UNSW Global
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA

PAPER
D

2011
ICAS
International Competitions
and Assessments for Schools

MATHEMATICS

**Educational
Assessment
Australia**
eaa.unsw.edu.au

1. Anish kept a record of the number of books he borrowed over a period of four months.

| Month | Number of books borrowed |
|---|---|
| January | 4 |
| February | 7 |
| March | 4 |
| April | ? |

Anish borrowed 23 books altogether over the four months.

How many books did he borrow in April?

(A)   7
(B)   8
(C)   12
(D)   23

2. Jess has two pieces of paper as shown.
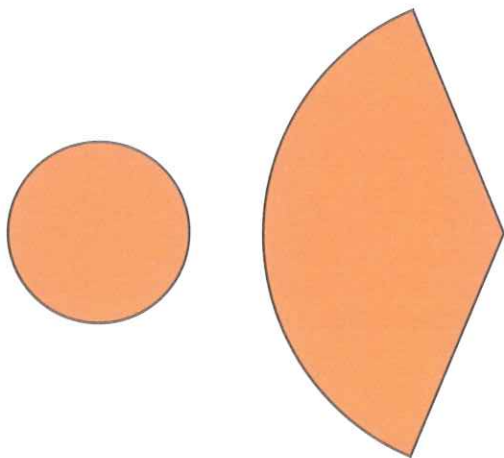


NOT TO SCALE

Jess can make a solid using these two pieces of paper without cutting or overlapping them.

Which solid can she make?

(A)   a cylinder
(B)   a sphere
(C)   a cube
(D)   a cone

3. Here are the first four numbers in a pattern:

3, 6, 12, 24…

Which option shows the correct calculation to find the next number in the pattern?

(A)   24 + 3
(B)   24 + 6
(C)   24 × 2
(D)   24 × 4

4. Here is the floor plan of a cabin on a cruise ship.
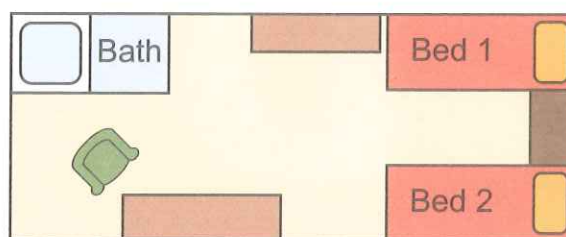


What fraction of the total cabin area do the two beds occupy?

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

(B)   $\frac{1}{3}$

(C)   $\frac{2}{9}$

(D)   $\frac{1}{9}$

5. $7 - 2\frac{2}{5} = $ ?

(A)   $4\frac{2}{5}$          (B)   $4\frac{3}{5}$

(C)   $5\frac{2}{5}$          (D)   $5\frac{3}{5}$

6. Yara cut out a piece of cardboard and placed it near a line on grid paper.
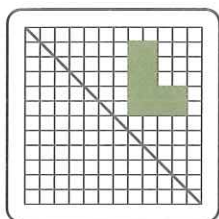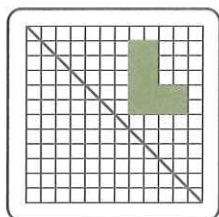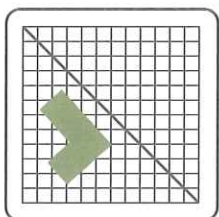


Which diagram shows Yara's piece of cardboard reflected in the line?


(A)


(B)


(C)
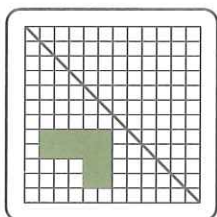

(D)

7. The picture shows four objects on a tray.
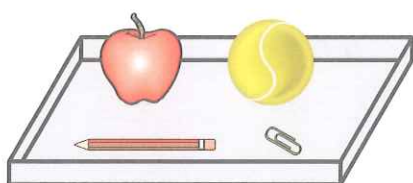


What is the approximate total mass of the objects on the tray?

(A)    250 grams
(B)    250 tonnes
(C)    250 kilograms
(D)    250 milligrams

8. Douglas, Ming and Omar each has a bag of marbles.

Ming has 3 less marbles than Douglas.

Omar has 12 less marbles than Douglas.

Which statement is true?

(A)    Ming has 15 more marbles than Omar.
(B)    Omar has 15 more marbles than Ming.
(C)    Omar has 9 more marbles than Ming.
(D)    Ming has 9 more marbles than Omar.

9. Natalia made a model using cubes. She drew the front view and the top view of the model.
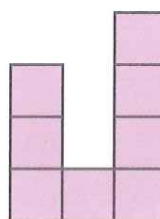


front view          top view

Which of these could be Natalia's model?


(A)
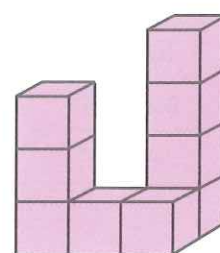

(B)
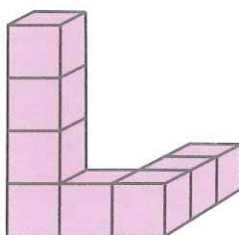

(C)
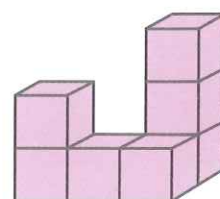

(D)

10. This table shows how long it took three adventurers to travel around the world.

| Name | Time |
|------|------|
| Jess | 410 days |
| Natalia | 13 months |
| Tony | 1.25 years |

Which table lists the adventurers from fastest to slowest?

(A)

| Name | Time |
|------|------|
| Natalia | 13 months |
| Jess | 410 days |
| Tony | 1.25 years |

(B)

| Name | Time |
|------|------|
| Jess | 410 days |
| Natalia | 13 months |
| Tony | 1.25 years |

(C)

| Name | Time |
|------|------|
| Jess | 410 days |
| Tony | 1.25 years |
| Natalia | 13 months |

(D)

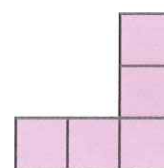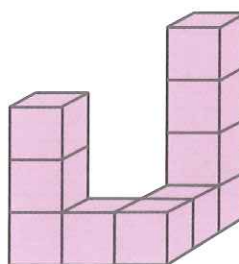| Name | Time |
|------|------|
| Tony | 1.25 years |
| Natalia | 13 months |
| Jess | 410 days |

11. A rectangular pyramid has eight edges, five faces and five vertices.
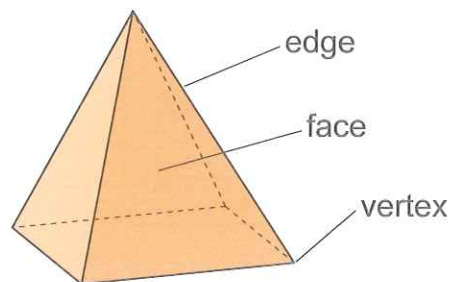


Which of the options shows the number of edges, faces and vertices for a rectangular prism?

|  | Edges | Faces | Vertices |
|------|------|------|------|
| (A) | 4 | 4 | 5 |
| (B) | 8 | 6 | 5 |
| (C) | 12 | 4 | 8 |
| (D) | 12 | 6 | 8 |

12. Anish was trying to lose weight. At the beginning of summer he weighed 76.5 kg. At the end of summer he weighed 69.8 kg.

How many kilograms did Anish lose?

(A)    16.7
(B)    13.3
(C)    7.3
(D)    6.7

13. Tony drew two diameters on a circle. He counted four reflex angles formed by the diameters, as shown.
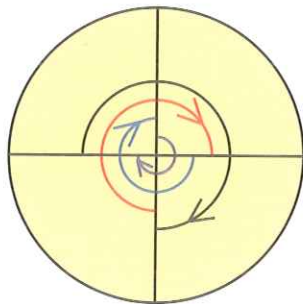


Tony drew another circle, this time with four diameters.

How many reflex angles are formed by the four diameters of the circle?

(A)  12
(B)  16
(C)  24
(D)  48

14. Yara was standing at point X, as shown below. She walked 20 metres east. Then she walked 20 metres north. From there Yara walked a further 20 metres south-east.

What was the final point that Yara reached at the end of her walk?

N
↑

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

            •
            X

⊢10 m⊣
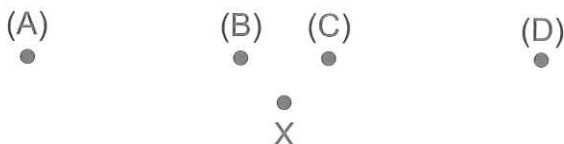
15. Anish had these four cards.

2  5  7  9
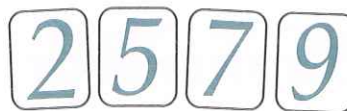
He picked two cards at random and then added the numbers on these two cards to get a total.

The total has the greatest chance of being a multiple of:

(A)  2          (B)  3
(C)  4          (D)  7

16. Matt and Jade used this game board and a die numbered one to six.

| 3.95 | 5.16 | 6.28 |
|------|------|------|
| 5.70 | 2.53 | 3.18 |
| 2.84 | 4.90 | 4.23 |

Each player rolled the die onto the game board. The number that the die landed on was multiplied by the number on the top face of the die.

If the product was greater than 25, the player coloured the number.

Which number has been **incorrectly** coloured?

(A)  3.18
(B)  4.90
(C)  5.16
(D)  5.70

**17.** Tony walked in a straight line from point A to point Z.

The distance from A to Z is 2400 m.



A ————————————————— Z

|——— 2400 m ———|

NOT TO SCALE

Tony stopped twice before reaching Z. First he stopped after 5000 cm at point B. Then after a further one km, he stopped at point C.

How far did Tony walk from point C to point Z, in km?

(A)   0.90
(B)   1.35
(C)   2.25
(D)   22.50

**18.** The column graph shows the minimum and maximum temperatures in Anyland for six months.

KEY
■ minimum
▨ maximum



Which month has the greatest range in temperature?

(A)   Jan        (B)   Feb
(C)   May        (D)   Jun

**19.** Whenever Yara enters a 2-digit number into her calculator, she always enters the digits in reverse order.

She is asked to add up the numbers 89, 98, 47, 77, and 85 using her calculator.

What is the difference between Yara's answer and the correct answer?

(A)   0
(B)   38
(C)   54
(D)   132

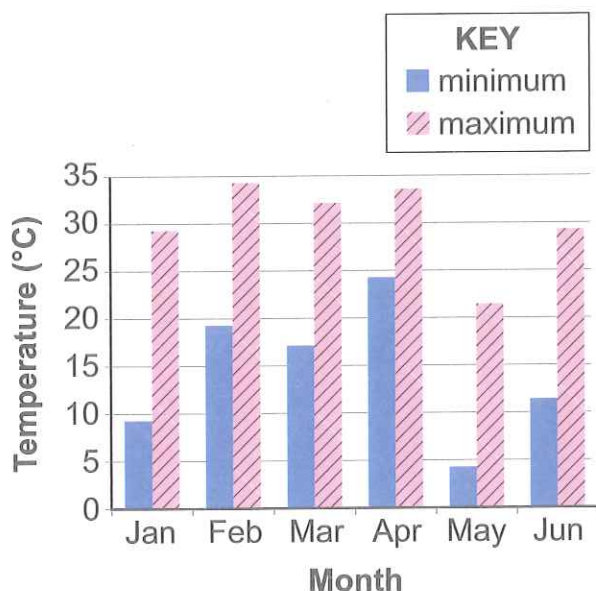**20.** This picture shows a boat that moves by turning pedals.



To move forward 1 metre the pedals need to make 6 full turns. The boy in the boat is turning the pedals at a rate of 48 turns every minute.

At this rate how long will it take him to pedal the boat 1 kilometre?

(A)   1 hour and 20 minutes
(B)   1 hour and 25 minutes
(C)   2 hours and 5 minutes
(D)   4 hours and 48 minutes

21. Anish went to a store to buy jerseys for members of his nature club.

The store had a special sale where a customer got one jersey free for every two jerseys bought. The jerseys were priced at $8.50 each.

How many jerseys did Anish get for $42.50?

(A)   5
(B)   7
(C)   8
(D)   10

22. The picture shows the area around Wendy's swimming pool.

She plans to have 5 pots along each side of the pool including a pot at every corner.

How many pots would Wendy need?

(A)   15        (B)   20

(C)   25        (D)   30

23. Jess thought of a 2-digit number. The product of the digits of the number is equal to double the sum of the digits of the number.

Which of the following could be the number Jess thought of?
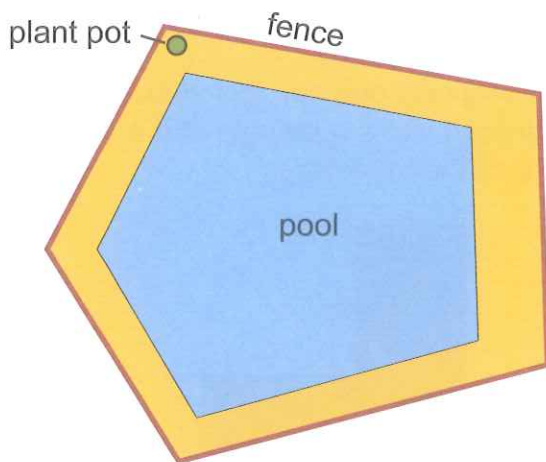
(A)   11
(B)   22
(C)   36
(D)   42

24. 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

25. Brett made this design on a computer.
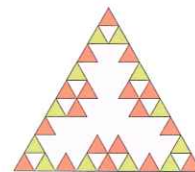
He then rotated the design. After the rotation it looked exactly the same.
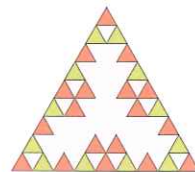
How many degrees would Brett have rotated the shape?

(A)   180°
(B)   120°
(C)   90°
(D)   60°

**26.** Natalia has two ten-sided dice. Each die has the numbers 0 to 9 written on it, one on each face.

Natalia rolls the two dice and adds the numbers she gets.

Which of these totals does Natalia have the greatest chance of rolling?

(A)   2
(B)   9
(C)   10
(D)   18

**27.** The train from Canberra to Sydney leaves at 11:50 am and arrives at 3:05 pm. The bus from Canberra to Sydney leaves at 11:49 am and arrives at 4:08 pm.

Which of these statements is true?

(A)   The travelling time for the train is 3 h 55 min.
(B)   The travelling time for the bus is 5 h 41 min.
(C)   The train arrives in Sydney 63 minutes before the bus.
(D)   The travelling time for the bus is four minutes longer than the travelling time for the train.

**28.** Nina and Walid played a game. To score points they had to throw hoops around the sticks.

Throwing a hoop around stick Y scores more points than throwing a hoop around stick X.
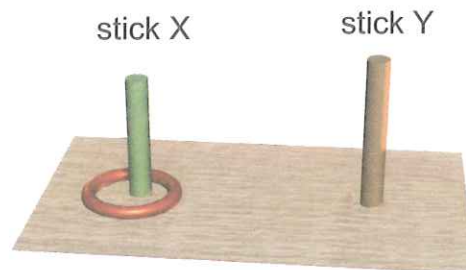
stick X          stick Y



Nina scored 14 points by throwing 3 hoops around stick X and 1 hoop around stick Y. Walid scored 16 points by throwing 2 hoops around each stick.

How many points are scored for throwing a hoop around stick Y?

(A)   3
(B)   4
(C)   5
(D)   6

**29.** Using only one cut, this shape can be divided into a rectangle and a square that have the same area.



8 m

8 m
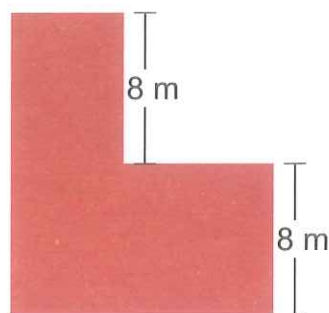
NOT TO SCALE

Which of the following can be the perimeter of this shape, in m?
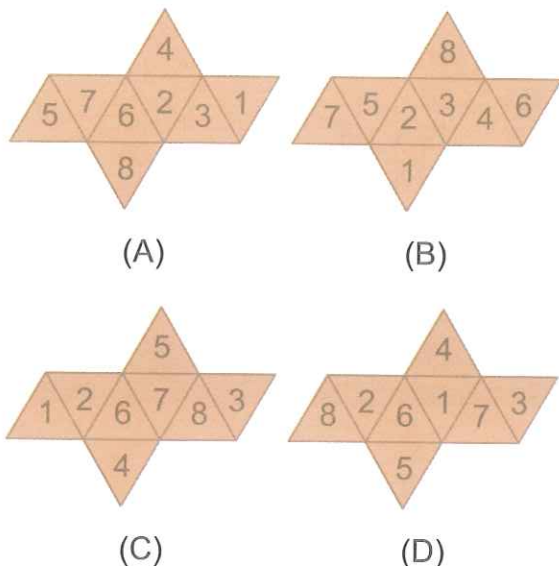
(A)   52
(B)   56
(C)   64
(D)   72

30. Two faces of a die that do not share an edge or a vertex are said to be opposite faces.

The opposite faces of an eight-sided die add to 9.

Which is a correct net for such a die?

(A)

(B)

(C)

(D)

31. Tony has a rectangular yard. The yard has two paths and four grass areas. One path is parallel to the longer side of the yard and the other is parallel to the shorter side.
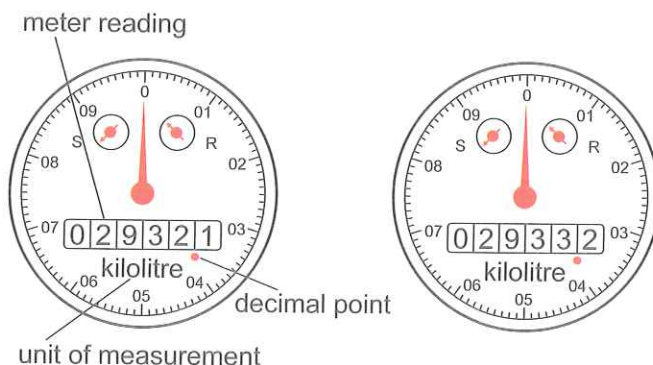
50 m

40 m

2 m

2 m

NOT TO SCALE
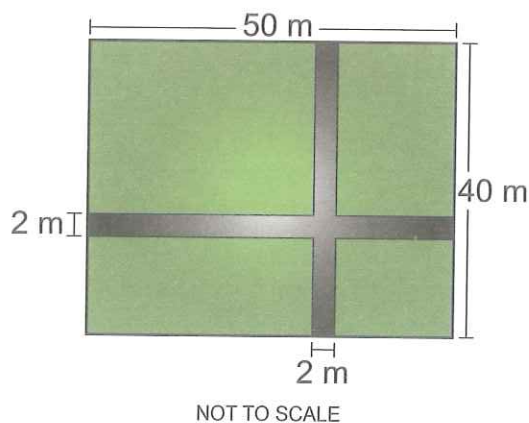
What is the total area of the two paths, in square metres?

(A) 172
(B) 176
(C) 180
(D) 184

32. Tony suspects that he has a leaking water pipe in his house.

The diagrams show his water meter readings on two days.

meter reading

0 2 9 3 2 1

kilolitre

decimal point

unit of measurement

0 2 9 3 3 2

kilolitre

**Monday 15 June
8 am**

**Wednesday 17 June
8 am**

He estimates that in these two days he should only have used a total of 850 litres.

He also estimates that the leak has wasted a total of 1000 litres up until the morning of Wednesday 17 June.
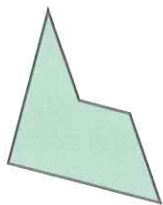
When did the leak start?

(A) Sunday 14 June
(B) Saturday 13 June
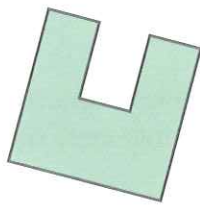(C) Wednesday 10 June
(D) Tuesday 9 June

9

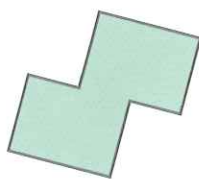33. Yasmeen wants to cut this rectangle into identical pieces, with no bits left over.
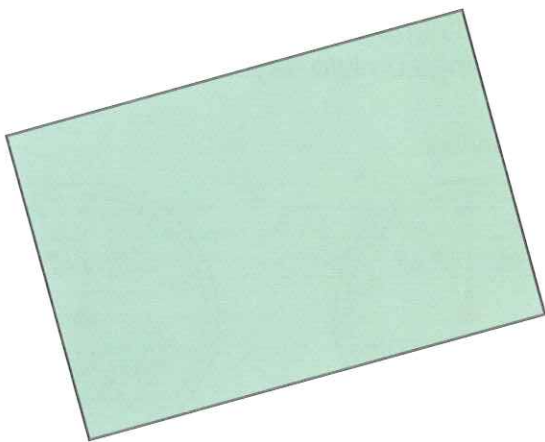
Which shape can the pieces be?

(A)

(B)

(C)
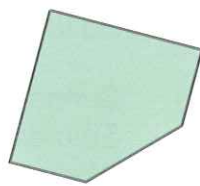
(D)

34. A board has squares on it as shown.
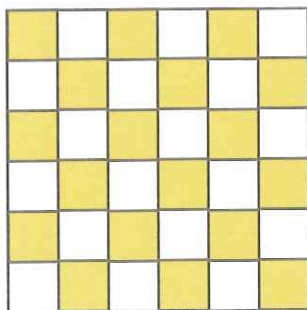
How many squares, of any size, can be traced on this board?

(A)    37        (B)    41
(C)    91        (D)    182

35. $4! = 4 \times 3 \times 2 \times 1$

$5! = 5 \times 4 \times 3 \times 2 \times 1$

Jess wrote the expression $20! - 19!$ on the board.

Which of the following has the same value as this expression?

(A)    1!
(B)    20
(C)    $19 \times 19!$
(D)    $20 \times 19!$

**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. An isosceles triangle is drawn over a yellow rectangle and a blue semicircle as shown in the diagram.

C

4 m

A├──── 6 m ────┤B

NOT TO SCALE
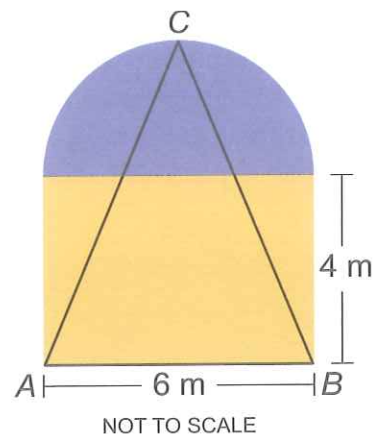
The rectangle is 6 m long and 4 m wide.

What is the area of triangle ABC, in square metres?

37. Jess and Yara are walking laps around a park.

Jess completes each lap in 10 minutes and then rests for 1 minute before starting the next lap.

Yara completes each lap in 13 minutes and then rests for 2 minutes before starting the next lap.

Jess and Yara start walking together in the same direction.

How many minutes will it be until they both meet together again?

38. The mass of a bag of Red Star sugar is 20% greater than the mass of a bag of Blue Star sugar.

However, a bag of Red Star sugar costs 50% more than a bag of Blue Star sugar.



For the same mass, Red Star sugar costs ? % more than Blue Star sugar.

What number should ? be?

39.

| 2, | 3, | 5, | 7, | 11, | 13, | ? |
| 5, | 7, | 11, | 13, | 17, | 19, | ? |
| 7, | 10, | 16, | 20, | 28, | 32, | ☐ |

What number should be placed in ☐ to complete the pattern?

40. Anish, Jess, Natalia and Tony are to be seated on four chairs at the table shown.
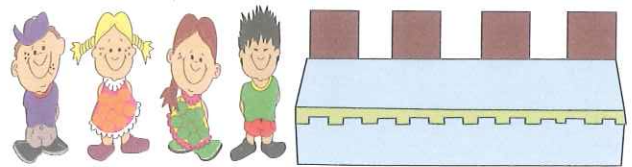


Anish and Tony must sit next to each other. Natalia cannot sit next to Anish.

In how many different ways can they all be seated?

11

FSC MIX Paper from responsible sources FSC® C014642

**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** | Year 6 |
| **Singapore** | Primary 5 |
| **South Africa** | Grade 6 |
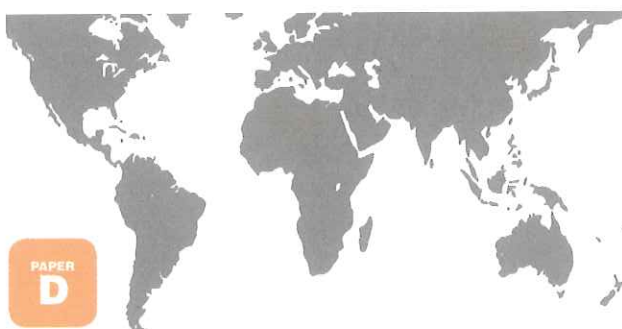
PAPER **D**

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

(Please turn over)

## M | 2011 Mathematics Answer Keys

ICAS
International Competitions and Assessments for Schools

| Question Number | Paper A | Paper B | Paper C | Paper D | Paper E | Paper F | Papers G & H | Papers I & J |
|---|---|---|---|---|---|---|---|---|
| 31 | C | C | B | B | C | D | C | C |
| 32 | B | C | C | D | B | C | D | B |
| 33 | C | A | C | A | C | D | D | C |
| 34 | B | B | C | C | D | C | A | D |
| 35 | B | A | A | C | C | B | B | A |
| 36 | A | C | C | 21\|021 | 900 | 56\|056 | 108 | 3\|03\|003\|0 3 |
| 37 | C | B | D | 43\|043 | 600 | 80\|080 | 3\|03\|003\|0 3 | 76\|076 |
| 38 | C | A | C | 25\|025 | 39\|039 | 28\|028 | 83\|083 | 439 |
| 39 | D | C | D | 40\|040 | 75\|075 | 114 | 9\|09\|009\|0 9 | 947 |
| 40 | B | D | B | 8\|08\|008\|0 8 | 131 | 7\|07\|007\|0 7 | 901 | 784 |

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