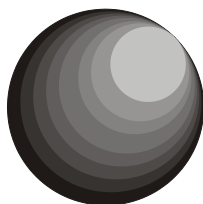


1. Write down the mathematical name for each of these three different 3-D shapes.

(i)



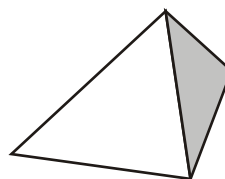
(i)

(ii)



(ii)

(iii)



(iii)

(Total 3 marks)

2. Here is a net of a cube.

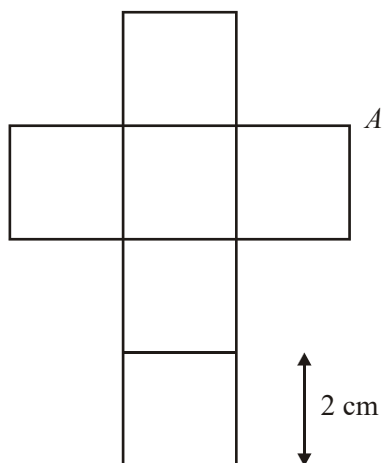


Diagram **NOT** accurately drawn

The net is folded to make the cube.
Two other vertices meet at *A*.

(a) Mark each of them with the letter *A*.

(2)

The length of each edge of the cube is 2 cm.

(b) Work out the volume of the cube.

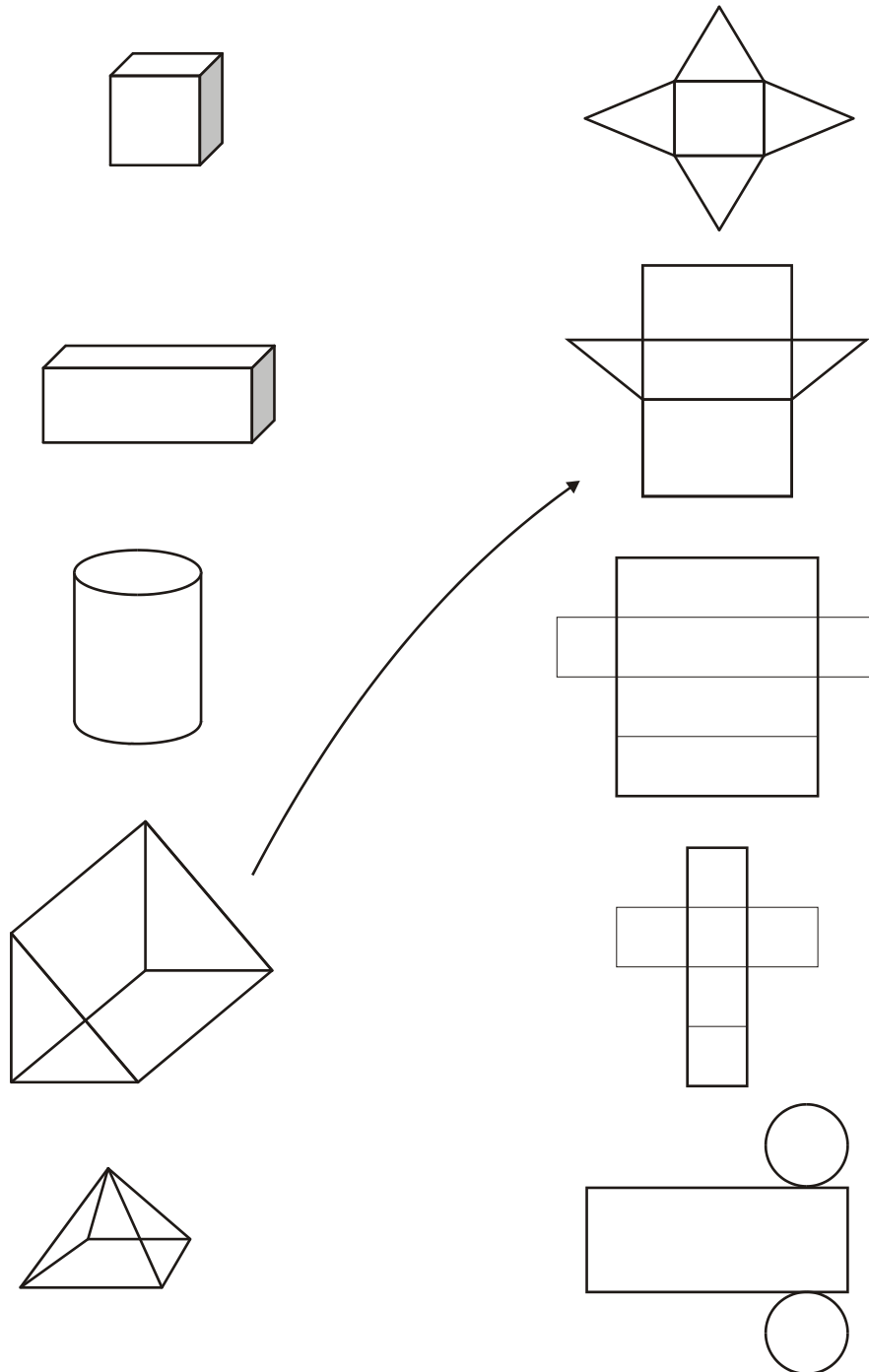
.....cm³

(2)

(Total 4 marks)

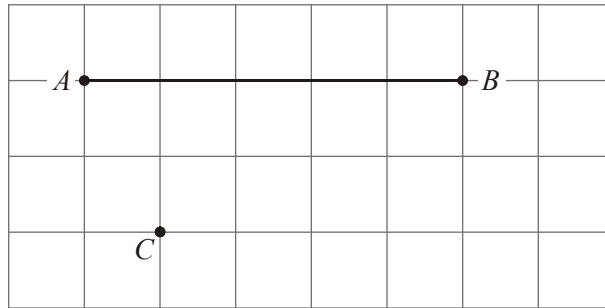
3. The diagrams show some solid shapes and their nets.
An arrow has been drawn from one solid shape to its net.

Draw an arrow from each of the other solid shapes to its net.



(Total 3 marks)

4.



(a) On the grid, draw a line from the point C perpendicular to the line AB .

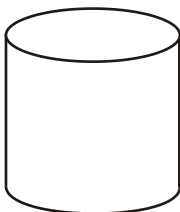
(1)

(b) Sketch a cylinder in the space below.

(1)
(Total 2 marks)

5. Write down the mathematical name of each of these two 3-D shapes.

(i)



(i)

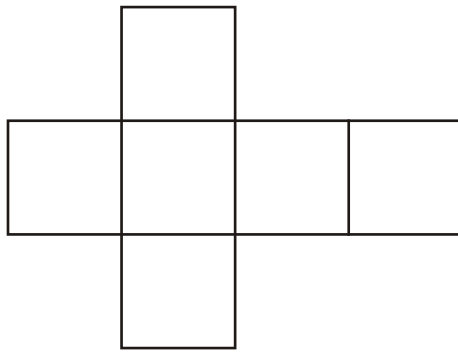
(ii)



(ii)

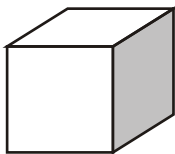
(Total 2 marks)

6.

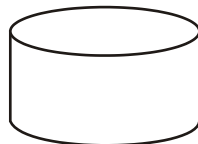


Here is the net of a 3-D shape.

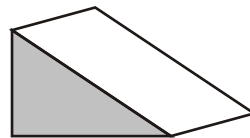
The diagrams show four 3-D shapes.



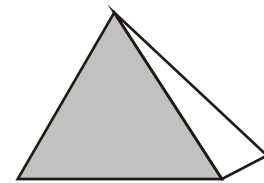
A



B



C

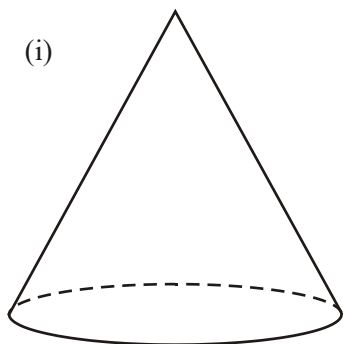


D

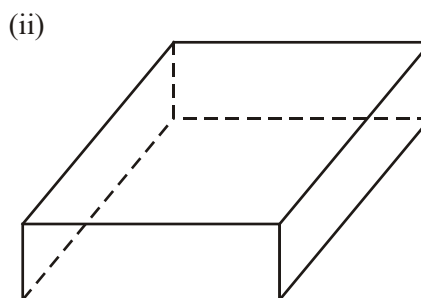
Write down the letter of the 3-D shape which can be made from the net.

.....
(Total 1 mark)

7. Write down the name of each of these two 3-D shapes.



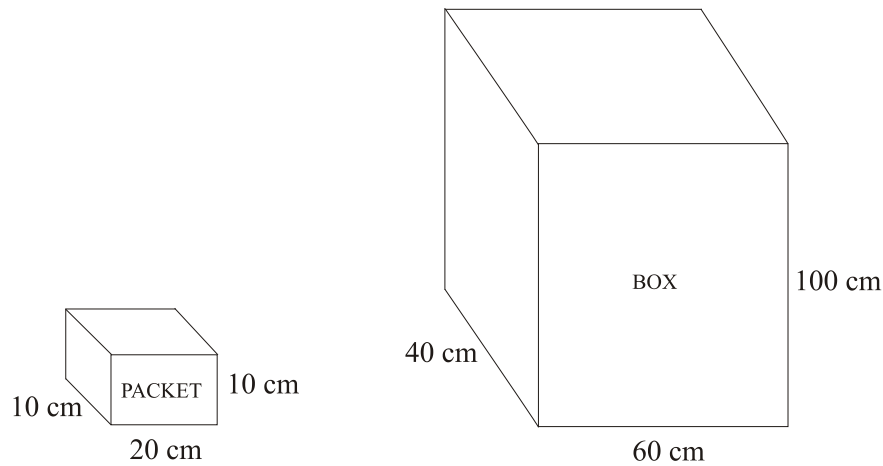
(i)



(ii)

(Total 2 marks)

8.



Diagrams **NOT** accurately drawn

A packet measures 10 cm by 20 cm by 10 cm.

A box measures 40 cm by 60 cm by 100 cm.

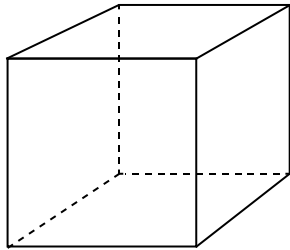
The box is to be completely filled with packets.

Work out the number of packets which can completely fill the box.

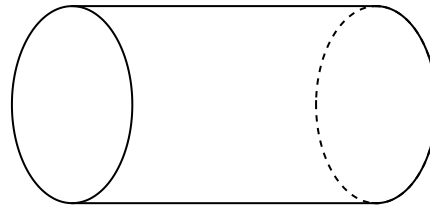
.....
(Total 3 marks)

9. Write down the mathematical name of each of these 3-D shapes.

(i)



(ii)



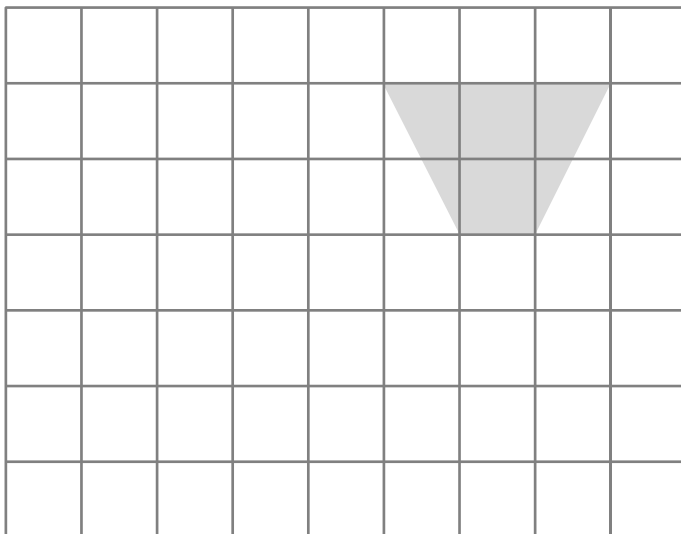
(i)

(ii)

(Total 2 marks)

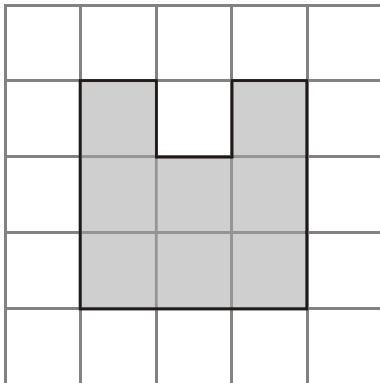
10. On the grid, show how this shape tessellates.

You should draw at least 6 shapes.



(Total 2 marks)

11. Here is a shaded shape on a centimetre grid.



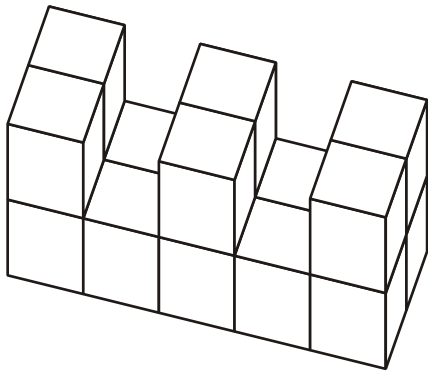
(a) Find the area of the shaded shape.

..... cm² (1)

(b) Find the perimeter of the shaded shape.

..... cm (2)

Here is a solid prism made of centimetre cubes.



(c) Find the volume of the solid prism.

..... cm³
 (2)
 (Total 5 marks)

12. The diagram shows a solid triangular prism.

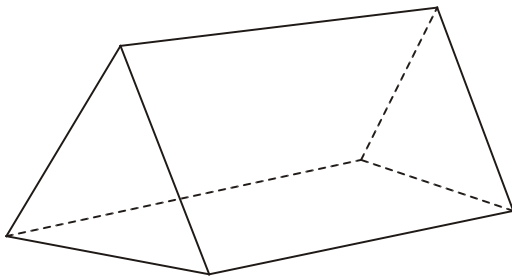


Diagram **NOT**
 accurately drawn

Write down

- (i) the number of faces
- (ii) the number of edges
- (iii) the number of vertices

(Total 3 marks)

13.

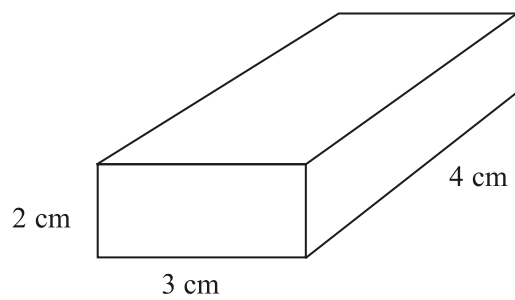
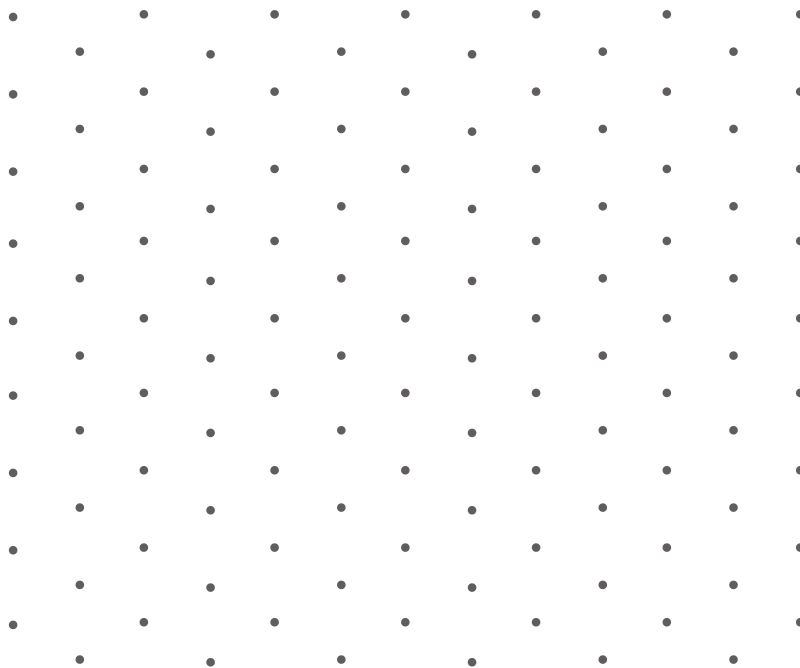


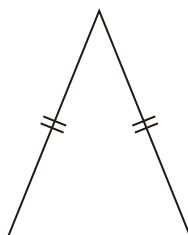
Diagram **NOT**
accurately drawn

The diagram shows a solid cuboid.
 On the isometric grid, make an accurate full size drawing of the cuboid.



(Total 2 marks)

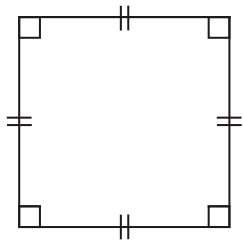
14. Here is a triangle.
 What type of triangle is it?



.....

(1)

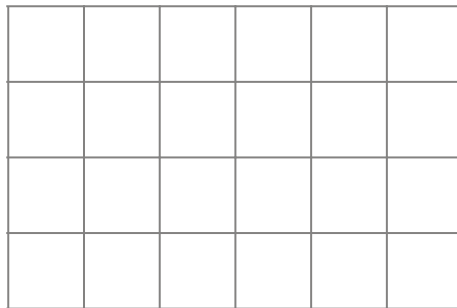
- (b) Here is a quadrilateral.
What type of quadrilateral is it?



.....

(1)

- (c) On the grid below, draw a trapezium.

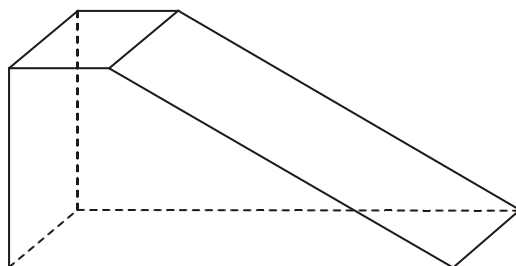


.....

(1)

(Total 3 marks)

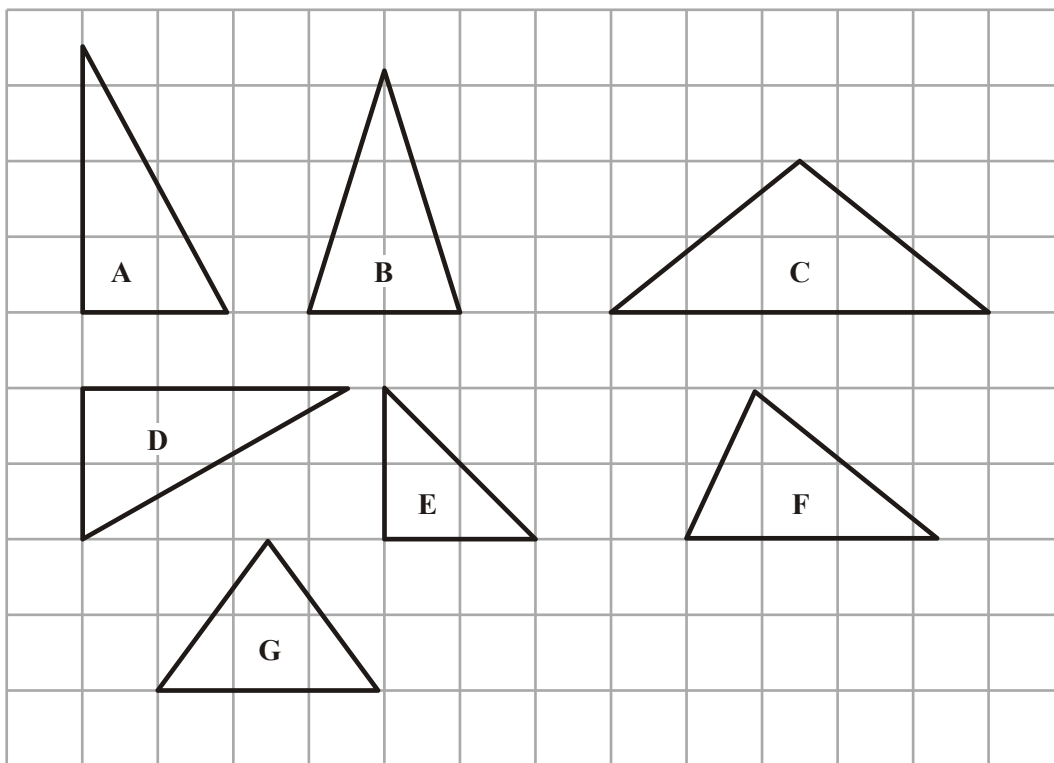
15. Here is a diagram of a 3-D prism.



Write down the number of (i) faces,
 (ii) edges,
 (iii) vertices.

(Total 3 marks)

16. Here are some triangles on a grid.



Two of these triangles are congruent.

(a) Write down the letters of these two triangles.

.....

(1)

One of these triangles is both right-angled and isosceles.

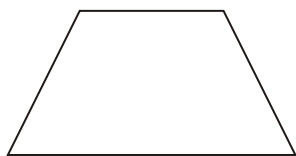
(b) Write down the letter of this triangle.

.....

(1)
(Total 2 marks)

17. (a) Write down the mathematical name of each of these quadrilaterals.

(i)



(i)

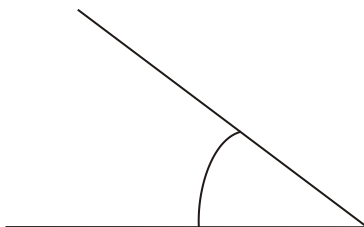
(ii)



(ii)

(2)

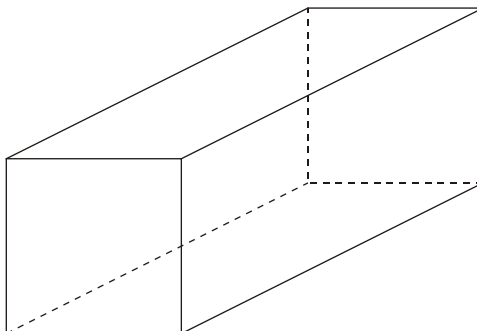
(b) What type of angle is this?



.....

(1)
(Total 3 marks)

18.



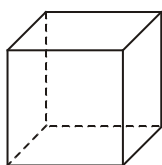
Here is a diagram of a cuboid.

Write down the number of

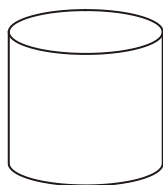
- (i) faces
- (ii) edges
- (iii) vertices

(Total 3 marks)

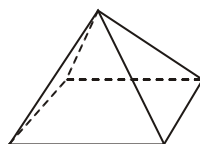
19.



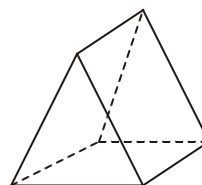
A



B



C



D

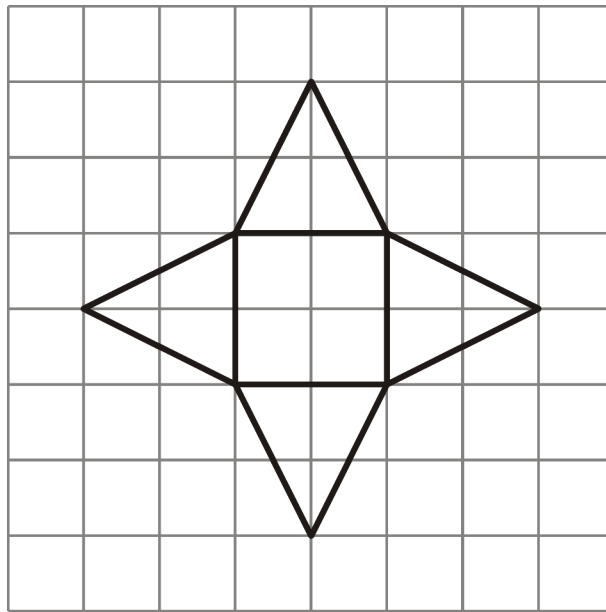
Diagram **NOT** accurately drawn

The diagram shows four 3-D solid shapes.

- (a) Write down the number of vertices of shape **A**.

.....

(1)



Here is the net of one of the shapes, **A**, **B**, **C** or **D**.

(b) Which shape?

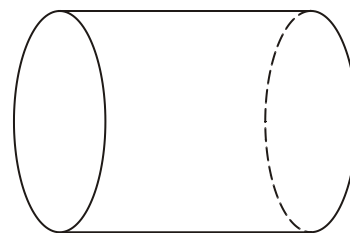
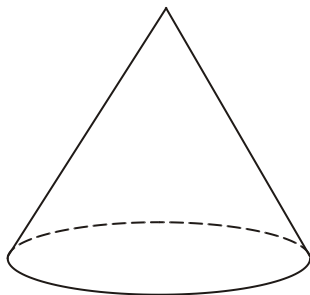
.....

(1)
(Total 2 marks)

20. Write down the name of each of these two 3-D shapes.

(i)

(ii)



(i)

(ii)

(Total 2 marks)

21. Here is a cuboid.

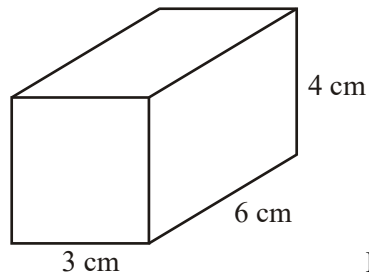


Diagram **NOT** accurately drawn

(a) Write down

(i) the number of edges of this cuboid,

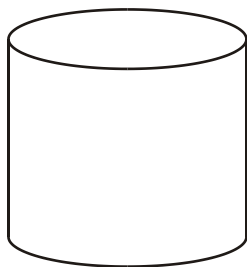
(ii) the number of vertices of the cuboid

(2)

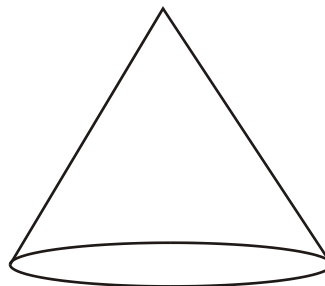
(b) Draw an accurate net for the cuboid.

(3)
(Total 5 marks)

22. (a) Write down the mathematical name of each of these 3-D shapes.



.....

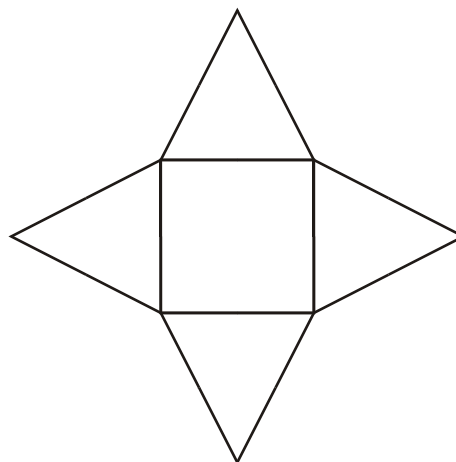
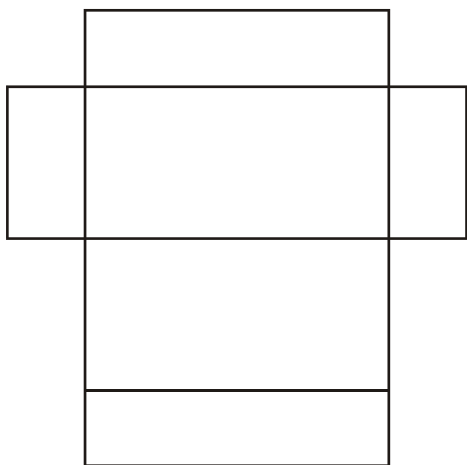


.....

(2)

Here are the nets of two different 3-D shapes.

(b)



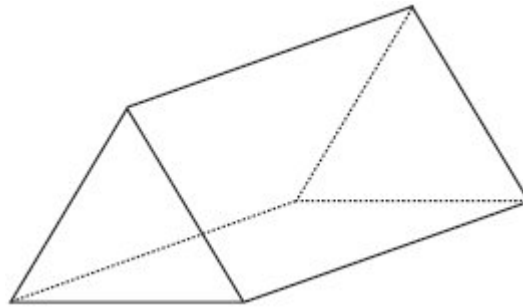
Write down the mathematical name of each of these 3-D shapes.

.....

.....

(2)
(Total 4 marks)

23.



The diagram shows a triangular prism.
The cross-section of the prism is an equilateral triangle.

- (a) In the space below, draw a sketch of a net for the triangular prism

(2)

- (b) In the space below, use ruler and compasses to **construct** an equilateral triangle with sides of length 6 centimetres.
You must show all construction lines.
One side of the triangle has already been drawn for you.



(2)
(Total 4 marks)

24. Here is a pyramid.
It has a square base with sides of length 4 cm.
The other four edges of the pyramid are each of length 4.5 cm.

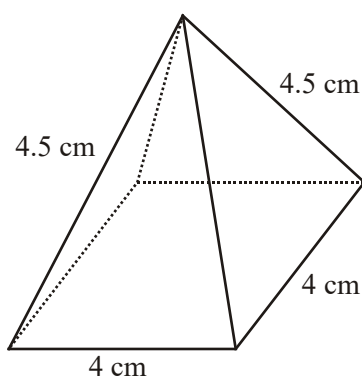
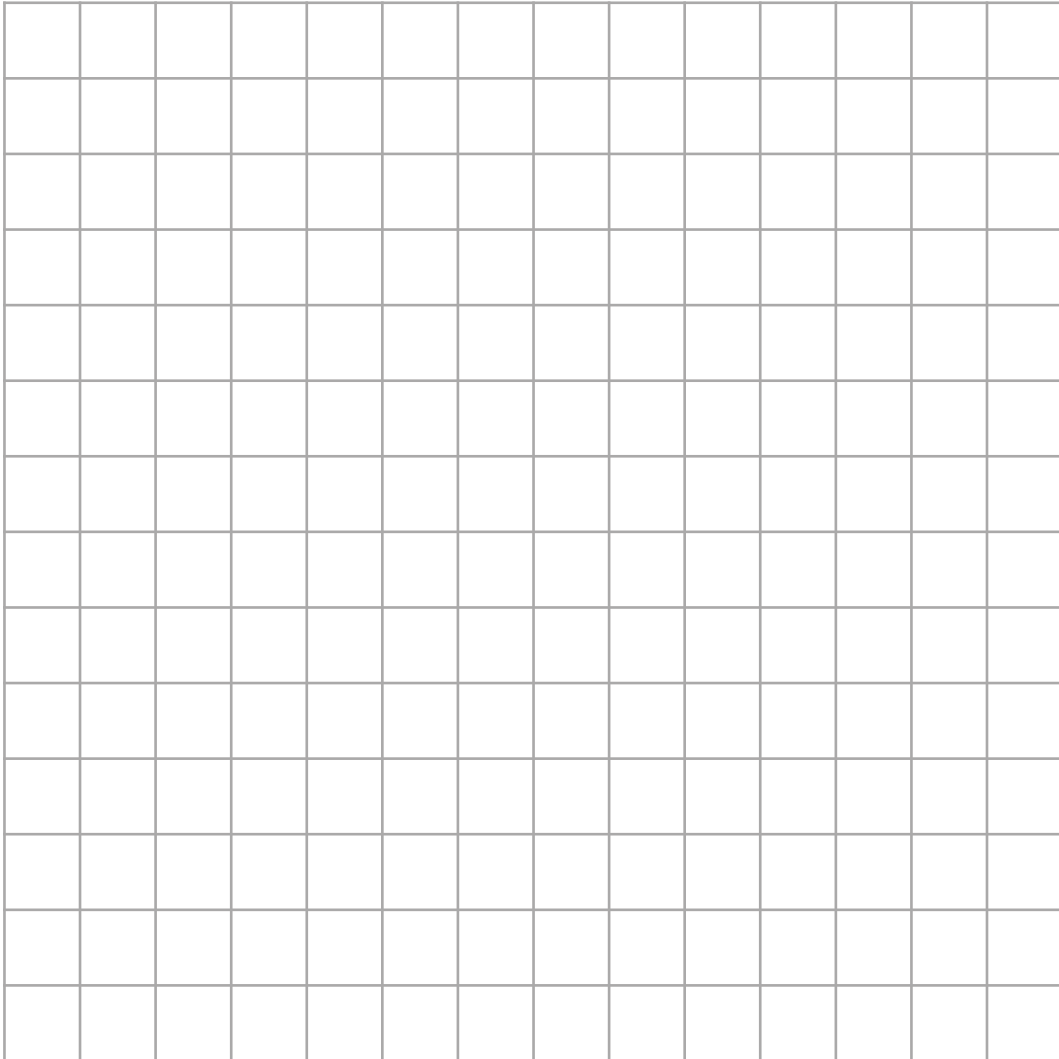


Diagram **NOT**
accurately drawn

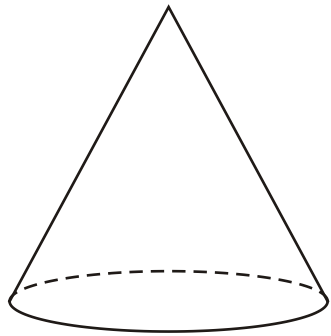
On the centimetre grid, make an **accurate** drawing of a net of this pyramid.



(Total 4 marks)

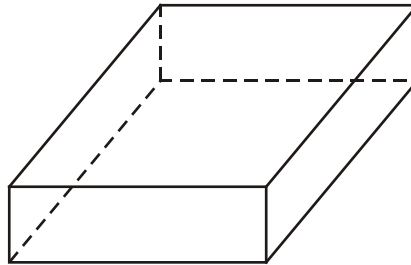
25. Write down the name of each of these two 3-D shapes.

(i)



(i).....

(ii)



(ii).....

(Total 2 marks)

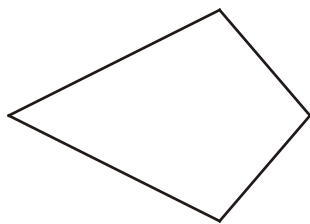
26. Here are some quadrilaterals.

Draw an arrow from each quadrilateral to its mathematical name.

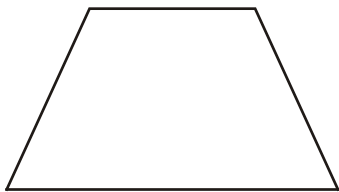
The square has been done for you.



rectangle

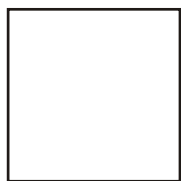


square



parallelogram

rhombus

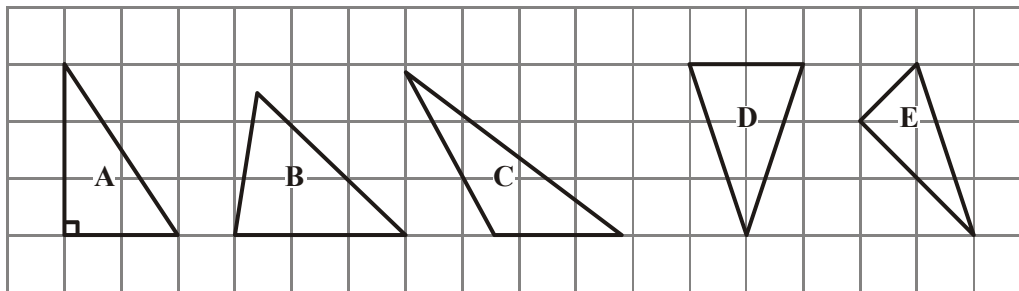


kite

trapezium

(Total 2 marks)

27. Which triangle is an isosceles triangle?



A

B

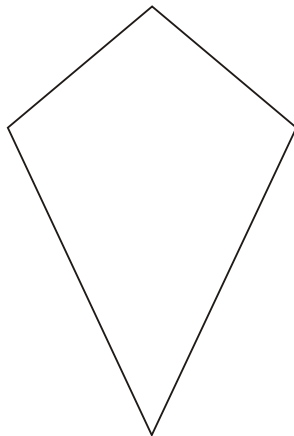
C

D

E

(Total 1 mark)

28. Write down the mathematical name of this quadrilateral.

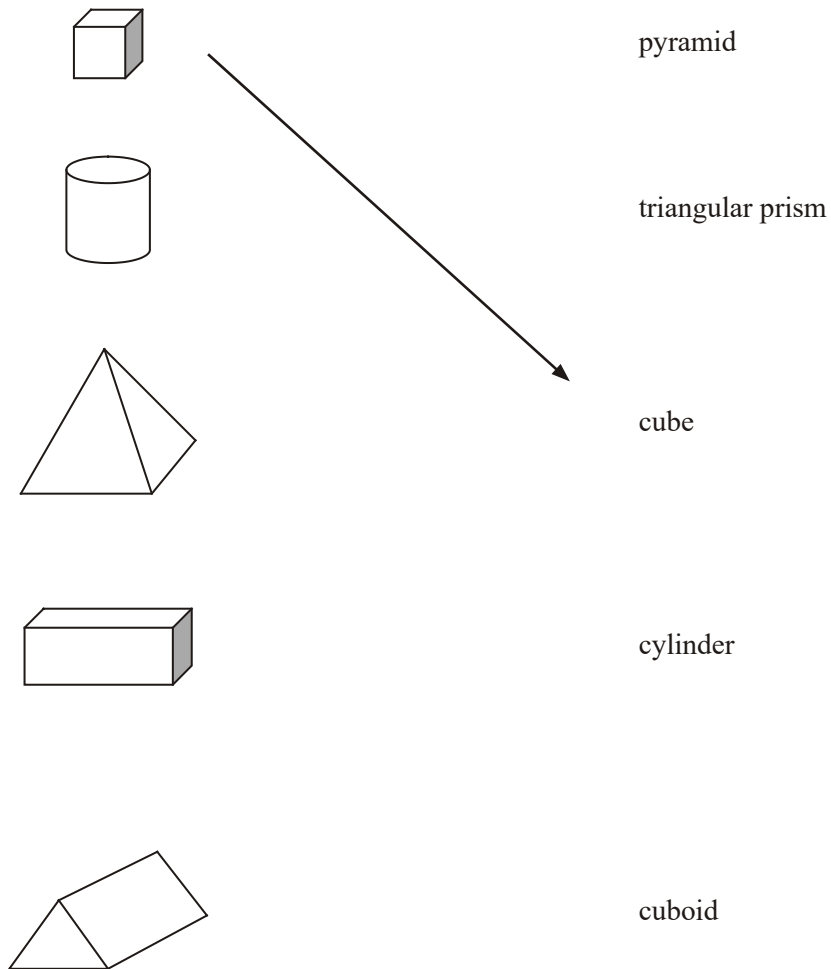


.....

(Total 1 mark)

29. The diagram shows some solid shapes and some mathematical names.
An arrow has been drawn from one solid shape to its mathematical name.

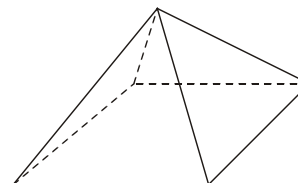
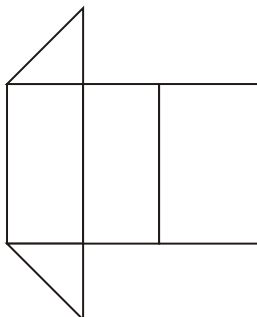
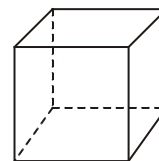
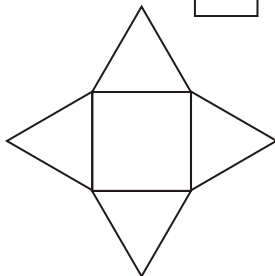
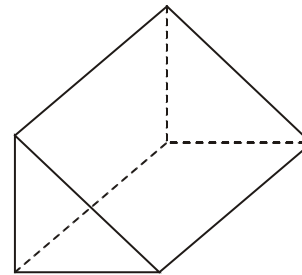
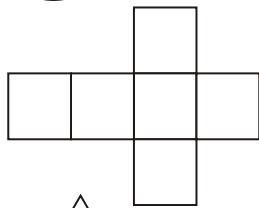
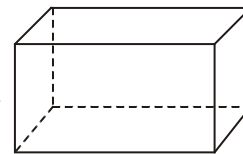
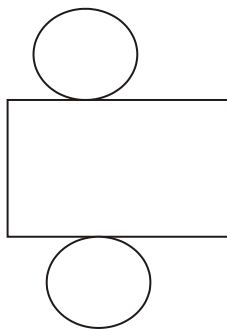
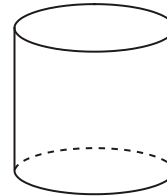
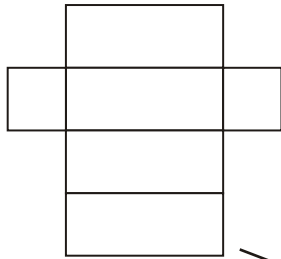
Draw an arrow from each of the other solid shapes to its mathematical name.
The cube has been done for you.



(Total 3 marks)

30. The diagram shows some nets and some solid shapes.
An arrow has been drawn from one net to its solid shape.

Draw an arrow from each of the other nets to its solid shape.



(Total 3 marks)

31. Here is a cuboid.

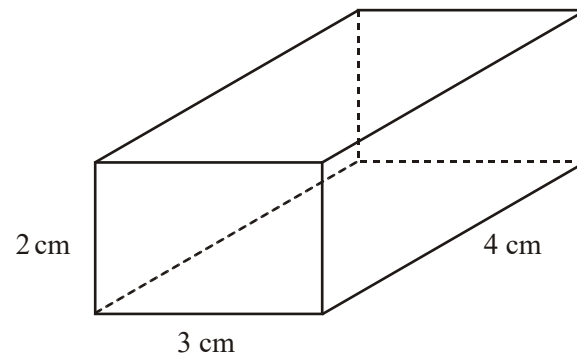
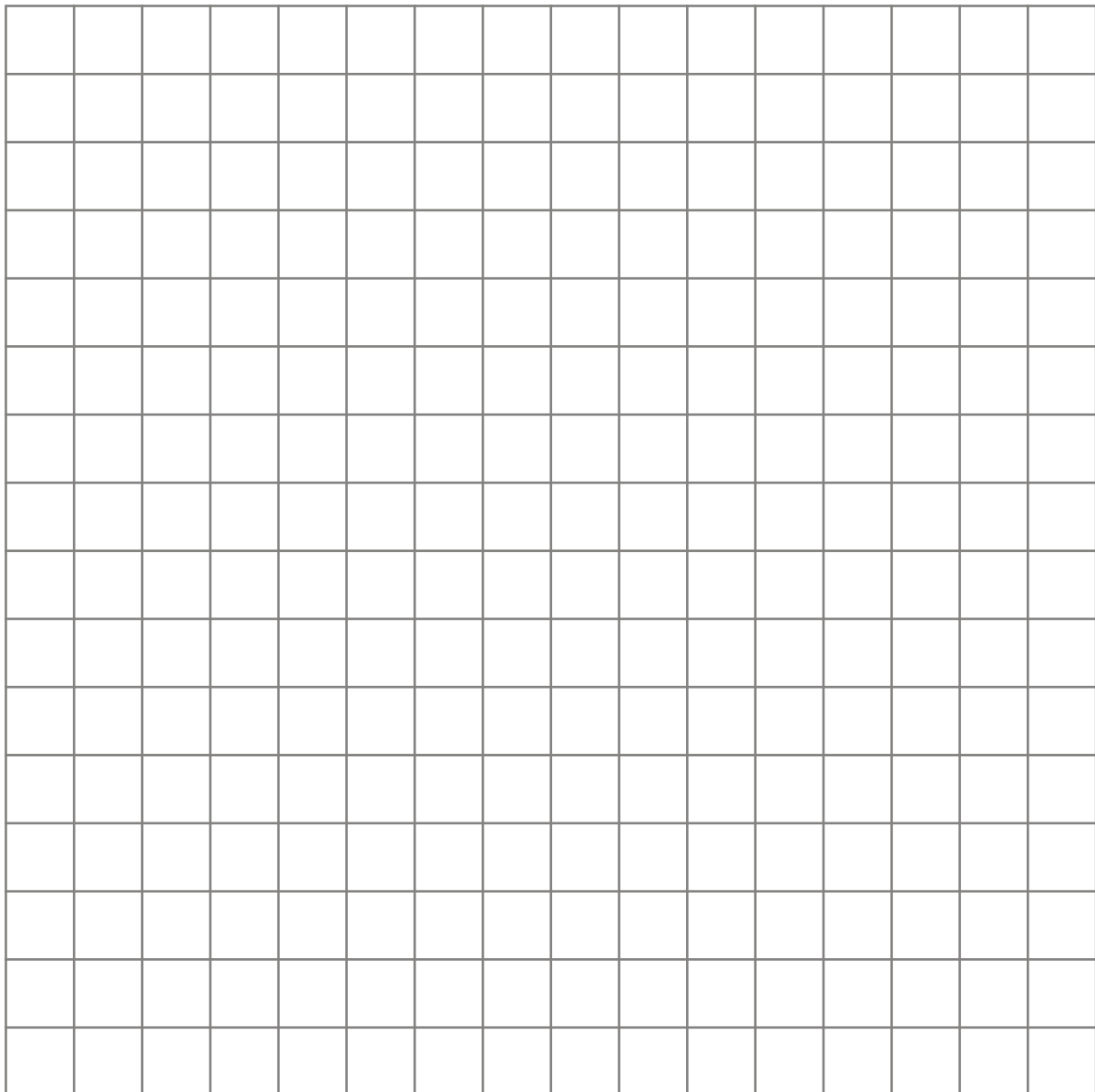


Diagram **NOT** accurately drawn

Draw an accurate net of this cuboid.



(Total 3 marks)

- | | | | |
|----|---------------|---|---|
| 1. | (i) sphere | <i>B1</i> | 1 |
| | (ii) cylinder | <i>B1 Accept circular prism</i> | 1 |
| | (iii) pyramid | <i>B1 Condone omission of "triangular" Accept tetrahedron</i> | 1 |

[3]

2. (a)  2

✓	×	
2	0	B2
1	0	B1
1	1	B1
2	1	B1

(b) 8 2
 $2 \times 2 \times 2$
M1 for $2 \times 2 \times 2$
A1 for 8 cao

[4]

3. See diagram 3
B3 all correct
(B2 for 3 correct
B1 for 2 correct)

[3]

4. (a) Draws perp. 1
B1 for correctly drawing perp must touch line or cut line
AB \pm 2mm

(b) Sketches a cylinder 1
B1 for sketching cylinder

[2]

5. (i) Cylinder 2
B1 ignore spelling

(ii) Cuboid
B1 ignore spelling

[2]

6. A 1
B1 cao **[1]**
7. (i) cone 1
B1 ignore spellings
- (ii) cuboid 1
B1 ignore spellings **[2]**
8. $(40 \div 10) \times (60 \div 20) \times (100 \div 10)$ 3
 120
M1 attempt one division (eg $40 \div 10$), may be implied by marks or number on one edge of diagram or by two of 4,3 and 10 seen
M1 (dep) for (" $40 \div 10$ ") \times (" $60 \div 20$ ") \times (" $100 \div 10$ ")
A1 cao
or
M1 for $10 \times 20 \times 10$ or $40 \times 60 \times 100$
M1 (dep) for " 240000 " \div " 2000 "
A1 cao **[3]**
9. (i) Cube 2
B1 for 'cube' (accept 'cuboid') ignore spelling
- (ii) Cylinder 2
B1 for 'cylinder' ignore spelling **[2]**
10. Shapes shaded on grid 2
 6 tessellating shapes
B2 for fully correct with 5 or more additional shapes, no gaps
(B1 for 4 shapes tessellating with at least one shape inverted, with or without the given shape ignore extras) **[2]**

11.	(a)	8		1	
			<i>B1 cao</i>		
	(b)	14		2	
			<i>B2 for 14 (B1 for 13 or 15)</i>		
	(c)	16		2	
			<i>B2 for 16 (B1 for 15, 17 or 8)</i>		
					[5]
12.	(i)	5 3		1	
			<i>B1 cao</i>		
	(ii)	9		1	
			<i>B1 cao</i>		
	(iii)	6		1	
			<i>B1 cao</i>		
					[3]
13.	Cuboid drawn			2	
			<i>B2 for correct isometric drawing in any orientation (ignore points 'behind', mark 7 vertices only); accept lines drawn near to dots as long as there is no ambiguity. (B1 for one of the three faces drawn correctly or for an isometric drawing of any cuboid)</i>		
					[2]
14.	(a)	Isosceles		1	
			<i>B1 for Isosceles (triangle) ignore spelling</i>		
	(b)	Square		1	
			<i>B1 ignore spelling</i>		
	(c)	Diagram of trapezium		1	
			<i>B1 for diagram of a trapezium</i>		
					[3]

- | | | | | | |
|-----|-------|---------|---|---|------------|
| 15. | (i) | 6 | | 1 | |
| | | | <i>Blcao</i> | | |
| | (ii) | 12 | | 1 | |
| | | | <i>Blcao</i> | | |
| | (iii) | 8 | | 1 | |
| | | | <i>Blcao</i> | | |
| | | | | | [3] |
| 16. | (a) | A and D | | 1 | |
| | | | <i>Blcao</i> | | |
| | (b) | E | | 1 | |
| | | | <i>Blcao</i> | | |
| | | | | | [2] |
| 17. | (a) | (i) | Trapezium | 1 | |
| | | | <i>BlTrapezium. Accept misspelling as long as the word given is still recognisable.</i> | | |
| | | (ii) | Parallelogram | 1 | |
| | | | <i>BlParallelogram. Accept misspelling as long as the word given is still recognisable.</i> | | |
| | (b) | Acute | | 1 | |
| | | | <i>Blcao</i> | | |
| | | | | | [3] |
| 18. | (i) | 6 | | 1 | |
| | | | <i>Blcao</i> | | |
| | (ii) | 12 | | 1 | |
| | | | <i>Blcao</i> | | |
| | (iii) | 8 | | 1 | |
| | | | <i>Blcao</i> | | |
| | | | | | [3] |

19.	(a)	8		1	
			<i>B1 cao</i>		
	(b)	C		1	
			<i>B1 for C or pyramid</i>		[2]
20.	(i)	cone		1	
			<i>B1 for cone or alternative spellings only that sound like "cone".</i>		
	(ii)	cylinder		1	
			<i>B1 for cylinder or alternative spellings only that sound like "cylinder". Accept circular based prism.</i>		[2]
21.	(a)	(i)	12	2	
			<i>B1</i>		
		(ii)	8		
			<i>B1</i>		
	(b)	net		3	
			<i>B3 for any correct net. See overlay. (B2 for 3 different-sized rectangles drawn within overlay) (B1 for 1 rectangle drawn within overlay) SC: B1 for any net that folds (by eye) to give a cuboid.</i>		[5]
22.	(a)	(i)	cylinder	2	
			<i>B1</i>		
		(ii)	cone		
			<i>B1</i>		
	(b)	(i)	cuboid	2	
			<i>B1</i>		
		(ii)	pyramid		
			<i>B1</i>		[4]

23.	(a) Correct net	2	
	<i>B2 cao</i> <i>(B1 for 2 equilateral triangles joined appropriately to at least one rectangle or for 1 equilateral triangle joined appropriately to one of the three rectangles)</i>		
	(b) Correct drawing	2	
	<i>B1 for two extra sides of length 6 cm ($\pm 2mm$)</i> <i>B1 for construction arcs 6cm from each of the ends of the given line</i>		
			[4]
24.	Correct net	4	
	<i>B1 for square side 4 cm</i> <i>B2 for one correct triangular face ($4.5 \times 4.5 \times 4$ ht 4.03)</i> <i>(B1 for an isosceles A)</i> <i>B1 for fully correct net</i>		
			[4]
25.	(i) Cone	1	
	<i>B1 ignore spellings</i>		
	(ii) Cuboid	1	
	<i>B1 ignore spellings</i>		
			[2]
26.		2	
	<i>B2 for all three quadrilaterals correctly identified</i> <i>(B1 for two quadrilaterals correctly identified)</i>		
			[2]
27.	D		[1]
28.	kite	1	
	<i>B1 cao</i>		
			[1]

29. cylinder,
pyramid,
cuboid,
triangular prism 3
- B3 for all 4 correct
(B2 for 2 or 3 correct)
(B1 for 1 correct)*
- [3]
30. B3 all 4 correct
B2 for 2 or 3 correct
(B1 for 1 correct)
- [3]
31. correct net 3
- B3 for correct net
(B2 for 5 faces drawn, all correct or 6 faces drawn with 4 or 5
faces correct
(B1 for a fully correct net with 6 faces for any cuboid)
Note: Accept outline only drawn*
- [3]

1. Mathematics a Paper 1

The quality of answers was almost as variable as the spelling. In general, any recognisable attempt received credit. Thus, for example, “Sophia” was awarded the mark in the first part, for which “ball” was the popular wrong answer. Part (ii) had the highest success rate of the three, although “tube” was often seen and, in part (iii), “prism” appeared frequently. The names of 2-D shapes e. g. circle, triangle and trapezium made regular appearances as well as more intriguing names such as “overall” (oval?) and “tunes” (tons?).

Mathematics B Paper 14

Poor spelling (although not penalised) was a feature of this question. Many candidates were not familiar with the mathematical names. Commonly seen was (i) ball or circle, (ii) tube, (iii) prism or triangular prism.

2. In part (a), there appeared to be some doubts about the meaning of “vertices”. From the labelling, some candidates seemed to confuse vertices with edges, while others seemed to confuse them with faces. The success rate on part (b) was very low, wrong answers being seen much more often than the correct answer. The most frequent one was 28, the perimeter of the net, with 38, the sum of the perimeter and the lengths of the internal lines, and 24, the surface area, also appearing regularly. 6, which was occasionally given as the answer, may have been an unsuccessful attempt to evaluate 2^3 .

3. Mathematics A Paper 2

About 95% of candidates gave a fully correct answer to this question and the other 5% scored 2 out of the 3 marks.

Mathematics B Paper 15

The vast majority of the candidates were able to identify each solid with its appropriate net correctly.

4. Candidates did not understand the idea of perpendicular and most candidates joined point C to A and or B . A few candidates confused parallel and perpendicular and drew a line through C parallel to AB . Only 7% of candidates drew the perpendicular correctly whilst 77 % of candidates were able to draw cylinder correctly in part (b).

5. Specification A

This questions caused candidates some confusion. Only 32% of candidates gained both marks and a further 42% gained one mark. Allowance was made for “interesting” spellings such as Queboyd and silinda.

Specification B

Naming the three-dimensional shapes met with considerable success. Some candidates, however, regarded them as being two-dimensional which resulted incorrectly as “circle” and “rectangle”.

6. Specification A

Nearly all candidates were able to identify A as the shape which could be made from the given net.

Specification B

This question was answered correctly by 95% of the candidates.

7. Part (i) was answered correctly by 64% of candidates, indicating that they were more familiar with a cone than a cuboid, which was the response that was required for part (ii).
8. A common approach was to calculate the volume of the box and the volume of the packet and divide the former by the latter. Many candidates had difficulty dealing with the number of zeros in the multiplications (often giving 24 000, rather than 240 000, as the volume of the box) and in the final division. Many candidates adopted the alternative method and attempted to find out how many packets fitted into each side of the box, i.e. 3, 4 and 10. These candidates were often successful. Sometimes, though, the figures were added rather than multiplied, giving rise to a common incorrect answer of 17.
9. Part (i) was almost always correct as a mark was given for cube or cuboid. In part (ii) candidates achieved less success, as they did not recognise the 3-D shape as a cylinder.

10. Foundation Tier

The candidates sitting this paper had little concept of tessellating a shape. Almost all the candidates knew that they had to draw extra trapeziums but some found it difficult to continue the shape without gaps. The shape given was fairly easy to tessellate but candidates failed to realise that to complete the diagram the shape had to be inverted. Many candidates, therefore, were frequently happy to tessellate the shape in two columns of three with spaces in between.

Intermediate Tier

The majority of candidates understood what was required and many fully correct tessellations were seen. Few candidates obtained one mark. Those who were unsuccessful almost always failed to recognize that the trapezium could be inverted and produced a tiling pattern with gaps or simply drew 5 or 6 more shapes of varying sizes on the grid.

11. Fewer candidates than in the past are getting confused between area and perimeter. Whilst the first part of this question was completed successfully by over 60% of candidates, answers to parts (b) and (c) were more susceptible to careless mistakes. Just under a half of the marks were earned in these two parts.
12. The correct number of faces was found by a good proportion of candidates but finding the number of edges and vertices caused a great deal more difficulty. Candidates often either counted inaccurately or were confused by the terms used.

13. Those candidates able to use the isometric grid correctly usually drew a cuboid with the correct dimensions and gained full marks. The majority of candidates, however, appeared to have no idea how to use the isometric grid properly and their drawings nearly always included horizontal lines, which are incorrect when drawing on such a grid. Many candidates did still gain 1 mark for drawing the right hand face correctly.
14. This question was, perhaps surprisingly, badly answered by many candidates. In particular part (b) was not very often recognised as a square. Many candidates thought that the equally marked sides were parallel. Some interesting shapes were seen for part (c) often not correct.
15. There was a mixed response to this question. Candidates were more often correct in recognising the number of faces. Often the number of edges and vertices were reversed.
16. Few of the candidates scored full marks for their answers to this question. Most could not recall the meaning of the term “congruent”. Many candidates confused it with “similar”. The success rate for part (b) of this question was disappointing with a large proportion of candidates choosing a triangle which satisfied only one of the two criteria given. Some candidates gave more than one letter in response to this part of the question despite clear instructions to the contrary.
17. There were predictably many confused spellings associated with naming the shapes; examiners did not penalise incorrect spelling unless it led to ambiguity. Overall this question was not well answered, with many incorrect names given for the shapes. Part (b) was better answered, with about $\frac{2}{3}$ of the candidates naming the angle correctly. The most common error was in naming it as an obtuse angle.
18. Many candidates were unable to understand the terms “face”, “edge” or “vertex”. About half of candidates gained the mark in (i), but answers given to (ii) were many and varied, almost arbitrary.
19. Only one in three candidates was able to give the correct number of vertices of the cube; 6 and 12 being the most common mistakes. Part (b) was very well answered.

20. Specification A

Poor spelling was not penalised as long as the word could be unambiguously associated with the solid. Nevertheless it was disappointing that 20% of candidates were unable to name these common solids correctly.

Specification B

Recognition of mathematical shapes and the use of the correct mathematical name was often evident with over 70% of the candidates scoring in each part. In part (i) the cone was often referred to as a pyramid or circular pyramid whilst in part (ii) the cylinder, with all its spelling variations, was sometimes referred to as a tube or a cuboid.

- 21.** Most candidates did not know the terms *vertices* and *edges* although there were some correct answers given and some reversed the answers in (a). In part (b) many tried to draw the cuboid accurately in 3D. There were some good responses with accurate nets being drawn, although some drew a net made up from only 2 different faces rather than 3.
- 22.** Naming a mathematical shape always produces strange and wonderful names and this year was no exception. Going for the simple *cylinder* and *cone* in part (a) was often overlooked. The cylinder became an 'oval' even though the question asked for a 3-D shape. The cone became a 'triangle' in spite of its elliptical base. Offerings like 'tricylinder' and 'prymaid' were not unusual. Naming the shapes in (b) proved more difficult with less than 20% obtaining both marks in (b) as opposed to 47% obtaining both marks in (a).
- 23.** Most candidates earned at least one mark in part (a) for their sketch of a net of the given triangular prism. Failure to score full marks was usually a result of sketches of; one rectangle with an equilateral triangle at each end, an equilateral triangle on each side, parallelograms (instead of rectangles) and trapezia instead of rectangles for the sides. Some candidates drew flaps onto their sketches; these were ignored and did not account for any loss of marks. A significant number of candidates, clearly understanding what a net is, tried to draw in perspective view. A greater number of candidates scored full marks in part (b) by clearly showing accurate construction arcs; however the absence of these arcs still is the most common source of error.

24. This question was a good discriminator. A fair number of candidates produced three dimensional sketches of the pyramid and could not be given any credit. However, over 60% of candidates understood the requirement to draw a net of the pyramid and so earned at least one of the marks available. Of these, most earned the mark for drawing a square of side 4cm and a mark for drawing at least one isosceles triangle. Many candidates were unable to draw a triangle accurately within the tolerance allowed and even fewer could reproduce this accuracy for all four triangles. One quarter of candidates scored full marks on this question. There was little evidence of the use of a pair of compasses to answer this question.
25. About two thirds of the candidates were able to identify the first shape as a cone. However, naming the cuboid proved more challenging with only a third of candidates writing an acceptable answer. Fortunately for the candidates, incorrect spellings were ignored as it was not uncommon to see cube boyed, queboyd and others as the name of the second shape.
26. Most candidates were able to correctly draw an arrow from two of the quadrilaterals on the left to its mathematical name. However there were many who could not get all three correct. The mean mark for this question was 0.99.
27. No Report available for this question.
28. Most candidates were able to recognise and name the kite although a significant number offered alternatives, the most common being rhombus, parallelogram and quadrilateral.
29. This question was answered correctly by 92% of candidates with a further 7% gaining 2 marks because then made 1 or 2 errors. Only 1% of candidates scored 1 or no marks.
30. This question was well answered by all.

31. Drawing an accurate net of the cuboid generally fell into two categories, those who produced a ruled accurate diagram and those who simply drew the same 2-D shape again on the squared outline provided. In between there were many nets with just five faces which were partially rewarded if the accuracy was there. Those candidates who ignored the given dimensions but drew an accurate net of a cuboid were awarded 1 mark. It was disappointing to note that nearly half the candidates failed to score any marks at all on this question.