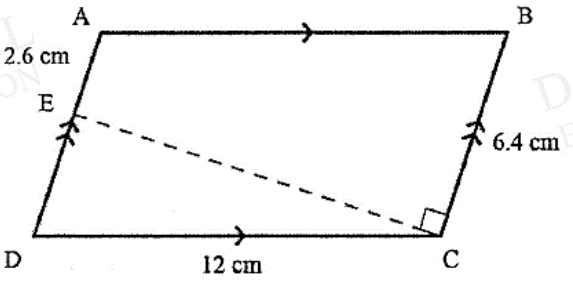
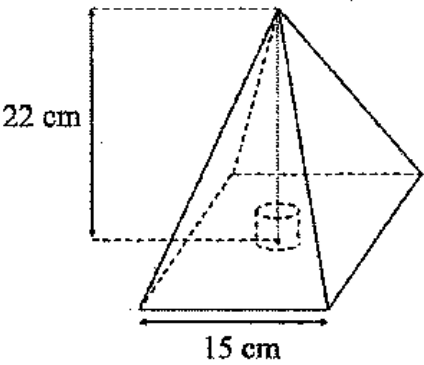
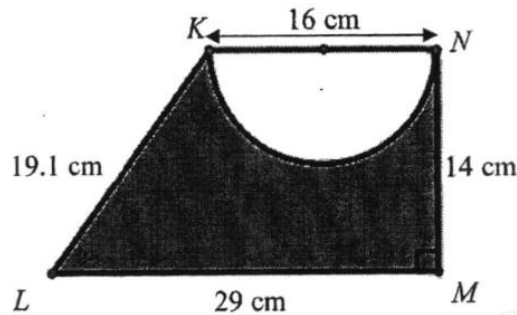


## 7 MUST KNOW QUESTIONS TO CONQUER

# BASIC GEOMETRY

1	<p><math>ABCD</math> is a parallelogram, with <math>BC = 6.4</math> cm, <math>CD = 12</math> cm and <math>AE = 2.6</math> cm. Given that the area of <math>ABCD = 72.96</math> cm<sup>2</sup>, find</p>  <p>(a) the length of <math>CE</math>,</p> <p>(b) the area of triangle <math>CED</math>.</p>	<p>[1] [2]</p>
2	<p>The diagram below shows a plastic model of a pyramid. The pyramid has a square base of length 15 cm and perpendicular height of 22 cm. To allow insertion of a stand, a cylindrical space of height 3 cm and diameter 2 cm is hollowed out.</p>  <p>(a) Given that plastic material costs \$0.05 /cm<sup>3</sup>, find the cost of producing the model, giving your answers to the nearest dollar.</p> <p>(b) A cover sheet is designed to cover the four triangular faces of the model exactly. The cover sheet has an area of 696 cm<sup>2</sup>. Find the slant height of the model pyramid.</p>	<p>[2] [2]</p>

3

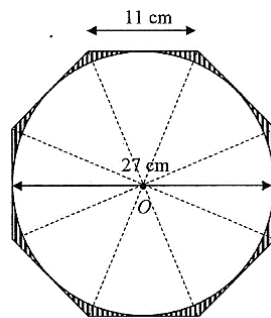


In the figure,  $KLMN$  is a trapezium and  $KN$  is the diameter of a semi-circle.  
 $LM = 29$  cm,  $KN = 16$  cm,  $MN = 14$  cm,  $KL = 19.1$  cm and  $\angle LMN = 90^\circ$ .

- (a) Calculate the perimeter of the shaded region. [2]  
 (b) Calculate the area of the shaded region. [3]

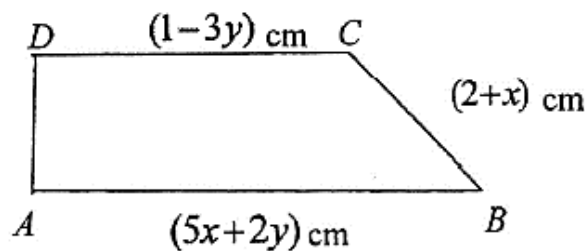
4

The figure below is made up of a regular octagon with sides 11 cm and a circle with centre  $O$  and diameter 27 cm.



Find the area of the shaded region. Correct your answer to 3 significant figures. [3]

5

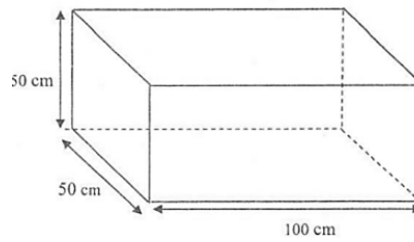


$ABCD$  is a trapezium.  $CD$  and  $AB$  are the two parallel sides.

$AB = (5x + 2y)$  cm,  $BC = (2 + x)$  cm,  $CD = (1 - 3y)$  cm and the perimeter of the trapezium is  $(5x - 2y + 9)$  cm. [2]

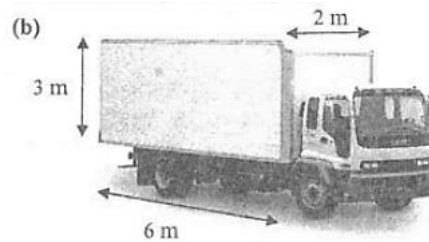
- (a) Find the length of  $AD$  in terms of  $x$  and  $y$ .  
 (b) Given  $x = 5$  and  $y = -3$ , find  
 (i) the perimeter of trapezium  $ABCD$ , [1]  
 (ii) the area of trapezium  $ABCD$ . [3]

6 The figure shows a metallic container with a rectangular base measuring 50 cm by 100 cm with height 50 cm.



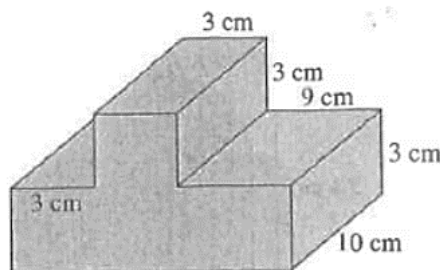
(a) Find the volume of the tank in  $\text{cm}^3$ .

These containers, which are used to store chemicals, are to be transported by a truck to a nearby chemical plant.



(b) If the storage space of the truck is a cuboid of base 6 m by 2 m and height of 3 m, calculate the number of containers the truck can carry in one trip.

7 Calculate the total surface area of the prism below.



**Answer Key**

1	Solutions:  (a) Length = $72.96 \div 6.4 = 11.4$ cm (b) $ED = 6.4 - 2.6 = 3.8$ $\text{Area of } \triangle CED = \frac{1}{2} \times 3.8 \times 11.4$ $= 21.66 \text{ cm}^2$  Ans: (a) 11.4 cm (b) 21.66 cm <sup>2</sup>
2	Solutions:  (a) Volume = $\left(\frac{1}{3} \times 15^2 \times 22\right) - (\pi \times 1^2 \times 3)$ $= 1640.57$ Cost = $1640.57 \times 0.05$ $= 82.028$ $= \$82 \text{ (nearest dollar)}$ (a) Each face = $696 \div 4 = 174$ Slant height = $174 \times 2 \div 15 = 23.2$ cm  Ans: (a) \$82 (b) 23.2 cm
3	Solutions:  (a) Half-circumference of semi-circle $= \pi \times 8 = 8\pi \text{ (or } 25.1327)$ Perimeter of logo $= 19.1 + 29 + 14 + 8\pi$ $= 87.2 \text{ cm (to 3sf)}$ (b) Area of semi-circle = $\frac{\pi(8)^2}{2}$ $= 32\pi \text{ (or } 100.53)$ Area of trapezium = $\frac{1}{2}(29 + 16)(14)$ $= 315 \text{ cm}^2$ Total area = $315 - 32\pi = 214 \text{ cm}^2 \text{ (to 3sf)}$  Ans: (a) 87.2 cm (to 3sf) (b) 214 cm <sup>2</sup> (to 3sf)
4	Solution:  Area of octagon = $8 \times \left(\frac{1}{2} \times 11 \times \frac{27}{2}\right)$ $= 594$ Area of circle = $\pi \times \left(\frac{27}{2}\right)^2$ $= 572.55 \text{ (5s.f)}$ Area of shaded region = $594 - 572.55$ $= 21.45$ $= 21.5 \text{ cm}^2 \text{ (3s.f)}$  Ans: 21.5 cm <sup>2</sup> (3s.f)

5	<p>Solutions:</p> <p>(a) <math>AD = (5x - 2y + 9) - (5x + 2y) - (2 + x) - (1 - 3y)</math>  <math>= 5x - 2y + 9 - 5x - 2y - 2 - x - 1 + 3y</math>  <math>= -x - y + 6 \text{ cm}</math></p> <p>(b) (i) Perimeter <math>= (5x - 2y + 9)</math>  <math>= 5(5) - 2(-3) + 9 = 40 \text{ cm}</math></p> <p>(ii) When <math>x = 5, y = -3,</math>  <math>AD = -5 - (-3) + 6 = 4 \text{ cm}</math>  <math>CD = 1 - 3(-3) = 10 \text{ cm}</math>  <math>AB = 5(5) + 2(-3) = 19 \text{ cm}</math>  <math>\therefore \text{Area of trapezium} = \frac{1}{2}(4)(10 + 19)</math>  <math>= 58 \text{ cm}^2</math></p> <p>Ans: (a) <math>= -x - y + 6 \text{ cm}</math> (b)(i) 40 cm (ii) 58 cm<sup>2</sup></p>
6	<p>Solutions:</p> <p>(a) Volume of container <math>= 100 \times 50 \times 50 = 250000 \text{ cm}^3</math></p> <p>(b) No. of containers that can fit into the truck <math>= \frac{600}{100} \times \frac{200}{50} \times \frac{300}{50} = 144 \text{ containers.}</math></p> <p>Ans: (a) 250000 cm<sup>3</sup> (b) 144 containers</p>
7	<p>Solution:</p> <p>Base area <math>= 15 \times 3 + 3 \times 3 = 54 \text{ cm}^2</math></p> <p>Perimeter of base <math>= 3 + 3 + 3 + 3 + 9 + 3 + 15 + 3 = 42 \text{ cm}</math></p> <p>Area of lateral faces <math>= 42 \times 10 = 420 \text{ cm}^2</math></p> <p style="text-align: right;"><math>SA = 420 + 2 \times 54</math>  <math>= 528 \text{ cm}^2</math></p> <p>Ans: 528 cm<sup>2</sup></p>