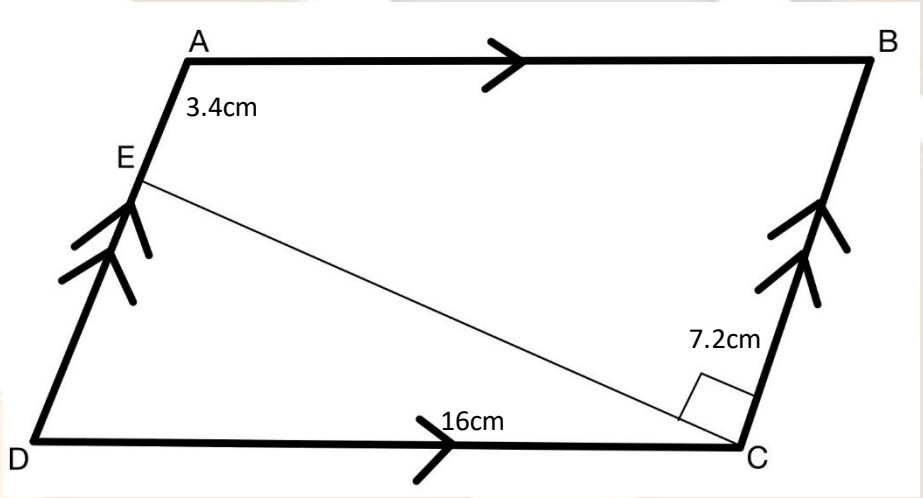
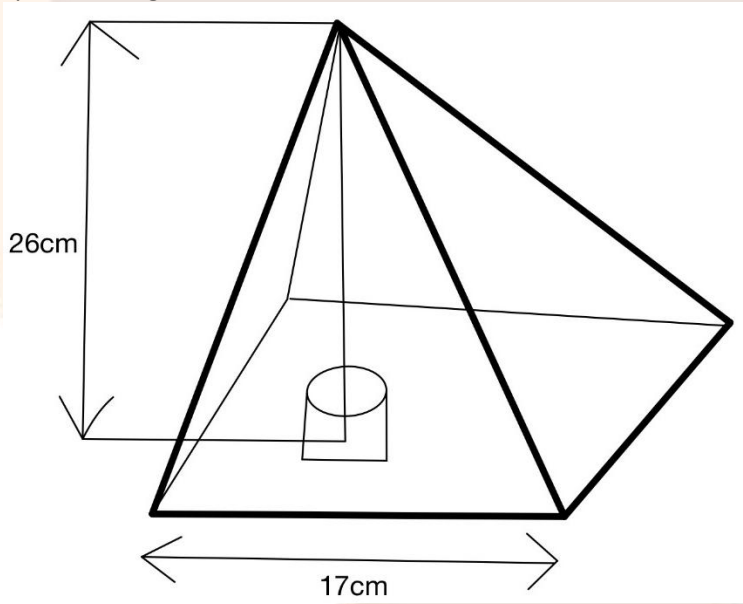
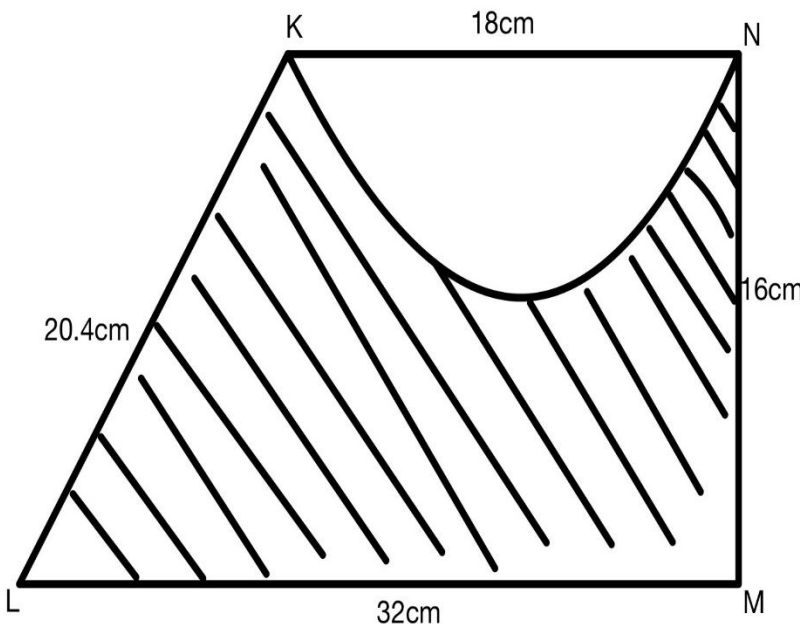
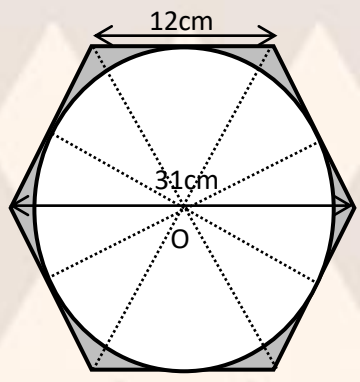
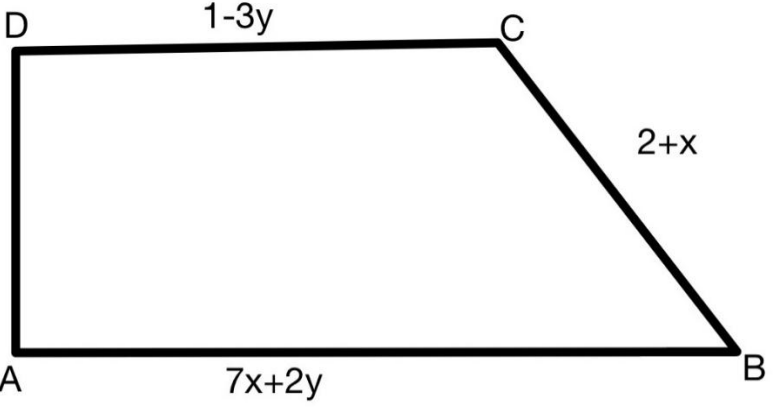
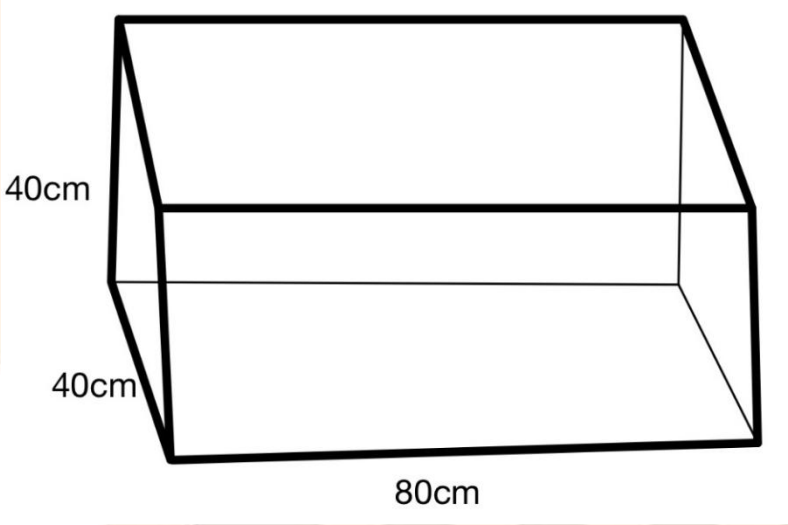


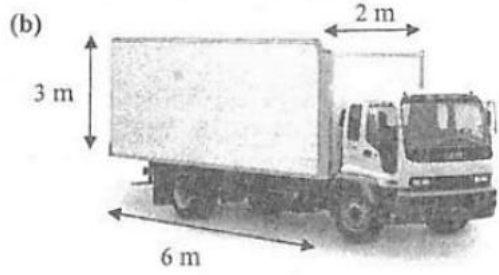
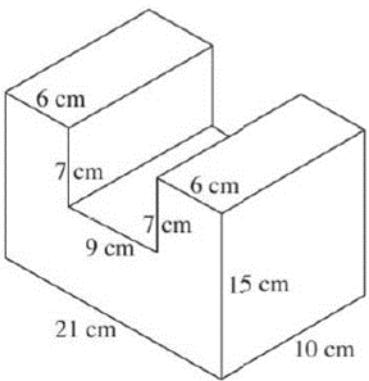
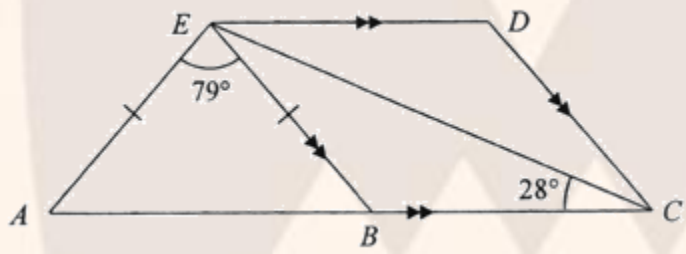
8 ESSENTIAL QUESTIONS TO MASTER

BASIC GEOMETRY

1	ABCD is a parallelogram, with $BC=7.2$ cm, $CD=16$ cm and $AE=3.4$ cm. Given that the area of $ABCD=80\text{cm}^2$, find  (a) the length of CE (b) the area of triangle CED	[1] [2]
2	The diagram below shows a plastic model of a pyramid. The pyramid has a square base of length 17cm and perpendicular height of 26cm. To allow insertion of a stand, a cylindrical space of height 3cm and diameter 2cm is hollowed out.  (a) Given that ceramic material costs $\\$0.15/\text{cm}^3$, find the cost of producing the model, giving your answers to the nearest dollar.	[2]

	(b) A cover sheet is designed to cover the four triangular faces of the model exactly. The cover sheet has an area of 720cm^2 . Find the slant height of the model pyramid.	[2]
3	In the figure, $KLMN$ is a trapezium and KN is the diameter of a semi-circle. $LM=32\text{ cm}$, $KN=18\text{ cm}$, $MN=16\text{ cm}$, $KL=20.4\text{ cm}$ and $\angle LMN=90^\circ$. (a) Calculate the perimeter of the shaded region. (b) Calculate the area of the shaded region. 	[2] [3]
4	The figure below is made up of a regular octagon with sides 12 cm and a circle with centre O and diameter 31 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. $AB = (5x + 2y)\text{ cm}$, $BC = (2+x)\text{ cm}$, $CD = (1-3y)\text{ cm}$ and the perimeter of the trapezium is $(5x-2y+9)\text{ cm}$.	

	 (a) Find the length of AD in terms of x and y. (b) Given $x = 7$ and $y = -4$, find (i) the perimeter of trapezium ABCD, (ii) the area of the trapezium ABCD.	[2] [1] [3]
6	The figure shows a wooden crate with a wooden carton measuring 40 cm by 80 cm with height 40 cm. (a) Find the volume of the tank in cm^3. (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 wooden crates the truck can carry in one trip. Round off to the nearest whole number. 	[1] [2]

	(b) 	
7	Calculate the total surface area of the prism below. 	
8	ED is parallel to BC and EB is parallel to DC. ED = BC and EB = DC. Given that $\angle AEB = 79^\circ$ and $\angle BCE = 28^\circ$.  (a) Find, stating your reasons clearly, (i) $\angle ABE$ (ii) $\angle ECD$ (iii) $\angle EDC$ (b) State the special name of the quadrilateral BCDE.	[1] [2] [1] [1]

Answer Key:

1	(a) Length of CE: $80 \div 7.2 = 11.1 \text{ cm}$ (b) $ED = 7.2 \text{ cm} - 3.4 \text{ cm} = 3.8 \text{ cm}$ Area of CED: $\frac{1}{2} \times 3.8 \times 11.1 = 21.09 \text{ cm}^2$	
---	--	--

2	(a) Volume $= (\frac{1}{3} \times 17^2 \times 26) - (\pi \times 1^2 \times 3)$ $= 2504.67$ Cost $= 2504.67 \times 0.15$ $= \\$375.71$ $= \\$375$ (nearest dollar) (b) Each face $= 720 \div 4 = 180$ Slant height $= 180 \times 2 \div 17 = 21.2 \text{ cm}$	
3	(a) Half-circumference of semi-circle $= \pi \times 8 = 8\pi$ (or 25.1327) Perimeter of logo $= 32 + 16 + 20.4 + 8\pi$ $= 93.533 \text{ cm}$ (to 3sf.) (b) Area of semi-circle $= \frac{\pi(8)^2}{2}$ $= 32\pi$ (or 100.53) cm^2 Area of trapezium $= \frac{1}{2}(32+18)(16)$ $= 400 \text{ cm}^2$ Total area $= 400 - 32\pi = 299 \text{ cm}^2$ (to 3sf)	
4	Area of octagon $= 8 \times (\frac{1}{2} \times 12 \times \frac{31}{2})$ $= 744 \text{ cm}^2$ Area of circle $= \pi \times (\frac{31}{2})^2$ $= 754.39 \text{ cm}^2$ (5s.f) Area of shaded region $754.39 - 744$ $= 21.45$ $= 21.5 \text{ cm}^2$ (3s.f)	
5	(a) The perimeter of a trapezium is the sum of all its sides. So, we have: $AB + BC + CD + AD = \text{Perimeter}$ Substituting the given values: $(7x + 2y) + (2 + x) + (1 - 3y) + AD = (7x - 2y + 9)$ Now, let's simplify and solve for AD: $8x - y + 3 + AD = 7x - 2y + 9$ $AD = (7x - 2y + 9) - (8x - y + 3)$ $AD = 7x - 2y + 9 - 8x + y - 3$ $AD = (-x - y + 6) \text{ cm}$ (b)(i) Perimeter is given as $(7x - 2y + 9) \text{ cm}$. Substitute $x = 7$ and $y = -4$: $(7(7) - 2(-4) + 9) \text{ cm}$ $(49 + 8 + 9) \text{ cm}$	

	Perimeter = 66 cm (b)(ii) $AB = (7x + 2y) = (7(7) + 2(-4)) = (49 - 8) = 41 \text{ cm}$ $CD = (1 - 3y) = (1 - 3(-4)) = (1 + 12) = 13 \text{ cm}$ Area of a trapezium is: $\text{Area} = \frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$ In this case, the parallel sides are AB and CD, and the height is AD. So: $\begin{aligned} \text{Area} &= \frac{1}{2} \times (AB + CD) \times AD \\ &= \frac{1}{2} \times (41 + 13) \times 3 \\ &= \frac{1}{2} \times (54) \times 3 \\ &= 27 \times 3 \\ &= 81 \end{aligned}$ Therefore, the area of trapezium ABCD is 81cm^2.	
6	(a) Volume = $40 \text{ cm} \times 80 \text{ cm} \times 40 \text{ cm} = 128000 \text{ cm}^3$ (b) Convert Truck Dimensions in cm. Base 6 m = 600 cm Width 2 m = 200 cm Height 3 m = 300 cm Volume = $600 \text{ cm} \times 200 \text{ cm} \times 300 \text{ cm} = 36000000 \text{ cm}^3$ Number of wooden crates = (Truck volume) ÷ (Container volume) $\text{Number of wooden crates} = \frac{36000000 \text{ cm}^3}{128000 \text{ cm}^3} = 281.25$ Round to the nearest whole number: The truck can carry approximately 281 wooden crates.	
7	The base is an inverted L-shape. $\text{Base area} = (21 \times 15) - (9 \times 7) = 315 - 63 = 252\text{cm}^2$ Volume of prism base area x height $\begin{aligned} &= 252 \times 10 \\ &= 2520\text{cm}^3 \end{aligned}$ Total surface area of the solid $\begin{aligned} &= (252 \times 2) + 2(6 \times 10) + 2(7 \times 10) + (9 \times 10) + (21 \times 10) + 2(15 \times 10) \\ &= 504 + 120 + 140 + 90 + 210 + 300 = 1364\text{cm}^2 \end{aligned}$	
8	(a) Find, stating your reasons clearly, (i) $\angle ABE = \frac{180 - 79}{2}$ [base angles of isos Δ] $= 50.5^\circ$	

	(ii) $\angle BEC = 50.5 - 28$ (ext. angle = sum of int opp angles) $= 22.5^\circ$ $\angle BEC = \angle ECD$ [alt. angle $EB \parallel DC$] (iii) $\angle EDC = \angle EBC$ [opp. Angles of $\parallel$ gram] $= 180 - 50.5$ $= 129.5^\circ$ (b) Parallelogram	
--	--	--