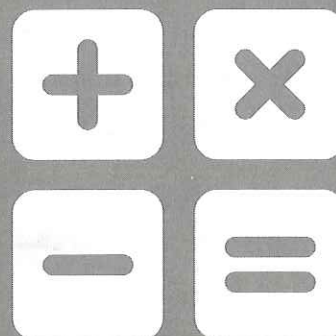UNSW Global
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA

PAPER E

2010
ICAS

International Competitions
and Assessments for Schools

MATHEMATICS

**Educational
Assessment
Australia**
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DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

40 QUESTIONS

TIME ALLOWED: 1 HOUR

STUDENT'S NAME: 7A.
Thuvarakan
   Muthukkumarasamy

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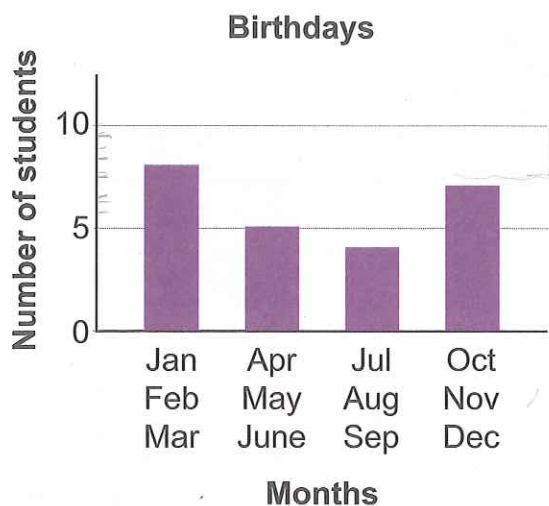You are **NOT** allowed to use a calculator.

1. A prime number has only two factors; the number 1 and the number itself.

Which of these is a prime number?

(A) 5
(B) 8
(C) 9
(D) 12
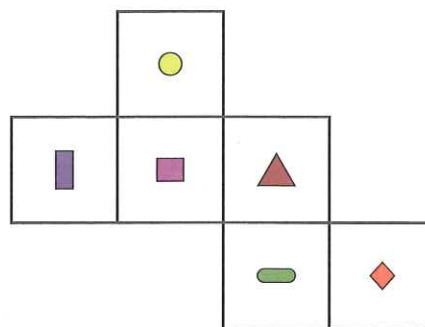
2. A class did a survey of the dates of their birthdays.

The graph shows the number of students whose birthdays fell in each three months of the year.

Birthdays

How many students have a birthday in the second half of the year?

(A) 4
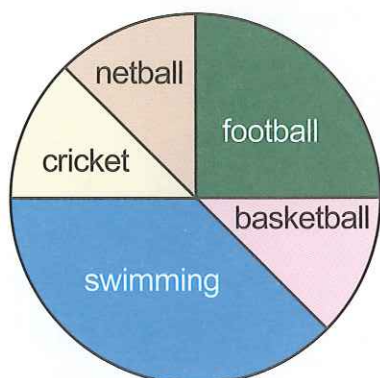(B) 5
(C) 11
(D) 13

3. Look at the figure below.

The figure can be folded to make a cube with the pictures on the outside.

Which shape will be on the face opposite the one with ◯ on it?

(A) ▮

(B) ▲

(C) ◆

(D) ▬

4. At a gym five different sports are available.

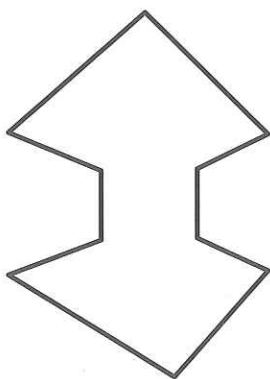The graph shows the proportion of students playing each sport during a physical education lesson.

Each student can only play one sport.

There are 36 students playing football.

What is the total number of students who are playing sport?
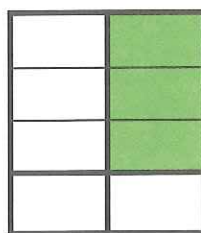
(A)   90
(B)   144
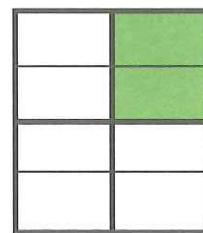(C)   180
(D)   270

5. Adam drew this shape.

This shape is an example of a

(A)   parallelogram.
(B)   tetrahedron.
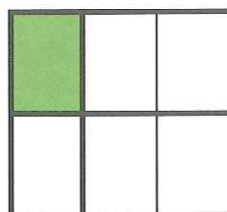(C)   nonagon.
(D)   polygon.

6. Which picture has $\frac{3}{4}$ of $\frac{1}{2}$ shaded?

(A)

(B)

(C)
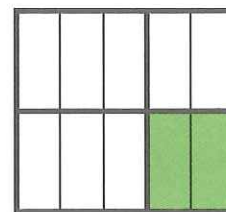
(D)

7. The sign for a garden centre is in the shape of an isosceles triangle.

NOT TO SCALE
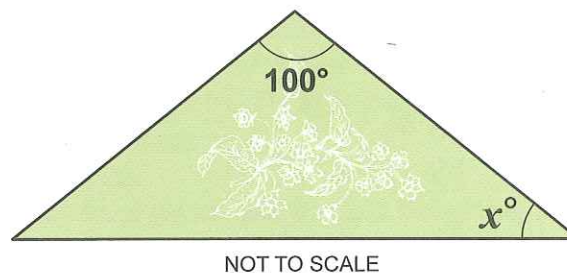
What is the value of x?

(A)   10
(B)   20
(C)   40
(D)   60

8. An obtuse angle is greater than 90° but less than 180°.

Which of these angles is obtuse?
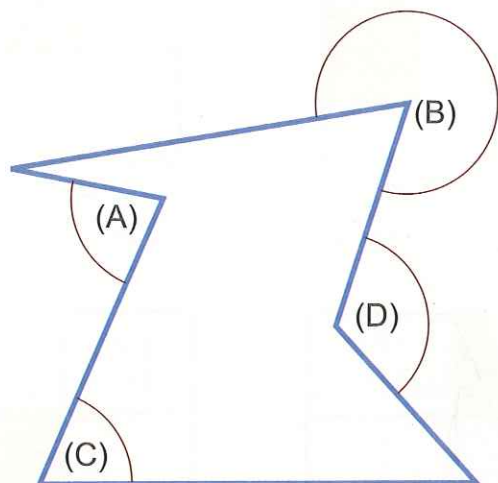
9. What is the next number in this number pattern?

3, 3, 6, 9, 15, 24, …

(A) 27
(B) 33
(C) 36
(D) 39

10. This sign post is on a path.

The sign to The 'Knoll' is pointing east.

In which direction is the sign to Lower Falls pointing?

(A) north (B) south

(C) east (D) west

11. Each layer in this stack of boxes is a square prism as shown.

How many boxes are in the stack?

(A) 10
(B) 19
(C) 25
(D) 30

12. Luisa is thinking of a quadrilateral.
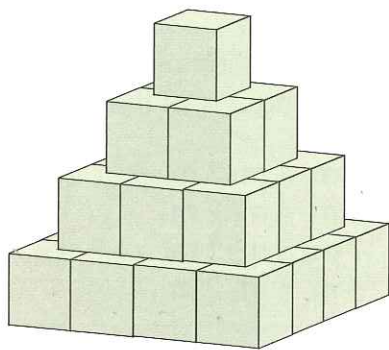
It has the following properties:

- both pairs of opposite sides are parallel
- diagonals bisect each other at right angles.

This shape is best described as a

(A) kite.
(B) rhombus.
(C) rectangle.
(D) trapezium.

13. This is part of a train timetable:

Station	pm	pm	pm
Springtown	3.19	4.05	4.38
Tetrahedron	3.22	4.08	- - -
Bravo	3.26	4.12	- - -
Mirrorland	3.30	4.16	4.47
Berrybrook	3.35	4.21	4.52
Rockstone	3.39	4.25	- - -
Rainbow	3.48	4.34	- - -
Coffeehill	3.52	4.38	5.08
Queenswood	- - -	- - -	- - -
Blue Lake	- - -	- - -	- - -
Green Mount	- - -	- - -	- - -
Valley	4.07	4.53	- - -
Nine Hills	- - -	- - -	- - -
Compass Point	- - -	5.01	- - -
All Good	4.17	5.05	5.31
Square 1	4.19	5.07	- - -
Hill Number	- - -	- - -	- - -
Division	4.30	5.18	5.43
Square 2	- - -	- - -	- - -
Central	4.43	5.31	5.56

The Simons family wants to travel from Springtown to Central. They worked out that if they catch the 4:05 pm train, it will be a longer trip than if they catch the 4:38 pm train.

By how much will the trip be longer?

(A) 8 minutes
(B) 25 minutes
(C) 1 hour 18 minutes
(D) 1 hour 26 minutes
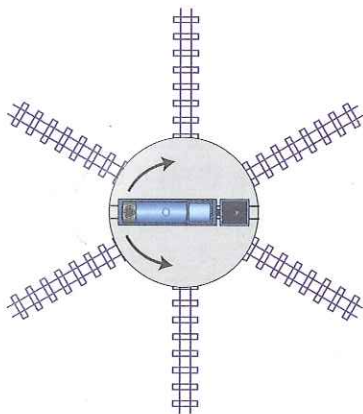
5

14. The table shows different units of computer memory.

8 bits	= 1 byte
1024 bytes	= 1 kB
1024 kB	= 1 MB
1024 MB	= 1 GB

Approximately how many bits equals 10 MB?

(A)   800 000 bits
(B)   8 000 000 bits
(C)   80 000 000 bits
(D)   8 000 000 000 bits

15. Shane has a model railway.

The diagram shows an engine on a turntable with 6 different tracks.

Shane needs to rotate the turntable so that the engine can leave on one of the tracks.

What is the smallest number of degrees Shane could rotate the turntable so that the engine can leave?

(A)   60
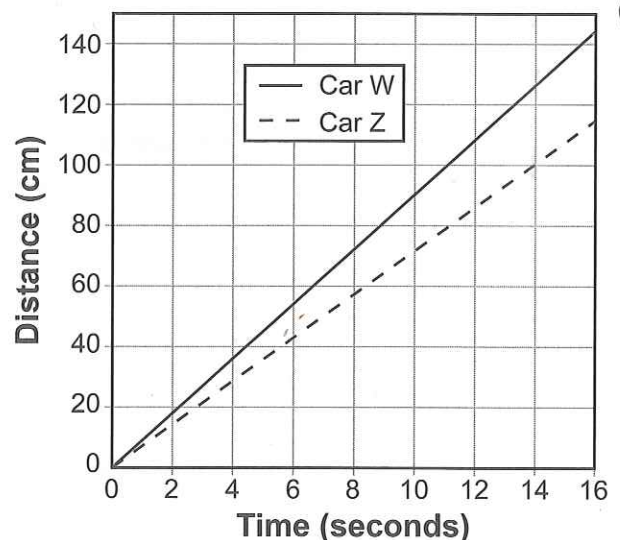(B)   45
(C)   30
(D)   15

16. Adam uses three wooden planks to make a triangular frame. He must join the planks at the ends.

Which combination of planks could he use without cutting any of them?

(A)   8 m, 4 m, 3 m
(B)   6 m, 4 m, 2 m
(C)   7 m, 5 m, 1 m
(D)   5 m, 4 m, 2 m

17. Manling is testing two model cars. She drew a graph to show how far they travelled in a given time.

What is the approximate distance between the two cars after 14 seconds?

(A)   12 cm
(B)   25 cm
(C)   30 cm
(D)   42 cm

18. Sunil wrote this expression;

$$12 + 15 \times 4 - 40 \div 2$$

What is the value of his expression?

(A) 16
(B) 32
(C) 34
(D) 52

19. Manling has some paper clips in a box.

Manling finds out that she needs 10 more paper clips to make either groups of three or groups of four or groups of five with no paper clips left over.

Which of the following could be the number of paper clips she has in the box?

(A) 20
(B) 50
(C) 60
(D) 70

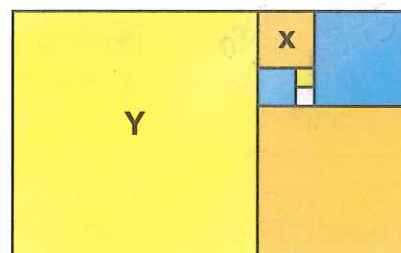**20.** Adam has a fair twelve-sided die. The faces of the die display the numbers from 1 to 12.

Adam rolls the die 20 times and records his results.

2	7	5	8	10
4	2	11	7	9
7	2	9	1	1
3	8	10	12	2

Which option shows the mean and median of Adam's results?

	Mean	Median
(A)	6	2
(B)	6	7
(C)	10	2
(D)	10	7

21. This shape is made up of seven squares.

Square **X** has a side length of 0.75 cm.

What is the perimeter of square **Y**?

(A) 12
(B) 13
(C) 48
(D) 68

22. Matthew had a 3 minute shower every day which used 13.5 litres of water per minute.

He installed a water-saving shower head which halved the amount of water used.
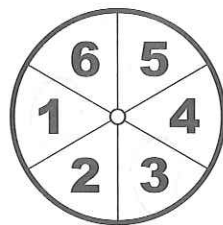
How much water does Matthew now use to shower in a **week**?

(A) 20.25 litres
(B) 40.5 litres
(C) 141.75 litres
(D) 283.5 litres

23. Adam has two spinners, X and Y.
Spinner X has three equal sections.
Spinner Y has six equal sections.
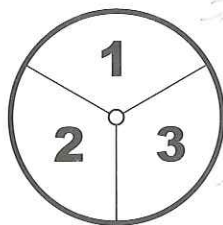
Spinner X   Spinner Y

Which statement is correct?

(A) Adam is more likely to score 3 on Spinner Y than on Spinner X.
(B) Adam will always score higher on Spinner Y than on Spinner X.
(C) Adam is more likely to score less than 3 on Spinner X than on Spinner Y.
(D) Adam is equally likely to score an odd number on Spinner X and on Spinner Y.

24. Luisa needs 12 cm by 6 cm cards.

What is the maximum number of cards of this size she can cut from a sheet of cardboard measuring 42 cm by 42 cm?

(A) 21
(B) 24
(C) 24.5
(D) 25

25. At the local school there are 500 students. Every student plays rugby or basketball or both.
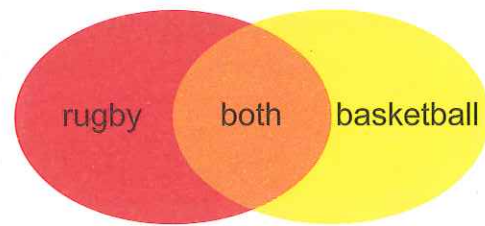
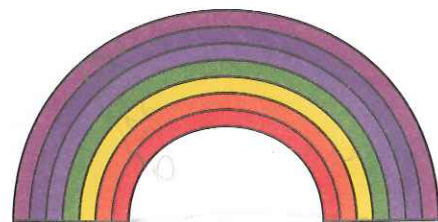62% play rugby and 46% play basketball.

What is the number of students who play both sports?

(A) 16
(B) 40
(C) 54
(D) 80

26. Luisa made a rainbow. She drew eight semicircles. Then she coloured between the semicircles as shown below.

The smallest semicircle has a diameter of 10 cm. The semicircles are 0.6 cm apart.

What is the diameter of the largest semicircle?

(A) 14.2 cm
(B) 14.8 cm
(C) 18.4 cm
(D) 28.4 cm

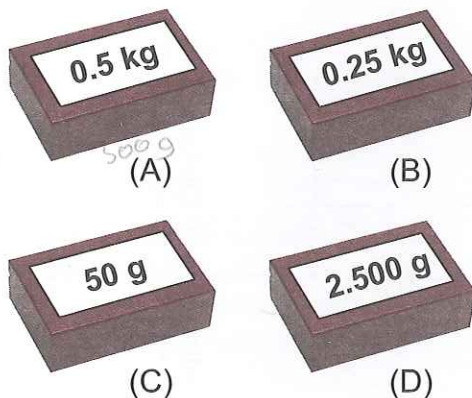27. These are the Personal Identification Numbers (PINs) four people use with their credit cards.

Aaron	4149
Joanne	2848
John	5397
Lesley	3095

Whose PIN is made up of digits that are all square numbers?
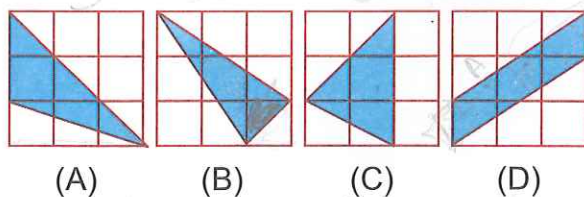
(A) Aaron's
(B) Joanne's
(C) John's
(D) Lesley's

28. Each of these boxes is labelled to show its mass.

Which box has the largest mass?

0.5 kg   (A)

0.25 kg   (B)

50 g   (C)

2.500 g   (D)

29. Which of the following shaded regions has a different area from the other shaded regions?
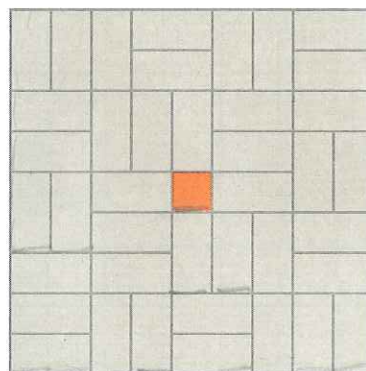

(A)   (B)   (C)   (D)

30. I think of a number, add 6 to it and then divide by 2. My answer is 47.

How can you find the number I thought of?

(A) divide 6 by 2 then add 47
(B) subtract 3 from 47 then double
(C) subtract 6 from 47 then double
(D) double 47 then subtract 3

31. Manling made a pattern with 40 identical rectangular tiles and one smaller square tile.

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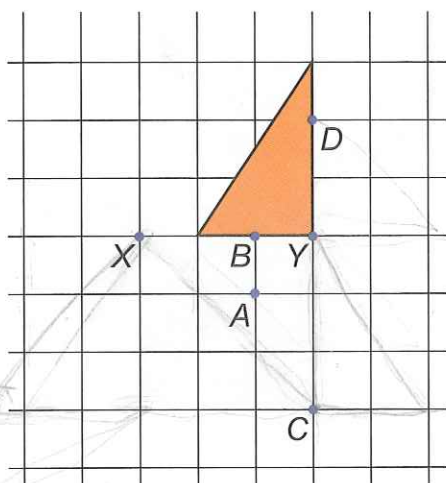The middle square tile has a perimeter of 36 cm.

What is the area of the pattern in cm²?

(A) 2583
(B) 2916
(C) 6480
(D) 6561

9

32. The capacity of 1 cm³ is 1 mL.

Which of these has a capacity of 1 L?

(A)   10 m³
(B)   1 m³
(C)   0.1 m³
(D)   0.001 m³

33. The triangle shown is rotated clockwise 180° about Y and then a further 90° clockwise about X.

This combination of the two rotations about Y and about X can be replaced by a single rotation.

Which point is the centre of the single rotation?

(A) A
(B) B
(C) C
(D) D

34. Sunil has 1 litre of mango juice that contains 14% sugar. He also has 3 litres of orange juice that contains 10% sugar.
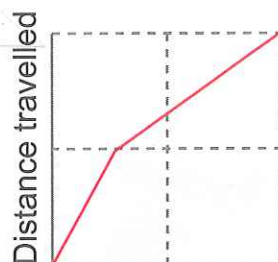
Sunil mixes the mango juice and the orange juice together.

What is the percentage of sugar in the juice mixture?
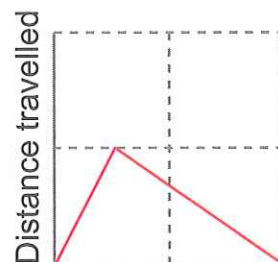
(A)   11
(B)   12
(C)   24
(D)   44

35. Noor ran from her home to the bus stop, but the bus had just left. She turned around immediately and walked directly home, using the same route she came.
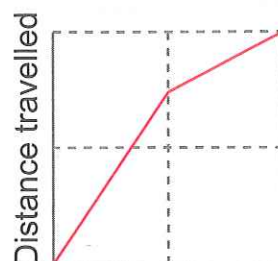
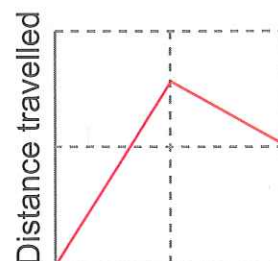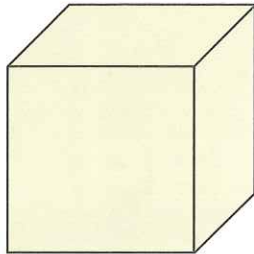Which graph represents Noor's trip to the bus stop and back?

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 cube measuring 50 centimetres on each edge is painted on the outside. Then it is cut into one-centimetre cubes.

NOT TO SCALE

How many one-centimetre cubes will have paint on only two faces?

37. What is the size of an angle whose complement is 25% of its supplement?

38. Adam has a recipe for six blueberry muffins, each with a weight of 85 g.

To make the muffins, he weighs two eggs and puts them in a bowl. He then adds double the weight of the two eggs in flour, half the weight of the two eggs in sugar, a quarter of the weight of the two eggs in butter and half the weight of the two eggs in blueberries.

What was the weight of the two eggs he used, in grams?

39. Manling has lost two digits of her calculation. The missing digits are shown in the calculation as A and B:

$$\begin{array}{r} 7\,3\,A \\ \times \qquad B \\ \hline 4\,4\,2\,8 \end{array}$$

What is the value of A + B?

40. Water comes out of two taps at different rates.

Water comes out of the first tap at a rate of 10 litres every 15 minutes. Water comes out of the second tap at a rate of 10 litres every 10 minutes.

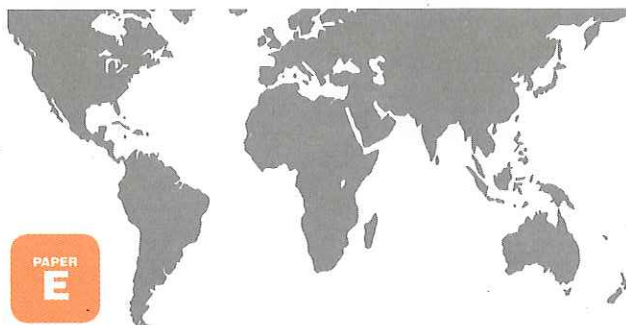Luisa fills a 75-litre container with water using both taps at the same time.

How many minutes does it take to fill the container?

The following year levels should sit THIS Paper:

Australia	Year 7
Brunei	Form 1
Indonesia	Year 8
Malaysia	Form 1
New Zealand	Year 8
Pacific	Year 7
Singapore	Primary 6
South Africa	Grade 7

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