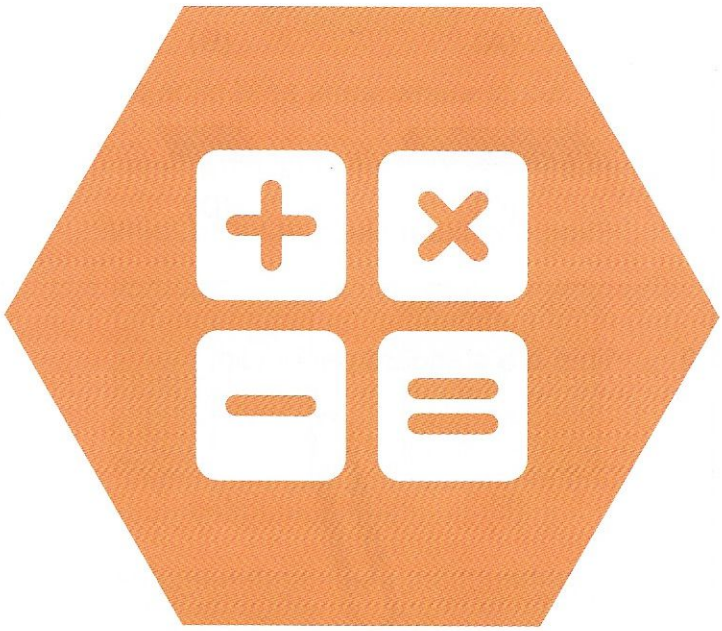
UNSW Global
AUSTRALIA

PAPER D



2016 ICAS

International Competitions and Assessments for Schools

MATHEMATICS

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.
You are **NOT** allowed to use a calculator.

Educational Assessment Australia
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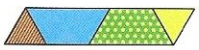
1. Mia made this repeating pattern.

Which of these is the part that repeats to continue the pattern?

(A)



(B)

(C)

(D)

2. This is a standard paper clip.

What is the approximate mass of this paper clip?

(A) 1 gram
(B) 1 milligram
(C) 3 millilitres
(D) 3 centimetres

3. Taylor wrote the number 8.973.

What is the value of the 7?

(A) 7 tens
(B) 7 tenths
(C) 7 hundreds
(D) 7 hundredths

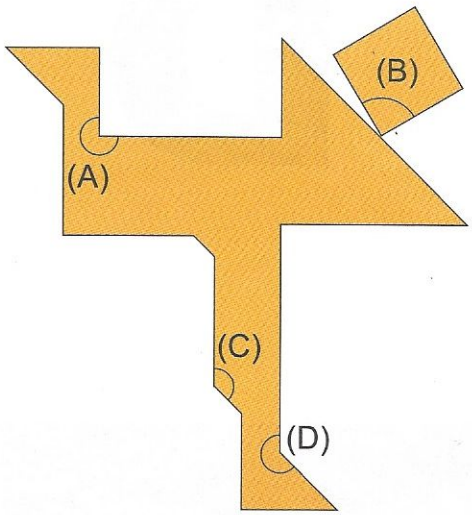
4. A plane drops 10 food parcels at equal intervals over a distance of 3 kilometres.

About how many metres is it between one parcel and the next?

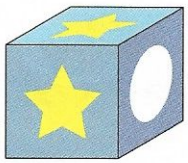
(A) 3
(B) 30
(C) 300
(D) 3000

5. Sven made a pattern with some cardboard shapes.

Which angle is the largest?



6. Alana had a cube. She painted one shape on each face. Alana painted 2 circles, 3 stars and 1 cross.



Alana rolled the cube along a table.

What is the probability that the cube finished with a star on top?

(A) $\frac{2}{6}$ (B) $\frac{3}{6}$

(C) $\frac{2}{3}$ (D) $\frac{3}{3}$

7. Jamie is using this recipe to cook pumpkin soup.

PUMPKIN SOUP

Serves 15

Ingredients

Pumpkin	2100 grams
Beef stock	1800 millilitres

Jamie is cooking for 5 people.

How much pumpkin should he use?

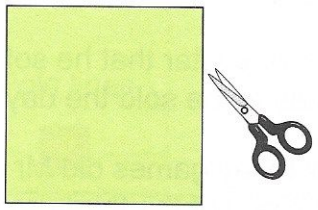
(A) 420 grams
(B) 600 grams
(C) 650 grams
(D) 700 grams

8. Abby is calculating $6015 \times 98 \div 49$.

What is a good estimate for Abby's answer?

(A) 12
(B) 120
(C) 1200
(D) 12000

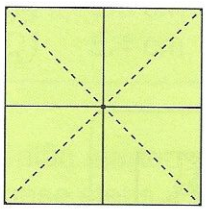
9. Tony is cutting and folding a piece of square paper to make an open box with rectangular faces.



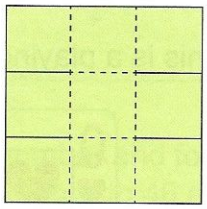
The solid lines show where to cut.

The dashed lines show where to fold.

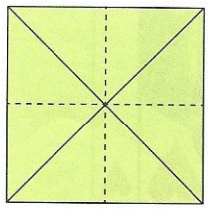
Which of these could make the box?



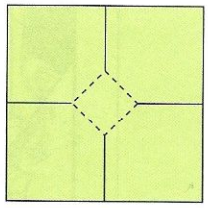
(A)



(B)



(C)



(D)

10. Mr Hay has fewer than 32 students in his class. Each student must play chess and soccer, and take part in a debate.

He divided his class into groups:

- 2 groups for chess
- 5 groups for soccer with 1 student left over
- 3 groups for debating with 2 students left over

How many students are there in his class?

(A) 16
(B) 22
(C) 26
(D) 30

11. Mr Martins opened a stall as he had 800 games to sell.

The first day he sold 120 games.

Each day after that he sold half as many games as he sold the day before.

How many games did Mr Martins have left at the end of the third day?

(A) 440
(B) 590
(C) 620
(D) 680

12. This is a playing card.

This image shows the top half of the card.

What must be done to this image in order to create the bottom half of the card?

(A) Flip it over the horizontal line.
(B) Flip it over the vertical line.
(C) Rotate it a half turn.
(D) Rotate it a quarter turn.

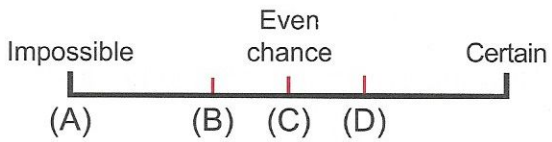
13. A rectangle has an area of 36 square metres. Its length and width are whole numbers.

Which of these could be its perimeter?

(A) 40 metres
(B) 37 metres
(C) 20 metres
(D) 12 metres

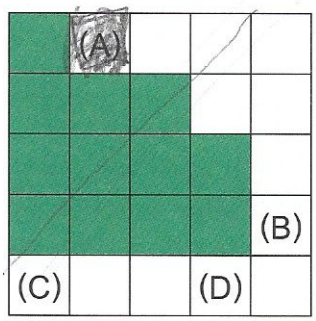
14. It is likely that it will rain tomorrow.

Which position on the line represents the chance that it will **NOT** rain tomorrow?

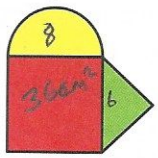


15. Alana needs to colour in one more square to make a shape with one line of symmetry.

Which square does she need to colour in?

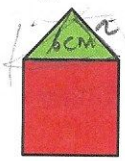


16. Figure A



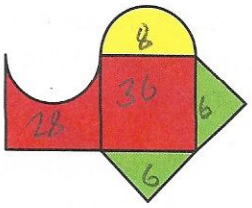
Area = 50 cm²

Figure B



Area = 42 cm²

Figure C



Area = ?

What is the area of Figure C?

(A) 84 cm²
(B) 92 cm²
(C) 100 cm²
(D) 117 cm²

17. Leila wanted to build a fence to enclose her octagonal vegetable garden as shown.

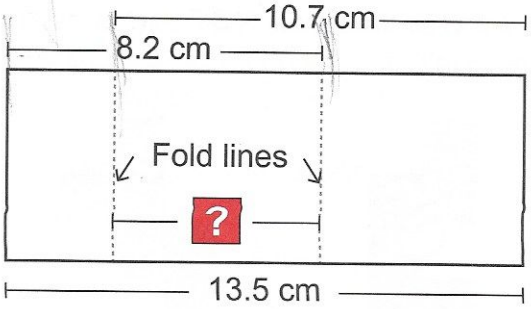
Leila calculated the total length of fencing required.

At the hardware store, this total length was rounded up to the nearest metre. Leila paid $5 per metre.

What was the cost of fencing for the vegetable garden?

(A) $123
(B) $130
(C) $132
(D) $135

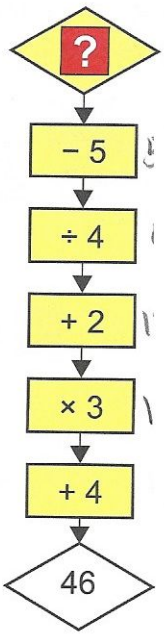
18. Min folded a piece of paper twice.



What distance must ? be?

(A) 2.8 cm
(B) 3.5 cm
(C) 5.3 cm
(D) 5.4 cm

19. Calan started with a number and followed these steps. He ended up with 46 as his final answer.

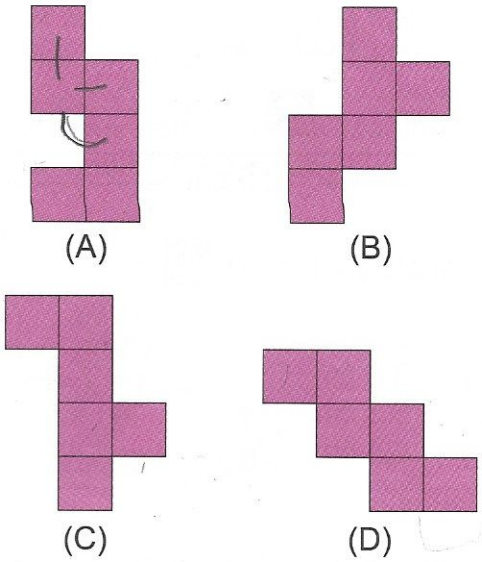


What was his starting number?

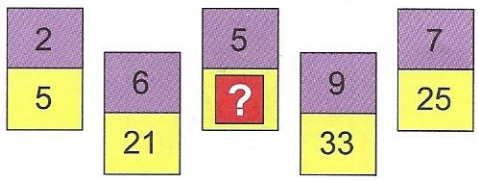
(A) 33
(B) 36
(C) 53
(D) 60

20. There are many different nets of a cube.

Which of these will **NOT** fold to make a cube?



21. A rule is applied to the top number in each rectangle to give the bottom number.



What number must ? be?

(A) 17
(B) 16
(C) 15
(D) 11

22. The four countries that won the most medals in the 2012 Summer Olympics were Great Britain, Russia, the USA and China.

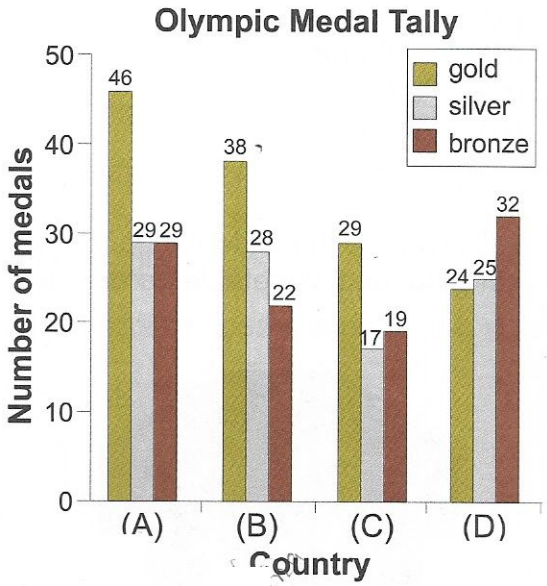
Russia won a total of 81 medals.

The USA won equal numbers of silver and bronze medals.

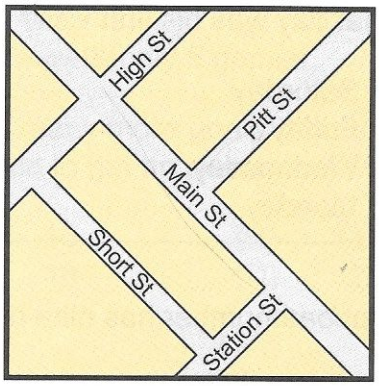
The combined number of gold and silver medals won by China was three times the number of bronze medals they won.

This unlabelled graph shows the number of medals won by each of these countries.

Which option represents the medals won by Great Britain?



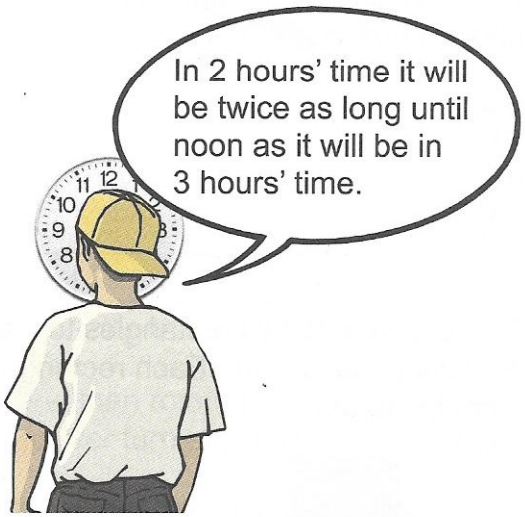
23. Edward is walking in a northerly direction along Pitt St towards Main St. When he reaches Main St, he turns right. Then he turns left into the next street and left again into the next street.



What direction will Edward then be facing?

(A) North (B) South
(C) East (D) West

24. Tim looked at the clock and said,



What is the time on the clock?

(A) 6:00 am
(B) 7:00 am
(C) 8:00 am
(D) 9:00 am

25. Kate is using a rule to generate her code.

For each letter, she uses the number of its position in the alphabet, doubles this number and then subtracts 3.

For example, B is in position 2 so:

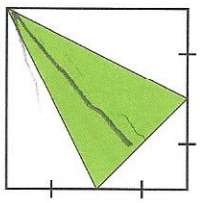
B = 2 × 2 – 3 = 1

What code will Kate use for F U N ?

(A) 6 21 14 (B) 6 36 22

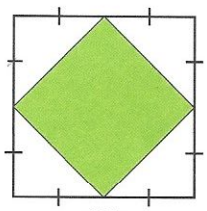
(C) 9 37 23 (D) 9 39 25

26. Lori had two identical white squares. She drew a triangle in the first square and shaded it.

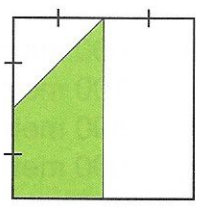


She drew a shape, with the same area, inside the other square.

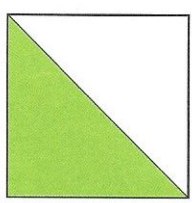
Which of these could be Lori's second square?



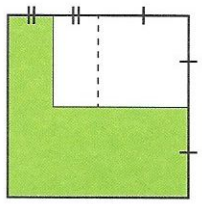
(A)



(B)



(C)



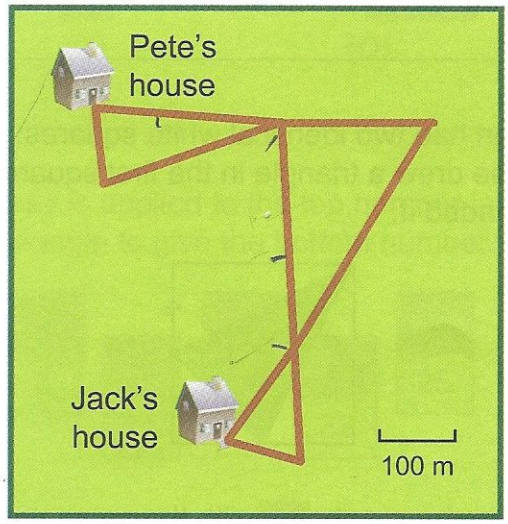
(D)

27. A digital timer counts down from 3 minutes to zero, one second at a time.

For how many seconds does at least one of these digits show a 5?

(A) 45
(B) 36
(C) 24
(D) 18

28. This map shows the bush tracks near Pete's house and Jack's house.



Pete walked to Jack's house by the shortest route.

About how far did he walk?

(A) 600 metres
(B) 700 metres
(C) 800 metres
(D) 900 metres

29. James has to visit the doctor twice. His two visits must be sixteen days apart. His second visit is the day after tomorrow.

Yesterday was Sunday.

On what day was his first visit?

(A) Saturday
(B) Friday
(C) Wednesday
(D) Monday

30. Zac's phone number has nine digits.

The sum of the digits is 49.

All of the digits are odd numbers and one digit appears exactly three times.

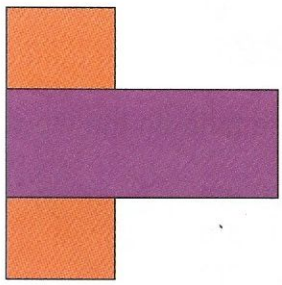
Zac wrote down the first six digits.

995773

Which digit appears three times in Zac's phone number?

(A) 3
(B) 5
(C) 7
(D) 9

31. Tala overlapped two rectangles to make a new shape as shown. Each rectangle was 4 cm by 10 cm.



What is the area of the new shape?

(A) 80 cm^2
(B) 64 cm^2
(C) 48 cm^2
(D) 40 cm^2

32. Mia is a goal shooter in netball.

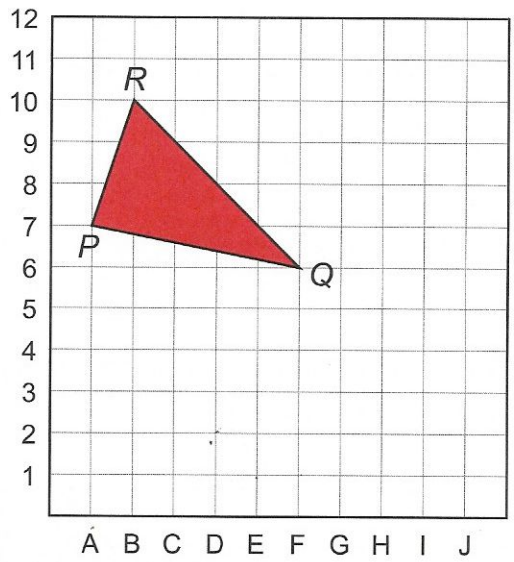
She scored 16 goals in the first game, 21 goals in the second game, 9 goals in the third game, 14 goals in the fourth game and 10 goals in the fifth game.

There were only 5 games.

How many more goals should Mia have scored to get an average of 16 goals?

(A) 16 (B) 14
(C) 10 (D) 2

33. Tracey drew the triangle *PQR*.

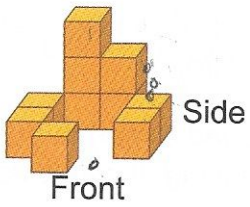


She then rotated the triangle a quarter turn anticlockwise about *Q*.

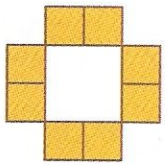
What was the position of *P* after the rotation?

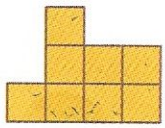
(A) E1
(B) F1
(C) D2
(D) E2

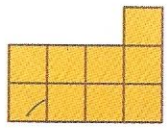
34. Ben stacked his cubes to make this pattern.



He wants to add more cubes so his pattern matches these views.


Top view


Front view


Side view

What is the minimum number of cubes Ben needs to add?

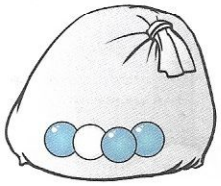
(A) 2 (B) 3
(C) 4 (D) 5

35. Kim had a bag with white and blue marbles.

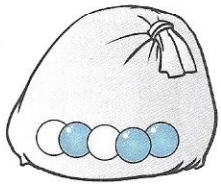
The chance of picking a white marble was one-third.

She removed a marble from the bag without looking. It was blue.

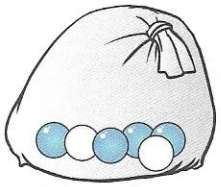
Which of the following could be Kim's bag after she had removed the blue marble?



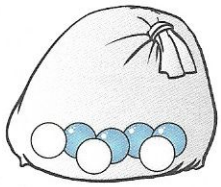
(A)



(B)



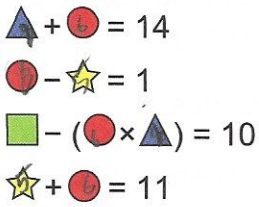
(C)



(D)

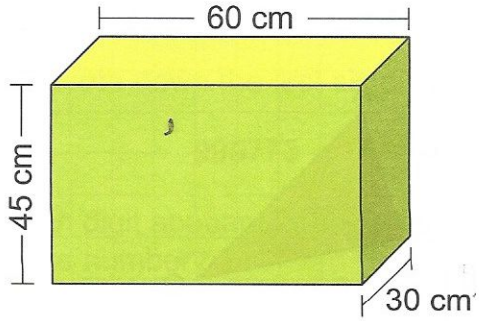
QUESTIONS 36 TO 40 ARE FREE RESPONSE.

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

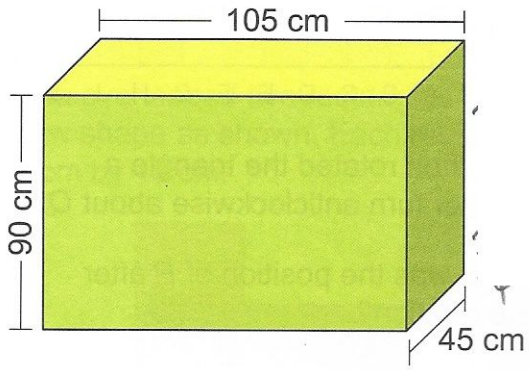
36. 

What is the value of ▢ ?

37. This box holds 24 identical cubes with no wasted space.



This new box was designed to hold more cubes than the original box.



How many cubes can fit in the new box?

38. *In the western calendar, leap years occur* every 4 years except at the turn of a century. However, if the year is a multiple of 400, it is also a leap year.

In this scheme, the first leap year occurred in 1752.

How many leap years have occurred from 1752 to 2016 inclusive?

39. Mrs Jones is meeting her son, Guy, at Waterfell Wharf at 6:00 pm. She needs to catch two trains to get from Gadon to Harbour Station and then a ferry to Waterfell.

Train Timetable

Station	Time				
Gadon	14:16	16:03	16:11	16:22	16:40
Chatting	14:56	16:43	16:51	17:02	17:20
Forest	15:05	16:54	17:00	17:11	17:29
Downing	15:15	17:04	17:10	17:19	17:37
Central	15:23	17:12	17:18	17:27	17:45

Station	Time				
Central	15:13	17:07	17:15	17:27	17:35
Downing	15:21	17:15	17:23	17:35	17:43
Harbour	15:24	17:18	17:26	17:38	17:46

Ferry Timetable

Wharf	Time				
Habour	15:00	15:30	16:00	17:00	17:30
Waterfell	15:30	16:00	16:30	17:30	18:00

What is the shortest amount of time, in minutes, for Mrs Jones to travel from Gadon to Waterfell?

40. *Ten minutes before the concert was due* to start, the hall was $\frac{1}{3}$ full.

The warning bell rang and 140 people entered the hall and sat down.

The hall was then $\frac{4}{5}$ full.

How many seats are there in the hall?

Acknowledgment

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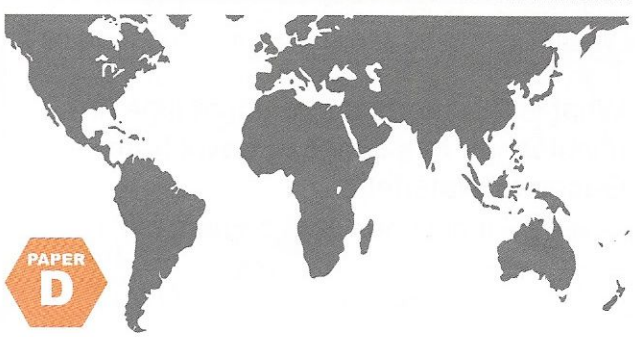
The following year levels should sit THIS Paper:

Australia	Year 6
Brunei	Primary 6
Indonesia	Year 7
Malaysia	Standard 6
New Zealand	Year 7
Pacific Region	Year 7
Singapore	Primary 5
South Africa	Grade 6



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ANALYSIS BY QUESTION

The following table shows the questions you answered correctly ☑ and shades the questions that you answered incorrectly ☐. The questions are ranked from hardest at the top to easiest at the bottom.

Difficult Questions

Question content	Area assessed	Question number	Correct answer
Read and interpret a timetable to find the fastest route	Measures & Units	39	98
Find the number of leap years over an extended period	Number & Arithmetic	38	65
Solve a packing problem involving rectangular prisms	Measures & Units	37	126
Use fractions of different amounts to find the capacity of the whole	Number & Arithmetic	40	300
Recognise the position of a vertex after a rotation	Space & Geometry	33	A
Use substitution and logic to find the value of one variable	Algebra & Patterns	36	58
Build a solid to match its top, side and front views	Space & Geometry	34	C
Solve a perimeter problem involving decimals and rounding	Measures & Units	17	D
Estimate the likelihood of a complementary event occurring	Chance & Data	14	B
Solve a problem involving time differences	Measures & Units	24	C
Estimate the length of the shortest route using the scale on a map	Space & Geometry	28	B
Solve a problem involving the sum of odd numbers	Number & Arithmetic	30	C
Complete the pattern to make a shape with one line of symmetry	Space & Geometry	15	A
Match the picture to a word description of the probability	Chance & Data	35	B
Solve a problem involving the difference of decimals	Number & Arithmetic	18	D
Find the perimeter of a rectangle with whole number sides given its area	Measures & Units	13	A
Find a missing value in a set of data given the average	Chance & Data	32	C
Follow a pattern to determine the missing code	Algebra & Patterns	25	D
Determine the frequency of a particular digit on a clock over a period of time	Number & Arithmetic	27	A
Determine the value in a number pattern involving two operations	Algebra & Patterns	21	A
Solve a problem involving the number of days between given days of the week	Measures & Units	29	D
Find the area of two overlapping rectangles	Measures & Units	31	B
Find the area of a composite shape	Measures & Units	16	A
Name the value of a digit in the hundredths column	Number & Arithmetic	3	D
Identify the transformation needed to form part of a shape	Space & Geometry	12	C
Find a compass point given directions	Space & Geometry	23	D
Identify the net that will not fold to make a cube	Space & Geometry	20	A
Use symmetry to identify two shapes with the same area	Measures & Units	26	B
Estimate an expression involving a product and a quotient	Number & Arithmetic	8	D
Solve a problem involving divisors and remainders	Number & Arithmetic	10	C
Solve a problem involving unit conversion and division	Measures & Units	4	C
Find the approximate mass of a paperclip	Measures & Units	2	A
Divide a quantity in a recipe by three	Number & Arithmetic	7	D
Identify labels on a bar graph based on given information	Chance & Data	22	C
Identify the largest angle in a composite shape	Space & Geometry	5	A
Solve a problem involving a pattern that decreases by half each time	Algebra & Patterns	11	B
Identify the instructions to create a box from paper	Space & Geometry	9	B
Use factors and multiples to solve a flowchart problem	Number & Arithmetic	19	C
Identify the part of a shape pattern that repeats	Algebra & Patterns	1	B
Calculate the probability of rolling a particular outcome on a dice	Chance & Data	6	B

Easy Questions