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New Zealand	Year 9
Pacific	Year 9
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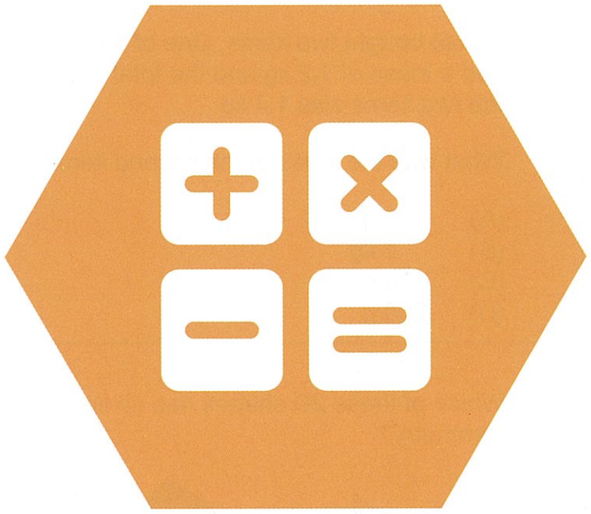
PAPER F



2013 ICAS

International Competitions and Assessments for Schools

MATHEMATICS

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DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

40 QUESTIONS

TIME ALLOWED: 1 HOUR

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.
Use a 2B or B pencil.
Do **NOT** use a pen.
Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

Mark only **ONE** answer for each question.
Your score will be the number of correct answers.
Marks are **NOT** deducted for incorrect answers.

There are **35 MULTIPLE-CHOICE QUESTIONS** (1–35).
Use the information provided to choose the **BEST** answer from the four possible options.
On your **ANSWER SHEET** fill in the oval that matches your answer.

There are **5 FREE-RESPONSE QUESTIONS** (36–40).
Write your answer in the boxes provided on the **ANSWER SHEET** and fill in the ovals that match your answer.

You may use a ruler and spare paper.
A **CALCULATOR** is required.

1. Which unit is most appropriate to measure the length of a bus?

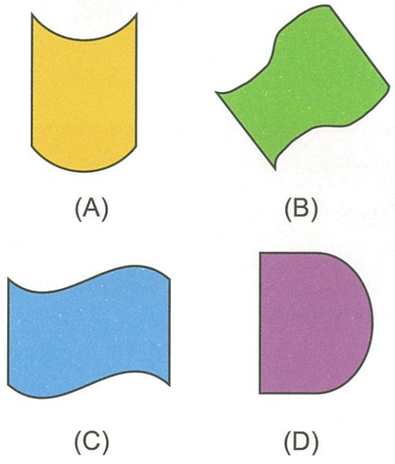
(A) litre
(B) metre
(C) kilometre
(D) square metre

2. Susan bought two items. One of the items had a mass of 1.2 kg and the total mass of the two items was 1.4 kg.

What was the mass of the second item?

(A) 2 g
(B) 2 kg
(C) 20 g
(D) 200 g

3. Which of these 2D shapes has no line of symmetry?



(A) (B)

(C) (D)

4. There are 18 sacks on a truck. Each sack contains 25 kg of fertiliser.

How much fertiliser is in the sacks altogether?

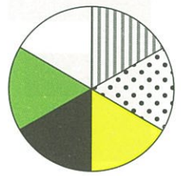
(A) 1890 kg
(B) 450 kg
(C) 200 kg
(D) 43 kg

5. Mia has a cone, a triangular prism and a square pyramid.

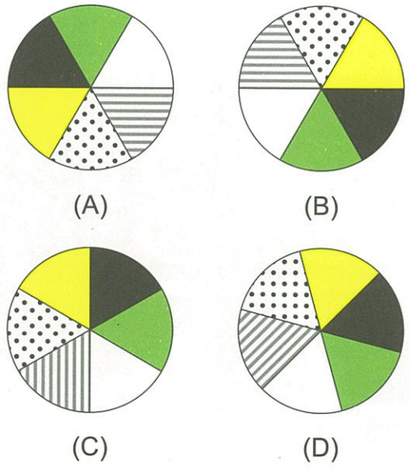
What is the total number of triangular faces on these three solids?

(A) 6
(B) 7
(C) 8
(D) 9

6. Edward turns this wheel a quarter turn anticlockwise. Then Mia turns it a further half turn in the same direction.



Which option shows the wheel after these turns?



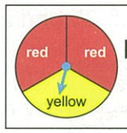
(A) (B)

(C) (D)

7. Which of the following events is the most likely to happen?

(A)  tossing an A when you throw a coin (the coin is labelled A on one side and B on the other)

(B)  rolling a 6 when you throw the dice once (the dice is numbered from 1 to 6)

(C)  landing on yellow when you spin this spinner

(D)  picking a black ball from this bag without looking

8. The numbers 4, 6, 10, 18, ... form a number pattern.

Which statement best describes the number pattern starting from the second term?

(A) Each number is eight more than the previous number.
(B) Each number is two less than twice the previous number.
(C) Each number is two more than the previous number.
(D) Each number is eight less than three times the previous number.

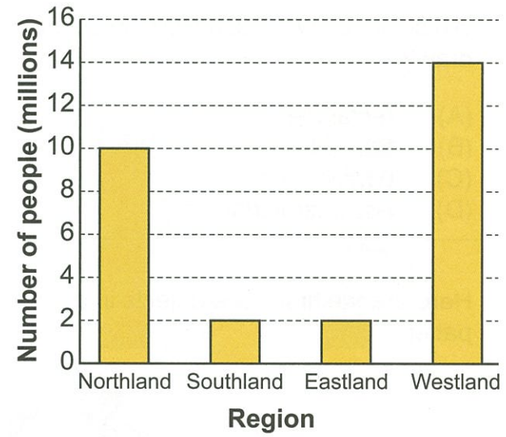
9. The price of six types of sandwiches sold at a store was :

$16, $12, $10, $6, $5, $20

What was the median price of the sandwiches?

(A) $3.50
(B) $8
(C) $11
(D) $11.50

10. Yara drew this graph to show the population of four regions in her country.

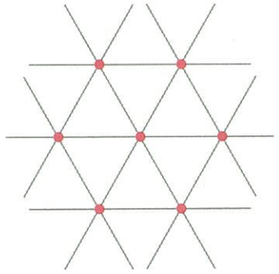


She wants to put the same information in a sector (pie) graph.

What angle should Yara use to represent the population of Westland?

(A) 64°
(B) 90°
(C) 150°
(D) 180°

11. Seven dots are shown on a grid.

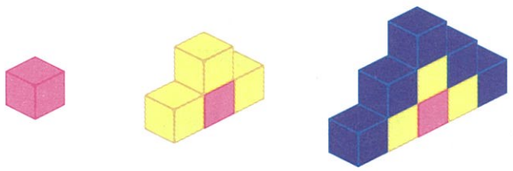


Anish wants to draw a plane shape using the dots for the vertices and the grid lines for the sides. Not all dots and grid lines will be used.

Which shape will Anish **NOT** be able to draw?

(A) rectangle
(B) trapezium
(C) parallelogram
(D) equilateral triangle

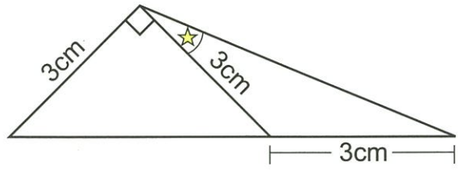
12. Here are the first three objects in a pattern.



How many blocks would be needed to make the 5th object in the pattern?

(A) 15
(B) 16
(C) 25
(D) 26

13.



What is the size of the angle marked ☆?

(A) 22.5°
(B) 30°
(C) 45°
(D) 112.5°

14. The table shows the cost of renting a DVD for n days.

n (days)	Cost (dollars)
1	4.25
2	5.50
3	6.75
4	8.00
5	9.25

Which of these expressions represents the cost, in dollars, of renting a DVD for n days?

(A) $1.25n + 3$
(B) $1.25 + 3n$
(C) $n + 3.25$
(D) $3n \times 1.25$

15. Raj has four pieces of copper wire. The lengths of the pieces are 3 m, 45 cm, 86 cm and 8 m.

Raj sells the four pieces for a total price of $36.

What calculation can Raj use to find the price per metre?

(A) $(3 + 0.45 + 0.86 + 8) \div 36$
(B) $(3 + 4.5 + 8.6 + 8) \div 36$
(C) $36 \div (3 + 0.45 + 0.86 + 8)$
(D) $36 \div (3 + 4.5 + 8.6 + 8)$

16. Jess had 70 flowers and 8 vases.

She put an equal number of flowers in each vase.

Which of these **CANNOT** be the number of flowers left over?

(A) 14
(B) 22
(C) 30
(D) 44

17. The Blue team played three games of basketball on Saturday and three games on Sunday. Overall the team scored an average of 16 points in their games.

The table shows their scores in five of the games.

	Game 1	Game 2	Game 3
Saturday	24	20	16
Sunday	17	13	?

How many points did the Blue team score in Game 3 on Sunday?

(A) 6
(B) 9
(C) 16
(D) 18

18. These posters are in four different shop windows.

Which shop is selling jeans for the lowest price?

(A)

(B)

(C)

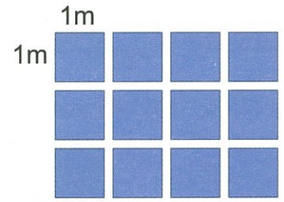
(D)

19. This box has a volume of 1 cubic metre.

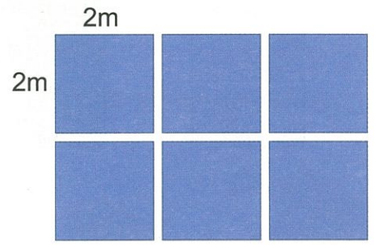
Raj used six squares to make this box. Each square has an area of one square metre.

Which set of shapes should Raj use to make a box that has a volume of 2 cubic metres, without having any shapes left over?

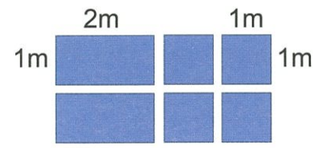
(A)



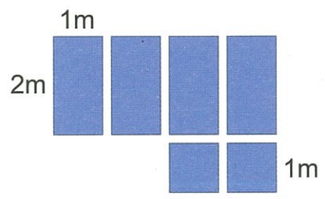
(B)



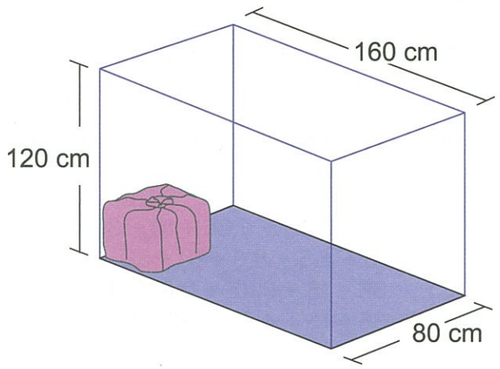
(C)



(D)



20. A package is placed into a large storage box as shown.



Which of the following is the best estimate of the volume of the package?

(A) 20 000 cm^3
(B) 60 000 cm^3
(C) 120 000 cm^3
(D) 190 000 cm^3

21. n stands for the number of guests who attended a party. Each guest was served 250 g of salad.

A 12 kg tray of pasta was also shared equally among the guests.

Which expression describes how much food each guest received, in kg?

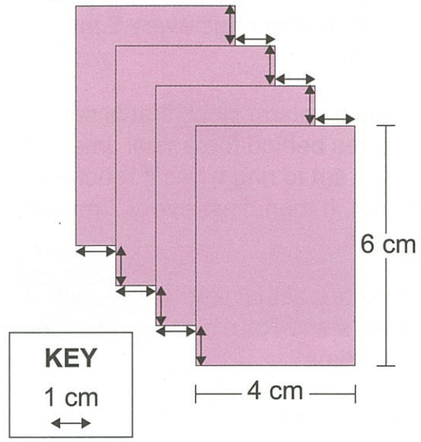
(A) $12n + 0.25$

(B) $\frac{1}{n} + \frac{1}{4}$

(C) $\frac{12}{n} + \frac{1}{4}$

(D) $\frac{n}{12} + 0.25$

22. Anna placed four identical rectangular pieces of paper on a table as shown.

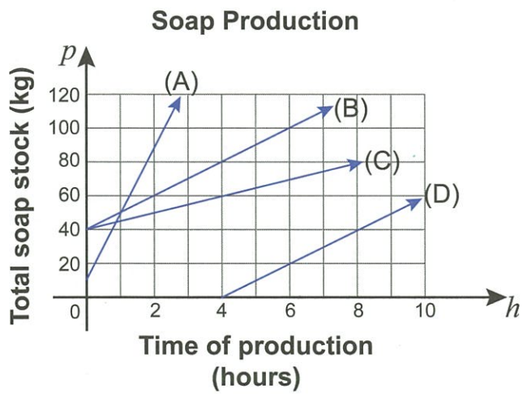


What area of the table did they cover?

(A) 96 cm^2
(B) 63 cm^2
(C) 54 cm^2
(D) 51 cm^2

23. On a particular day, a soap factory has 40 kg of soap in stock. The factory produces a further 10 kg of soap every hour.

Which line shows the total soap stock p kg, after h hours of production during that day?

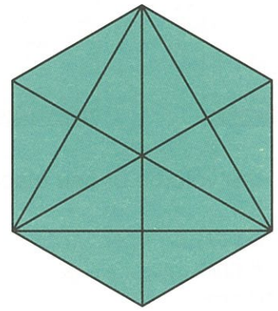


24. An ant walked 2 m north-east. It then walked 4 m south-east and finally walked 2 m south-west.

How far was the ant from its starting position?

(A) 8 m
(B) 6 m
(C) 4 m
(D) 2 m

25. How many triangles of any size are there in this diagram?



(A) 43
(B) 37
(C) 17
(D) 13

26. Edward had a book to read.

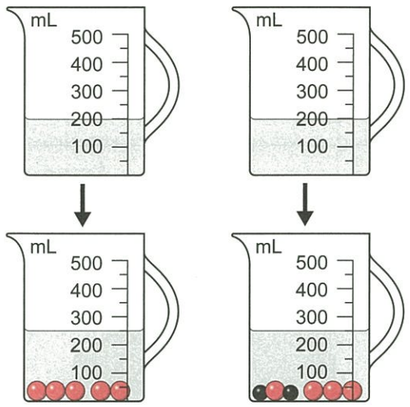
On Monday he read half of the book. On Tuesday he read a third of the pages remaining from Monday. On Wednesday he read a quarter of the pages remaining from Tuesday.

What fraction of the book does Edward have left to read?

(A) $\frac{1}{24}$ (B) $\frac{1}{4}$
(C) $\frac{3}{9}$ (D) $\frac{3}{4}$

27. Anna has two jugs. Each jug contains 200 mL of water.

Anna dropped 5 red balls in one jug. She also dropped 4 red and 2 black balls in the other jug.



What is the volume of one black ball?

(A) 5 cm^3
(B) 8 cm^3
(C) 10 cm^3
(D) 25 cm^3

28. In the Jones family there are boys and girls.

Each boy in the Jones family has as many brothers as sisters.

Each girl in the Jones family has twice as many brothers as sisters.

How many children are there in the Jones family?

(A) 3
(B) 6
(C) 7
(D) 9

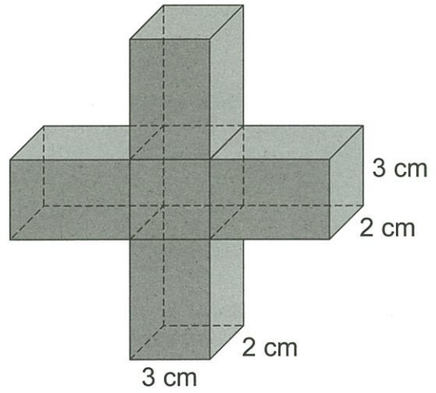
29. Edward has an alarm clock that is set 4 minutes ahead of the actual time. The alarm is set to ring when it reaches 6:14 am. It then rings every 8 minutes after that.

Raj has an alarm clock that is set 3 minutes behind the actual time. The alarm is set to ring when it reaches 6:10 am. It then rings every 7 minutes after that.

What is the actual time when both Edward's and Raj's clocks ring together for the first time?

(A) 6:34 am
(B) 6:38 am
(C) 6:42 am
(D) 7:06 am

30. A teacher shows her class a 3D shape made by intersecting two identical rectangular prisms, each with dimensions 2 cm × 3 cm × 10 cm, as shown in the diagram.



NOT TO SCALE

The prisms have a common centre and the faces intersect at right angles.

What is the volume of the resulting solid, in cubic centimetres?

(A) 100
(B) 102
(C) 108
(D) 120

31. Anna and Raj each have some pens.

Anna has three fewer pens than Raj.

If Raj had two more pens, then he would have twice as many pens as Anna.

How many pens do Anna and Raj have altogether?

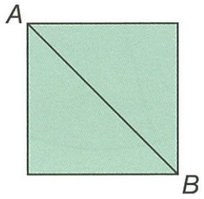
(A) 5
(B) 10
(C) 13
(D) 15

32. Edward paints a fence in 12 hours. Danny paints 60% faster than Edward.

How much time would Danny need to paint the same fence?

(A) 4 hours and 48 minutes
(B) 7 hours and 12 minutes
(C) 7 hours and 30 minutes
(D) 8 hours

33. Edward walked around two edges of a square field from *A* to *B*. Mia walked diagonally from *A* to *B*.



Approximately what percentage of the distance Edward walked was the distance Mia walked?

(A) 50 %
(B) 71 %
(C) 100 %
(D) 141 %

34. Reservoirs A and B supply water to the City of Bigland.

The ratio of the capacity of Reservoir A to the capacity of Reservoir B is 3:1.

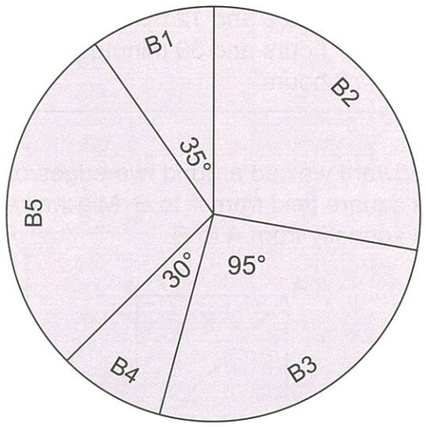
When Reservoir A is 40% full it holds 427 200 megalitres (ML) of water.

What is the capacity of Reservoir B?

(A) 170 880 ML
(B) 356 000 ML
(C) 1 068 000 ML
(D) 3 204 200 ML

35. In a survey 1440 students were asked about the internet browser they use. Each student named one browser only.

The results of the survey are represented by this pie graph.



About how many more students use B5 than B4?

(A) 70
(B) 170
(C) 280
(D) 680

QUESTIONS 36 TO 40 ARE FREE RESPONSE.

Write your answer in the boxes provided on the ANSWER SHEET and fill in the ovals that match your answer.

36. A group of students are going on a roller coaster ride. Each car of the roller coaster has two seats.

The table lists two possible seating arrangements.

Seating arrangement	Result
1 student in each car	2 students without seats
2 students in each car	1 car is empty

What is the number of students in the group?

37. Mia chose a number.

Raj chose a number that is 2 more than Mia's number.

The square of Raj's number is 16 more than the square of Mia's number.

The cube of Raj's number is x more than the cube of Mia's number.

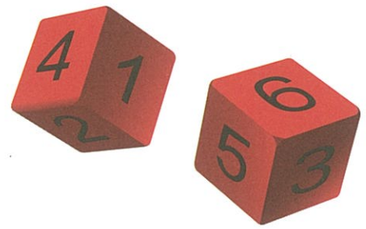
What is the value of x?

38. A bus company has two different sizes of bus. A small bus can carry 20 people and a large bus can carry 50 people. The ratio of the number of small buses to large buses is 5:7.

All the company buses together can carry a total of 900 people.

How many small buses does the company have?

39. On a 6-sided standard dice, the numbers on opposite faces add to seven. For example if one side shows 3, the opposite side shows 4.



Sue has 27 standard dice which she stacks to form a 3 × 3 × 3 cube. She then adds all the numbers on the outside faces of her large cube.

What is the smallest possible sum Sue can get?

40. A speedboat, towing a skier, drives in a full circle with a 42 m diameter. It takes 10 seconds to complete the circle.

The skier takes the same amount of time to complete a larger circle with a diameter of 56 m.

How much faster than the speedboat does the skier travel to the nearest km per hour?

ICAS MATHS 2013 F – ANSWER KEY

Question Number	Paper F
1	B
2	D
3	C
4	B
5	A
6	A
7	D
8	B
9	C
10	D
11	A
12	C
13	A
14	A
15	C
16	D
17	A
18	D
19	D
20	B
21	C
22	D
23	B
24	C
25	B
26	B
27	A
28	C
29	A
30	B

Question Number	Paper F
31	C
32	C
33	B
34	B
35	C
36	6|006|06
37	98|098
38	10|010
39	90|090
40	16|016