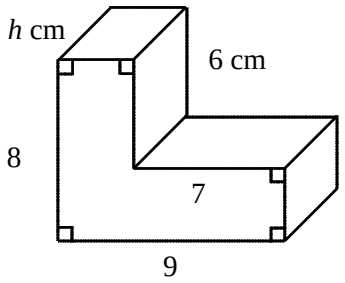
(a) Find the value of h. **(2 marks)**

(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)**



Prism *A*

Figure 4(a)



Prism *B*

Figure 4(b)

7. [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)

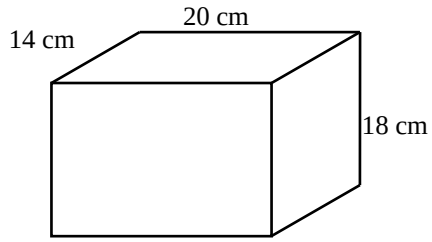


Figure 2(a)

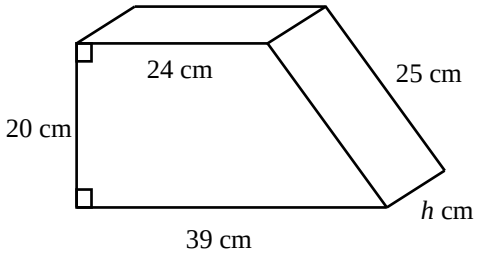


Figure 2(b)

8. [15-16 Mid-year Q13]

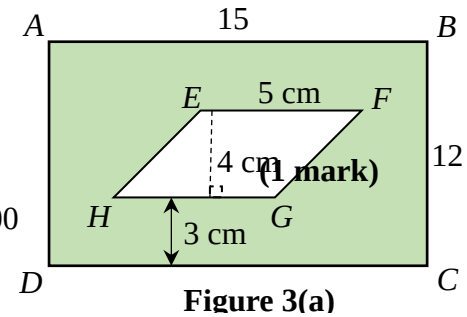


Figure 3(a)

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

(a) Find the area of the shaded region in **Figure 3(a).** **(1 mark)**

(b) **Figure 3(b)** shows a closed rectangular container with 1 200 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.

(i) Find the height of the water level. **(2 marks)**

(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)

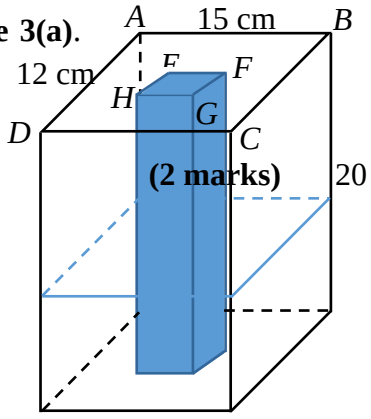


Figure 3(b)

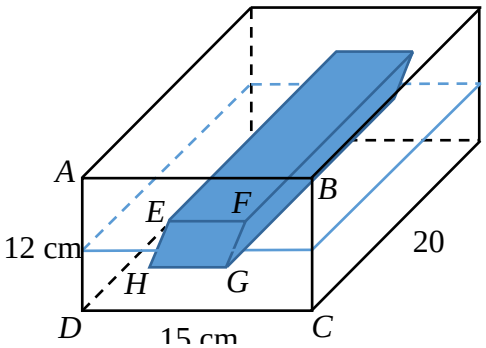


Figure 3(c)

9. [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)**

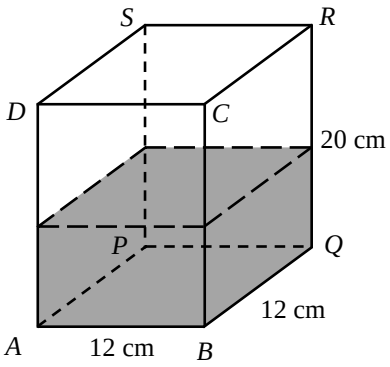


Figure 6(a)

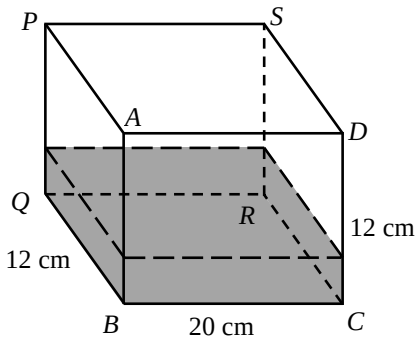


Figure 6(b)

(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)**

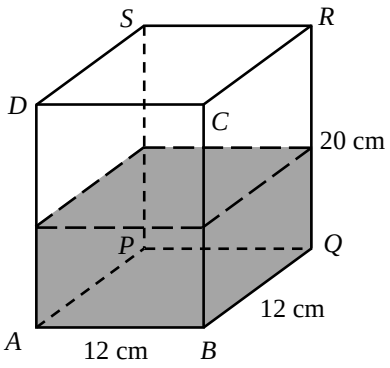


Figure 6(a)

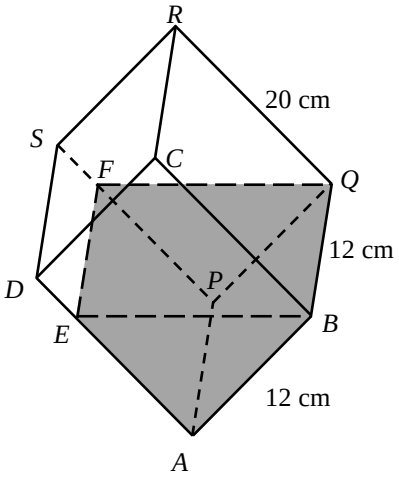


Figure 6(c)

10. [16-17 Mid-year Exam, #11]

Figure 1 shows a rectangular tank measures 15 m by 20 m by 40 m. The tank is filled with some water.

(a) Find the capacity of the tank. **(1 mark)**

(b) When 100 metal cubes with side 3 m are put into the tank and are totally submerged in water, the water level is exactly 40 m without overflow of water. Find the height of the water level before putting 100 metal cubes into the tank. **(2 marks)**

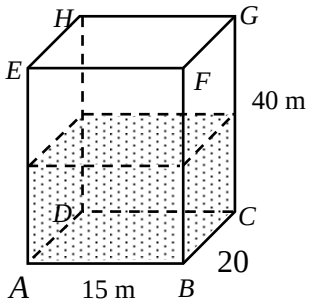


Figure 1

11. [16-17 Mid-year Exam, #12]

Figure 2 shows a prism of height 25 cm and base *ABCDEF*.

AB = *x* cm, *DE* = 6 cm,

EF = 12 cm and *AF* = 12 cm.

(a) Find the perimeter of the base. **(1 mark)**

(b) Express the base area in terms of *x*. **(2 marks)**

(c) If the volume of the prism is 2100 cm^3, find the total surface area of the prism. **(3 marks)**

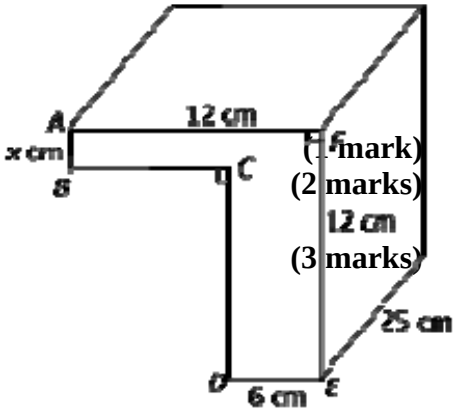


Figure 2

12. [16-17 Final Exam, #9]

Amy wants to design a solid which is in the shape of a right prism as shown in **Figure 2**. The uniform cross-section surface is made up of a trapezium and a square. It is given that the height of the trapezium is *h* cm and the total surface area of the solid is 178 cm^2.

(a) Find the perimeter of the uniform cross-section. **(1 mark)**

(b) Find the volume of the solid. **(3 marks)**

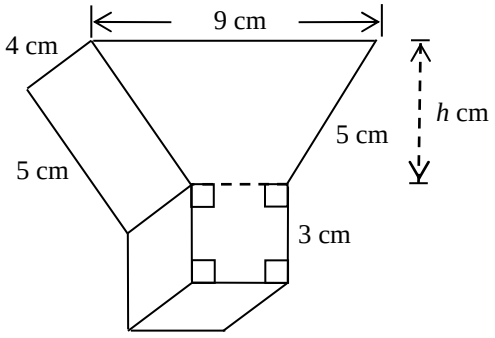


Figure 2

13. [17-18 Standardized Test 2 Q3]

Figure 3 shows two containers, a cuboid and a prism. The base of the prism is a trapezium. It is known that the capacity of the prism is twice the cuboid.

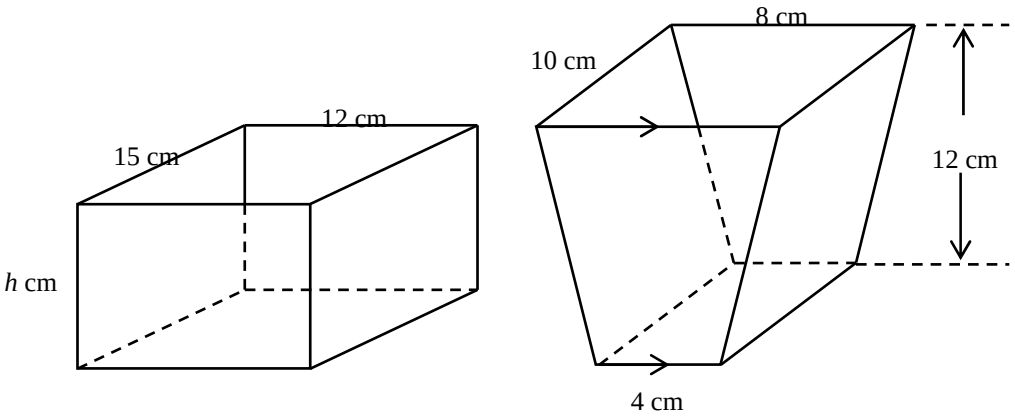


Figure 3

(a) Find the capacity of the prism. **(2 marks)**

(b) Find the value of h. **(2 marks)**

14. [17-18 Final Exam Q12]

In **Figure 8**, a metal solid rectangular block is melted and recast to form a triangular prism.

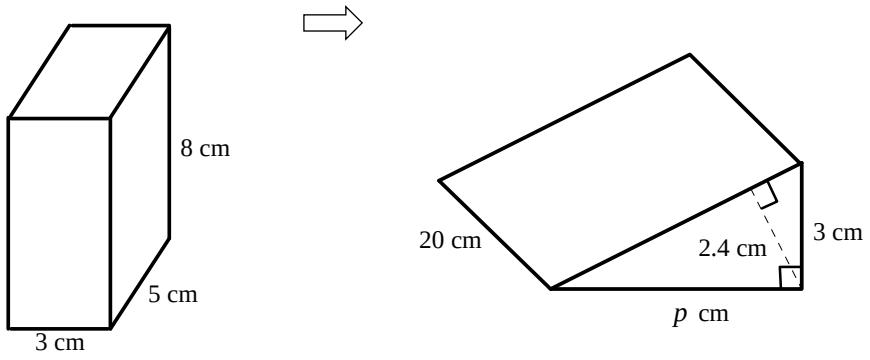


Figure 8

(a) Find the value of p. **(2 marks)**

(b) Find the total surface area of the triangular prism. **(3 marks)**

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