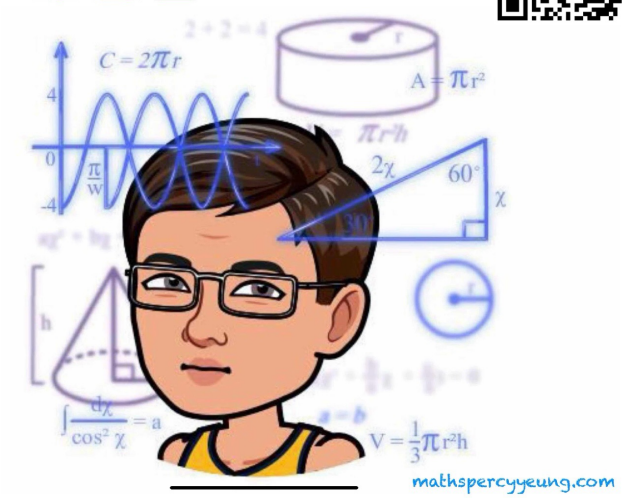


S1

Mathematics

Past Exam Paper (1314–2223)

Question Book

Ch9 Area & Volume (I)

UCCKE F1 Ch9 Area and Volume (I)

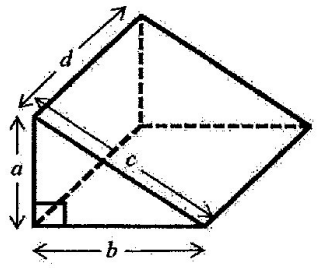
Name: _____

Class & Number: _____( )

Ch9 Area & Volume (I)

[1314 S.1 2nd Exam MC Q4]

1. The figure below shows a prism. Which of the following expressions represents the total surface area of the prism?



A. $\frac{abd}{2}$

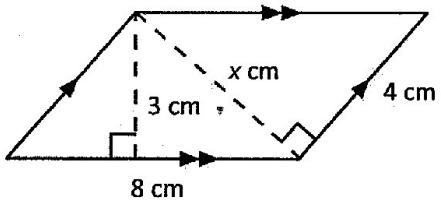
B. abd

C. $ab+3cd$

D. $(a+b+c)d+ab$

[1314 S.1 2nd Exam SQ Q1]

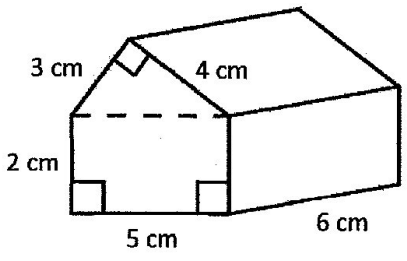
2. The figure shows a parallelogram. Find the value of x.



(2 marks)

[1314 S.1 2nd Exam SQ Q2]

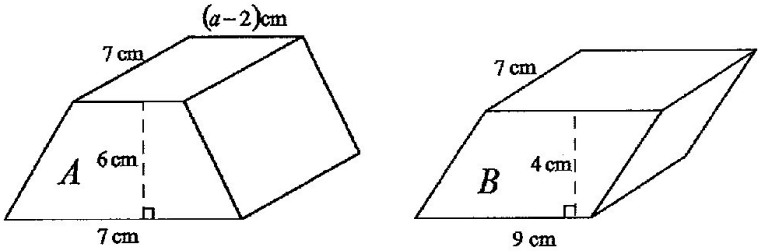
3. Find the volume of the following prism.



(2 marks)

[1314 S.1 2nd Exam Enhanced Question Q5]

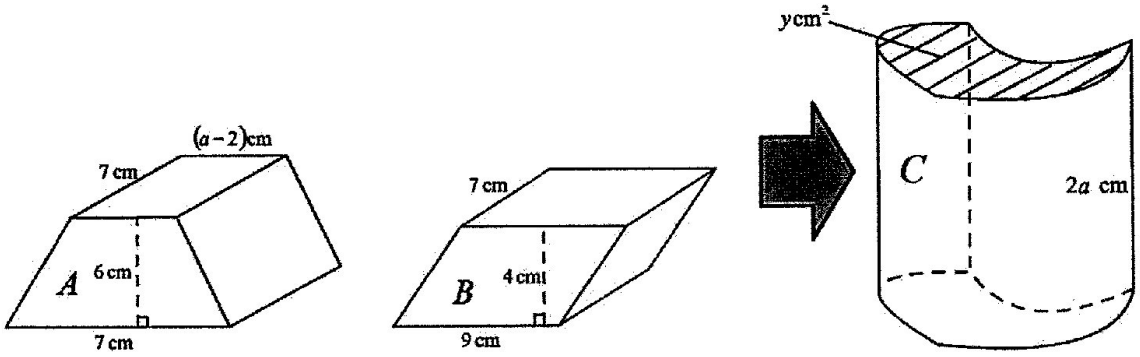
4. There are two prisms A and B as shown below.



(a) Find the volume of the prisms A in terms of a. (3 marks)

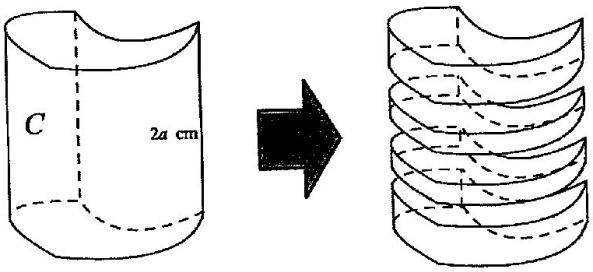
(b) If the volume of the prisms A and B are the same, find the value of a. (3 marks)

(c)



If the prisms A and B are melted together and recast to form prism C as shown in the figure above. The base of C is an irregular shape with area y cm^2 and the height of C is $2a$ cm. (where a is the value found in (b)). Find the value of y. (2 marks)

(d)

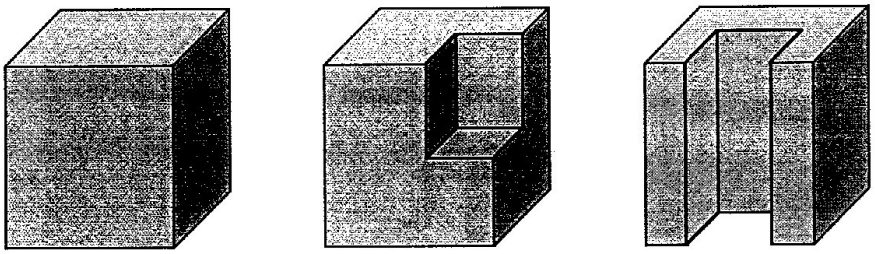


If prism C is cut into **FOUR** slices horizontally with the same base area but unequal heights, find the increase in the total surface area.

(2 marks)

[1415 S.1 2nd Exam MC Q1]

5. Figure 1 shows three solids. Solid P is a cuboid. Solids Q and R are formed by removing different cuboids from solid P.



P Q R

Figure 1

Which of the following is/are true?

I. Solid P has the largest volume.

II. Solids P and Q have the same total surface area.

III. The three solids have the same total surface area.

A. I only
B. II only
C. I and II only
D. I, II and III

[1415 S.1 2nd Exam MC Q2]

6. Perimeter of the base of a prism × the height of a prism =

A. Total area of all the lateral faces of a right prism.

B. Total surface area of a right prism.

C. Base area of a right prism.

D. Volume of a right prism.

[1415 S.1 2nd Exam SQ Q1]

7. Find the area of polygon *ABECD* in figure 2.

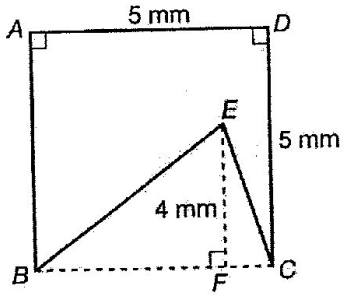


Figure 2

(3 marks)

[1415 S.1 2nd Exam SQ Q2]

8. Find the value of *a* in figure 3.

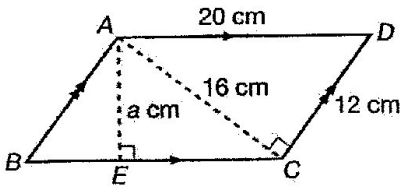


Figure 3

(3 marks)

[1415 S.1 2nd Exam Enhanced Question Q1]

9. Two prisms are shown in figure 5.

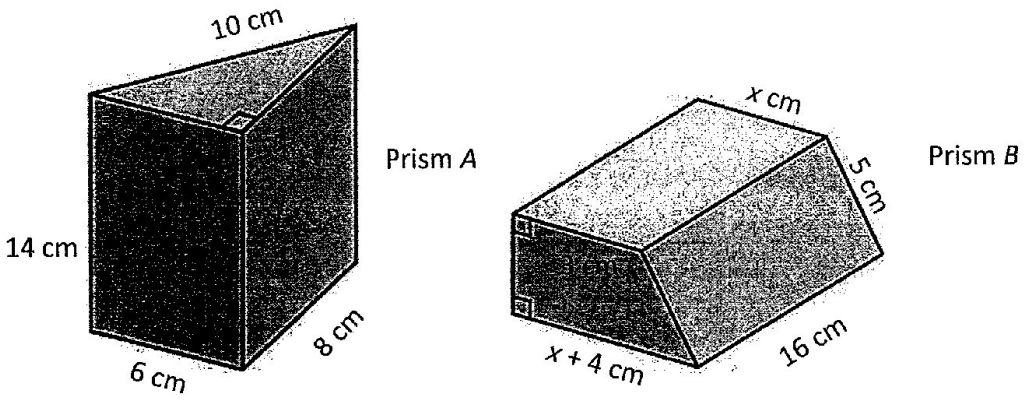


Figure 5

(a) Find the total surface area of prism A.

(2 mark)

(b) It is known that the volume of prism A and prism B are the same. Find the value of x.

(3 marks)

[1516 S.1 2nd Exam Enhanced Question Q1]

10. The Figure 10 shows a trapezium $ABCD$.

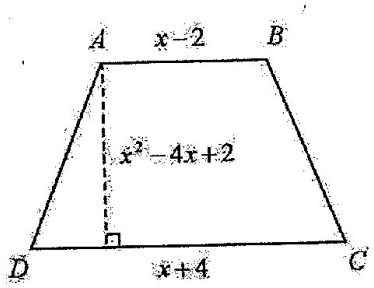


Figure 10

(a) Express the area of trapezium $ABCD$ in terms of x. Simplify your answer. (3 marks)

(b) If $x = 5$, find the area of the trapezium. (2 marks)

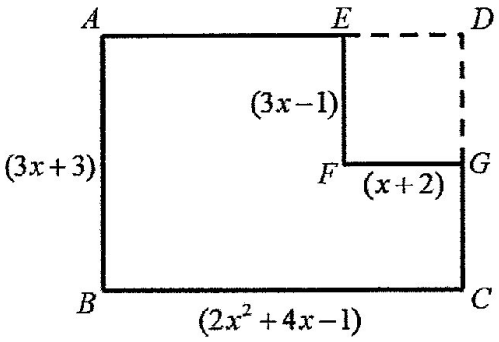
[1617 S.1 2nd Exam Enhanced Question Q20]

11. In the figure, $ABCD$ and $DEFG$ are rectangles. It is given that $AB = 3x + 3$, $BC = 2x^2 + 4x - 1$, $FG = x + 2$ and $EF = 3x - 1$.

    (a) Find the area of the polygon $ABCGFE$ in terms of x. Simplify your answer and arrange the terms in descending power of x.

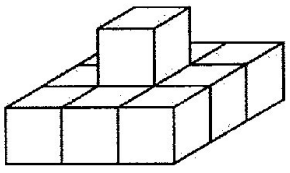
    (b) If $AB = 9$ cm, find the area of the polygon $ABCGFE$.

(5 marks)



[1718 S.1 2nd Exam MC Q1]

12. The solid shown in the figure is formed by 10 identical cubes with side length equals to 2 cm. Find the total surface area of the solid.



A. $80\,\text{cm}^2$

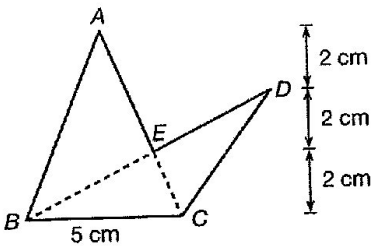
B. $136\,\text{cm}^2$

C. $144\,\text{cm}^2$

D. $240\,\text{cm}^2$

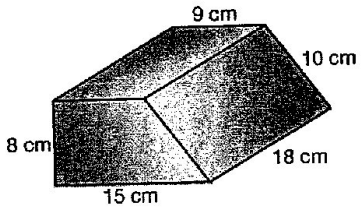
[1718 S.1 2nd Exam FQ Q13]

13. Find the area of the polygon ABCDE. (2 marks)



[1718 S.1 2nd Exam FQ Q14]

14. In the figure, find the total surface area of the prism. (2 marks)



[1718 S.1 2nd Exam EQ Q24]

15. Figure 2 shows a rectangular tank. It is given that the volume of water inside the tank is 2520 cm^3.

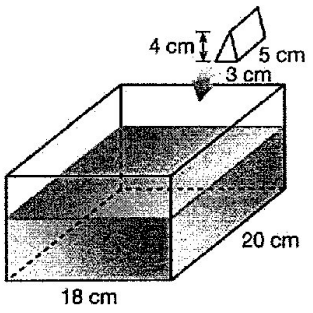


Figure 2

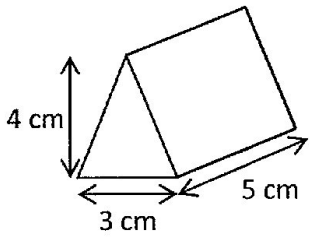


Figure 3

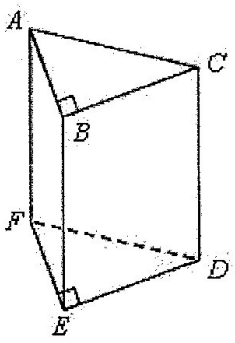
(a) Find the height of the water inside the tank.

(b) If some triangular prisms, as shown in Figure 3, are put into the tank, then the wet surface of the tank is increased by 152 cm2. Find the number of triangular prisms that has been put into the tank.

(5 marks)

[1819 S.1 2nd Exam MC Q3]

16. The figure shows a right triangular prism. Which of the following statements is/are correct?



I. Volume of the prism = Area of ΔABC × length of CD

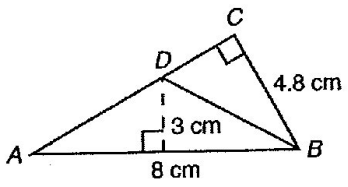
II. Total area of all the lateral faces of the prism = Perimeter of ΔDEF × length of CD

III. Total surface area of the prism = Perimeter of ΔDEF × length of CD + Area of ΔABC

A. I only
B. I and II only
C. II and III only
D. I, II and III

[1819 S.1 2nd Exam MC Q4]

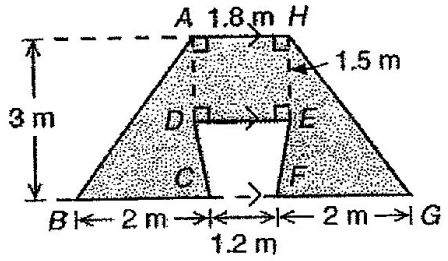
17. If $\triangle ABD$ in the figure is an isosceles triangle with $AD = BD$, find the perimeter of $\triangle ABD$.



A. 18 cm
B. 12 cm
C. 10 cm
D. 5 cm

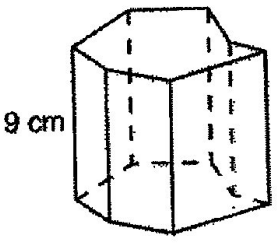
[1819 S.1 2nd Exam BQ Q14]

18. Find the area of the shaded region in the figure. (3 marks)



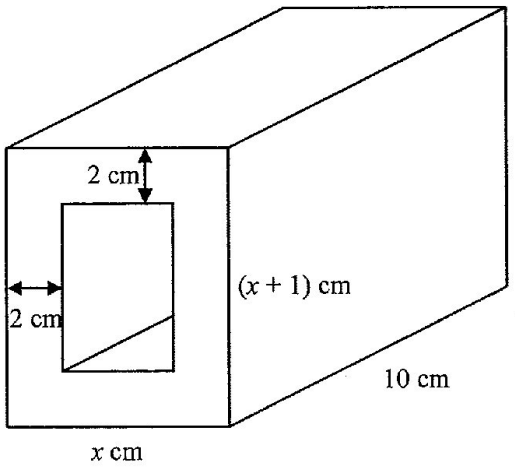
[1819 S.1 2nd Exam BQ Q15]

19. The figure shows a prism of height 9 cm. If the base area of the prism is 40 cm^2 and the perimeter of the base is 25 cm, find the total surface area of the prism. (2 marks)



[1819 S.1 2nd Exam IQ Q27]

20. The figure shows a wooden block in the shape of a cuboid of dimension x cm × $(x + 1)$ cm × 10 cm, where $x > 4$. A hole in the shape of a cuboid is drilled through the block at the centre of its base. It is given that the distance between an edge of the base of the block and an edge of the hole is uniform and is of length 2 cm.



In each of the following parts, expand and arrange your answers in descending powers of x.

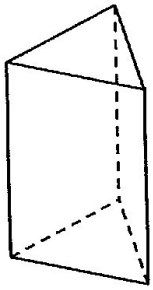
(a) Express the volume of the hole in terms of x. (3 marks)

(b) Express the volume of the wooden block with the hole drilled in terms of x. (2 marks)

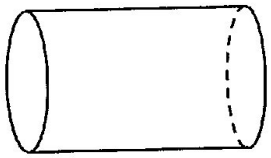
[1819 S.1 3rd Exam MC Q3]

21. Which of the following solids does not have uniform cross-sections?

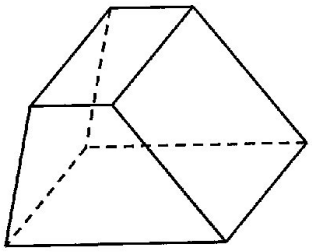
A.



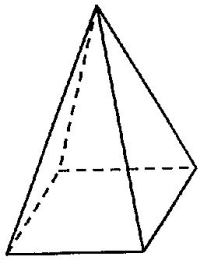
B.



C.

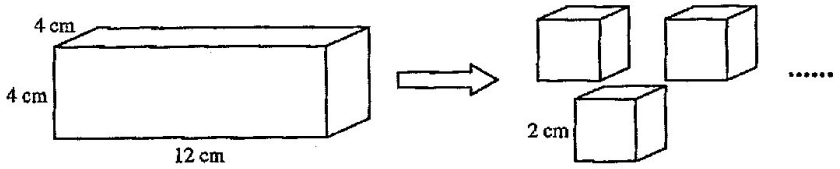


D.



[1819 S.1 3rd Exam IQ Q24]

22. Andy melts the rectangular block in the figure and recasts it into some equal cubes of side length 2 cm.



(a) Find the number of cubes formed. (3 marks)

(b) Find the percentage change in total surface area after the recast and round off the percentage to 1 decimal place. (3 marks)

[1920 S.1 Exam MC Q6]

23. In the following estimation:

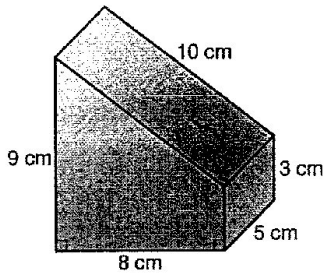
$$30.1 \times 0.67 \approx 30 \times \frac{2}{3}$$
$$= \underline{\underline{20}}$$

Which estimation method is used?

A. Using a clustered value
B. Using compatible numbers
C. Rounding up
D. Rounding down

[1920 S.1 Exam MC Q7]

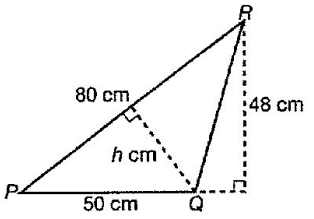
24. Find the total surface area of the prism in the figure.



A. $198\,cm^2$
B. $201\,cm^2$
C. $206\,cm^2$
D. $246\,cm^2$

[1920 S.1 Exam MC Q8]

25. In the figure, find the value of h.



A. 60
B. 45
C. 30
D. 15

[1920 S.1 Exam BQ Q4]

26. In Figure 2, find the area of the shaded region. (2 marks)

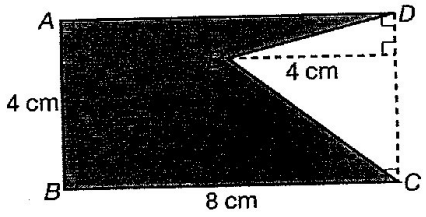


Figure 2

[1920 S.1 Exam AQ Q16]

27. Figure 8A shows an enclosed glass container, in the form of a cuboid, with some water inside. The container is then put to stand on its smallest face, as shown in Figure 8B.

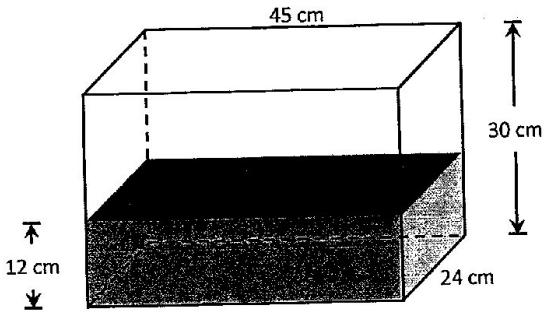


Figure 8A

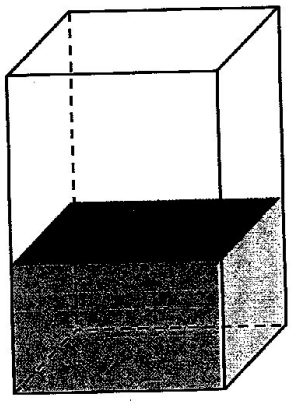


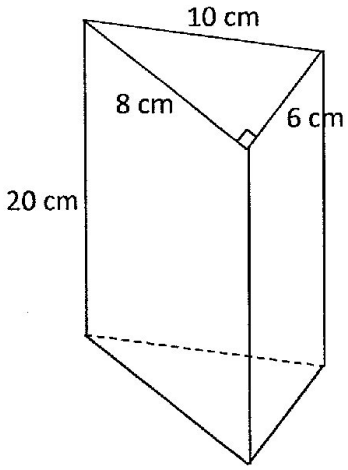
Figure 8B

(a) Find the volume of water in the container. (2 marks)

(b) Are the total areas of the wet surfaces of the containers in Figure 8A and Figure 8B the same? Explain your answer. (3 marks)

[2021 S.1 Final Exam BQ Q7]

28. The figure shows a right prism with base in the form of a right-angled triangle. Find the total surface area of the prism. (2 marks)



[2021 S.1 Final Exam AQ Q16]

29. (a) In Figure (i), $ABCD$ is a square. E is a point on CD such that the area of the shaded region is 108 square units.

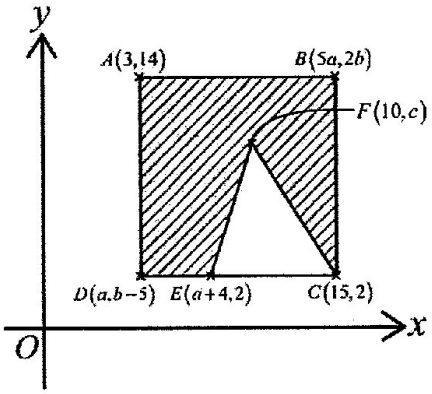


Figure (i)

(i) By considering $ABCD$ is a square, find the values of a and b.

(ii) By considering the area of the shaded region is 108 square units, find the value of c.

(5 marks)

(b)

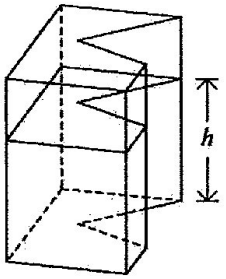


Figure (ii)

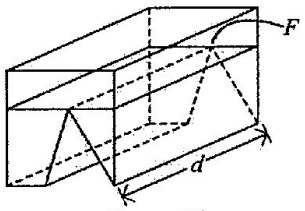
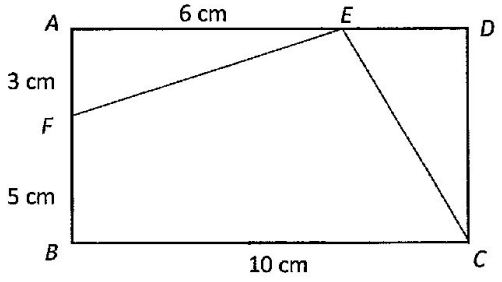


Figure (iii)

Figure (ii) shows a right prismatic container with the base in the form of shaded region in Figure (i). A certain amount of water is poured into the container and the depth of water is h units. When the container is placed in the way shown in Figure (iii), the depth of water will just reach vertex F as shown in the diagram. The length of the container is d units. It is known that d is greater than h by 6 units. Find the value of d. (3 marks)

[2021 S.1 Final Exam MC Q11]

30. The figure shows a rectangle $ABCD$. E is a point on AD such that $AE = 6$ cm. F is a point on AB such that $AF = 3$ cm and $FB = 5$ cm. Find the area of the quadrilateral $BCEF$.



A. 30 cm^2
B. 55 cm^2
C. 71 cm^2
D. 80 cm^2

[2021 S.1 Final Exam MC Q13]

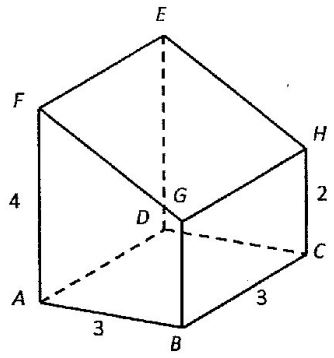
31. The perimeter of the base of a right prism is p cm. If the height, the base area and the total surface area of the prism are 20 cm, 10 cm^2 and 200 cm^2 respectively, find p.

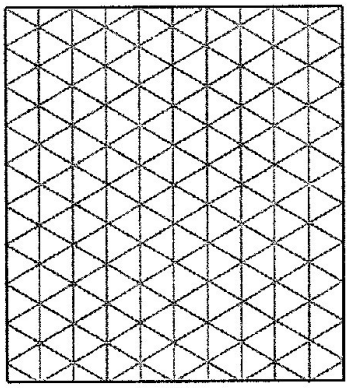
A. 9
B. 9.5
C. 10
D. 16

[2122 S.1 Final Exam BQ Q7]

32. Draw a two-dimensional representation of the prism shown below on isometric grid paper.

(2 marks)



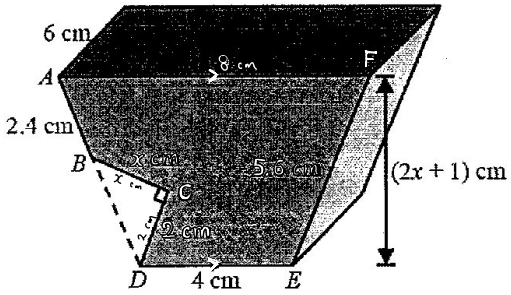


[2122 S.1 Final Exam IQ Q14]

33. The figure shows a prism whose base is $ABCDEF$, in which A, B and D are points on a straight line. The base area of the prism is 28 cm^2.

(a) Find the value of x. (2 marks)

(b) Find the total surface area of the prism. (2 marks)

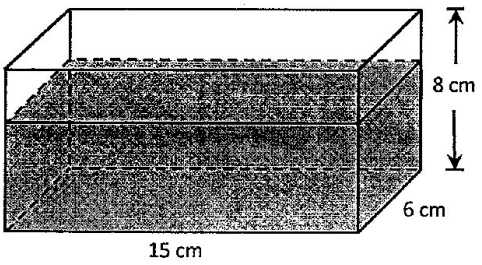


[2122 S.1 Final Exam AQ Q18]

34. The figure shows a rectangular container with water to a depth of 6 cm.

(a) Find the volume of water inside the container. (2 marks)

(b) If a metal rod of base area $20\ cm^2$ with height 15 cm is placed into the container vertically, will the water overflow? Explain your answer. (3 marks)



[2122 S.1 Final Exam MC Q16]

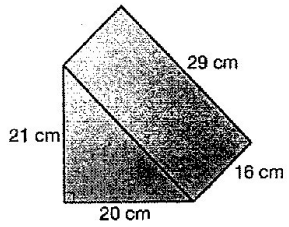
35. In the figure, the volumes of the 2 prisms are the same. Find the total surface area of the prism on the right.

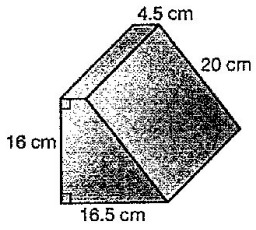
A. $1140\ cm^2$

B. $1476\ cm^2$

C. $1556\ cm^2$

D. $3360\ cm^2$

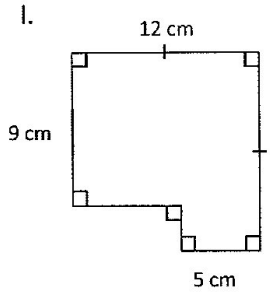




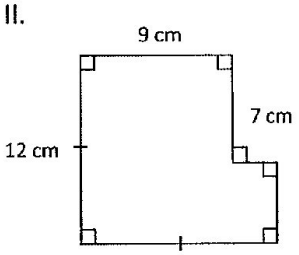
[2122 S.1 Final Exam MC Q17]

36. In the figure, determine which hexagons are congruent.

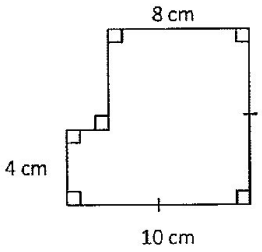
I.



II.



III.



A. I and II only

B. I and III only

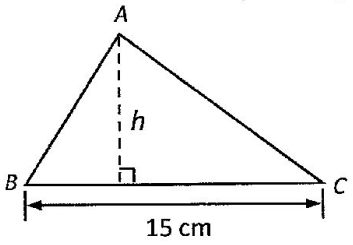
C. II and III only

D. I, II and III

[2223 S.1 Final Exam BQ Q5]

37. The figure shows a triangle ABC which has the same area as a square of side 9 cm. Find h.

(2 marks)



[2223 S.1 Final Exam IQ Q11]

38. Figure I shows a right triangular prism.

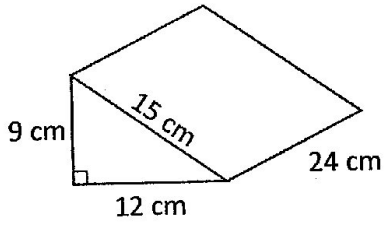


Figure I

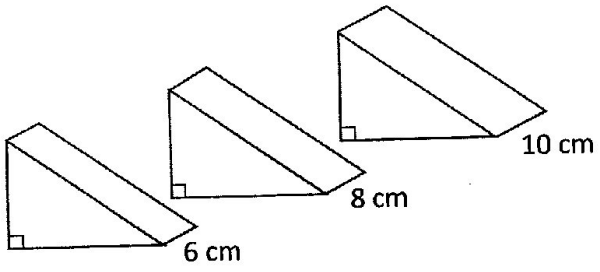


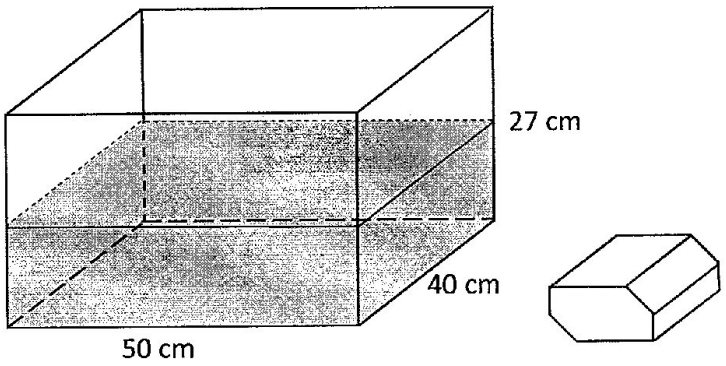
Figure II

(a) Find the total surface area of the prism in Figure I. (3 marks)

(b) The prism is to be painted and the painting cost of each cm^2 is $\$a$. If the triangular prism in Figure I is cut into three triangular prisms with heights 6 cm, 8 cm and 10 cm respectively as shown in Figure II, the change in the painting cost is +\$32.4. Find the value of a.(2 marks)

[2223 S.1 Final Exam AQ Q14]

39. The figure shows a rectangular water tank of length 50 cm, width 40 cm and height 27 cm, and a prism of height 16 cm. The tank is half-filled with water. It is given that when the prism is put into the tank, it is totally immersed in water and the water level rises 2 cm.



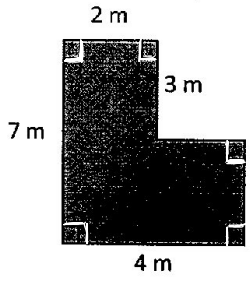
(a) Find the base area of the prism. (2 marks)

(b) Grace claims that when the prism is put vertically into the tank with the base facing upwards, it will be totally immersed in water. Do you agree? Explain your answer by considering the volume of water.

(3 marks)

[2223 S.1 Final Exam MC Q7]

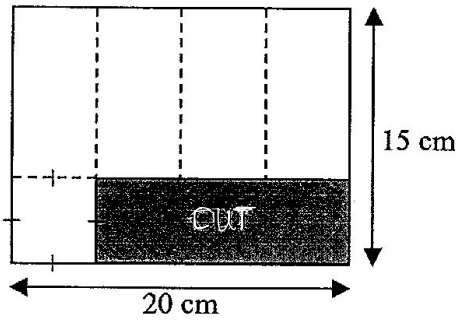
40. The figure shows the base of a right prism of height 0.5 m. Find its total surface area.



A. 11 m^2
B. 22 m^2
C. 44 m^2
D. 55 m^2

[2223 S.1 Final Exam MC Q14]

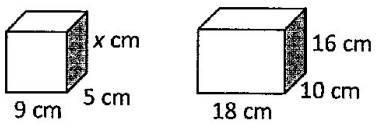
41. Mary has a cardboard of length 20 cm and width 15 cm. She makes a net of a rectangular box with a square base without a lid. She then cuts and folds the net to make the box. Find the capacity of the box.



A. 225 cm^3
B. 250 cm^3
C. 300 cm^3
D. 375 cm^3

[2223 S.1 Final Exam MC Q19]

42. A solid metal cube of length 15 cm is melted and recast into two solid cuboids as shown in the figure. Find x.



A. 8
B. 11
C. 49
D. 64