



UNSW  
THE UNIVERSITY OF NEW SOUTH WALES  
SYDNEY • AUSTRALIA

EDUCATIONAL ASSESSMENT  
AUSTRALIA

PAPER  
**E**

# ICAS

INTERNATIONAL COMPETITIONS AND  
ASSESSMENTS FOR SCHOOLS

# MATHEMATICS

# 2009

**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.

PLEASE SEE BACK COVER FOR A LIST  
OF THE YEAR LEVELS THAT SHOULD  
SIT THIS PAPER



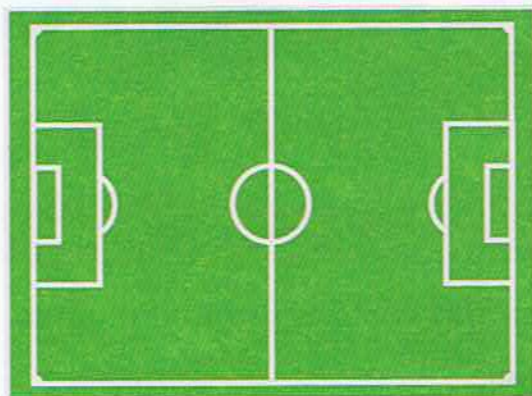
1. Here is a picture of a tennis ball.



Which word best describes the shape of a ball?

- (A) cube
- (B) cylinder
- (C) prism
- (D) sphere

2. Tessa is measuring the area of the local football field.



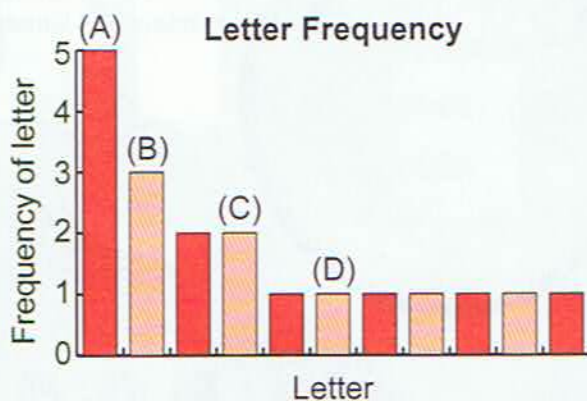
What measurement unit should she use?

- (A) metres
- (B) centimetres
- (C) square metres
- (D) cubic centimetres

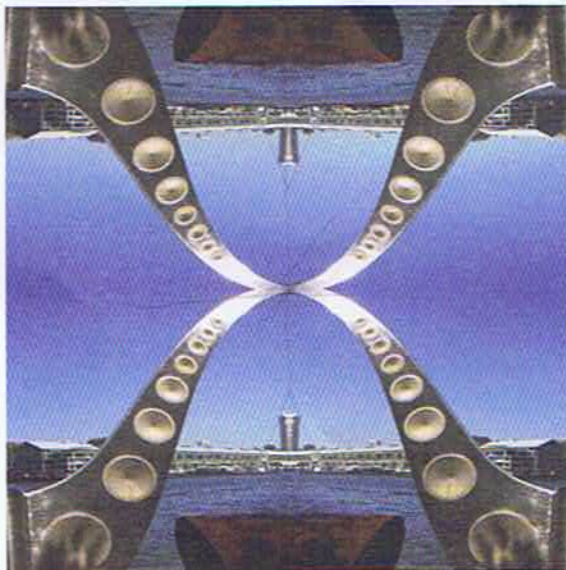
3. Marzia counted how many times each letter appeared in this sentence:

**Fish swim in this river.**

Which column on the graph represents the letter 'i' in the sentence?



4. How many lines of symmetry does this picture have?



- (A) 8
- (B) 4
- (C) 2
- (D) 1

5. When Olivia weighed herself, the scale showed 58.2 kg. She took off her jacket and the scale showed 56.6 kg.

What was the mass of her jacket?

- (A) 1.4 kg
- (B) 1.6 kg
- (C) 2.4 kg
- (D) 2.6 kg

6. A lift is designed to hold 13 people. The average person weighs 75 kg.

What weight is the lift designed to hold?

- (A) 975 kg
- (B) 965 kg
- (C) 775 kg
- (D) 765 kg

7. Which number is next in the pattern?



- (A) 21
- (B) 24
- (C) 28
- (D) 43

8. Eva has three t-shirts and three skirts.



How many different ways can she match a t-shirt and a skirt?

- (A) 12
- (B) 9
- (C) 6
- (D) 3

9. Chris bought 5 identical packets of biscuits. She opened one packet and ate 3 biscuits. She then had 82 biscuits left.

Which expression shows how to work out the number of biscuits in a complete packet?

- (A)  $(82 + 3) \div 5$
- (B)  $(82 - 3) \div 5$
- (C)  $82 + 3 \div 5$
- (D)  $82 - 3 \div 5$

10. Uma walks to school each day. She walks 2 kilometres from her house to the school gate. She then walks 23 metres from the school gate to her classroom.

How far does she walk to get from her house to her classroom?

- (A) 25 m
- (B) 43 m
- (C) 223 m
- (D) 2023 m



11. This table shows a pattern of numbers.

4	6	8	10	?
16	36	64	100	?

What number should ? be?

- (A) 12  
(B) 48  
(C) 120  
(D) 144

12. The table shows the maximum temperature in five cities for one day.

Athens	8 °C
Cairo	20 °C
Dublin	-4 °C
Lahore	21 °C
Moscow	-12 °C

Which city's maximum temperature was 12 °C colder than Athens?

- (A) Cairo  
(B) Dublin  
(C) Lahore  
(D) Moscow

13. Cindy and Rand recorded the amount of exercise they did in one week.

Cindy exercised for 14 hours and 12 minutes and Rand exercised for 12 hours and 41 minutes.

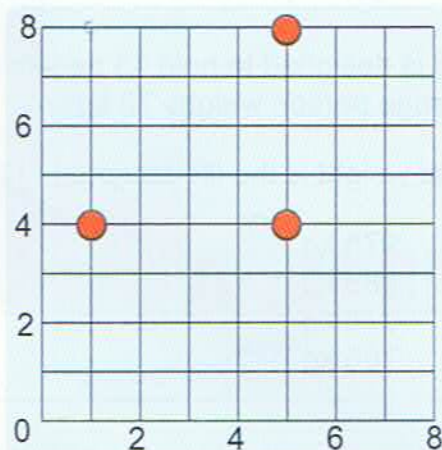
For how much longer did Cindy exercise than Rand?

- (A) 1 hour and 11 minutes  
(B) 1 hour and 31 minutes  
(C) 2 hours and 31 minutes  
(D) 2 hours and 53 minutes

14. What is the value of:  $7^2 + 5^2$

- (A) 14  
(B) 24  
(C) 74  
(D) 144

15. The diagram shows the points (1, 4), (5, 4) and (5, 8) on a grid.



Manling drew another point on the grid which was an equal distance from each of the other three points.

What are the coordinates of the fourth point?

- (A) (8, 1)  
(B) (6, 3)  
(C) (3, 6)  
(D) (1, 8)

16. 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)  $180^\circ$   
(B)  $120^\circ$   
(C)  $90^\circ$   
(D)  $60^\circ$

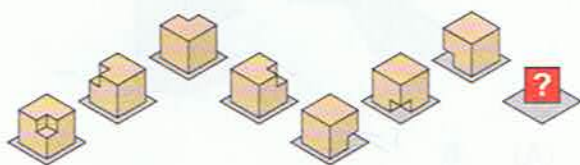
17. A 'perfect number' is a number that is equal to the sum of all its factors except for itself. Six is a perfect number because

$$1 + 2 + 3 = 6$$

Which of these is a perfect number?

- (A) 20  
(B) 24  
(C) 26  
(D) 28

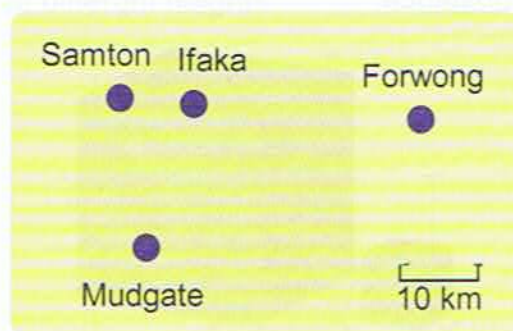
18. This pattern is based on rotation.



Which comes next in this pattern?

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

19. The map shows four towns.



Which table matches the distances in kilometres between the towns on the map?

(A)

	Forwong	Mudgate	Ifaka
Samton	40	20	10
Ifaka	30	20	
Mudgate	40		

(B)

	Forwong	Mudgate	Ifaka
Samton	40	10	10
Ifaka	30	20	
Mudgate	30		

(C)

	Forwong	Mudgate	Ifaka
Samton	30	10	10
Ifaka	20	20	
Mudgate	30		

(D)

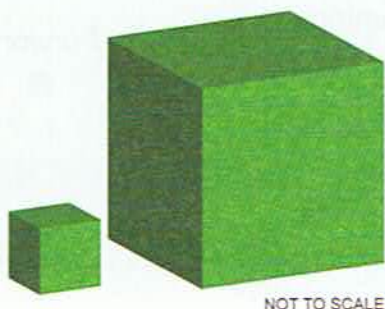
	Forwong	Mudgate	Ifaka
Samton	40	30	20
Ifaka	20	20	
Mudgate	30		

20. How many multiples of 21 are there between 200 and 400?

- (A) 9  
(B) 10  
(C) 11  
(D) 12



21. Ivan has two cubes made of the same substance.

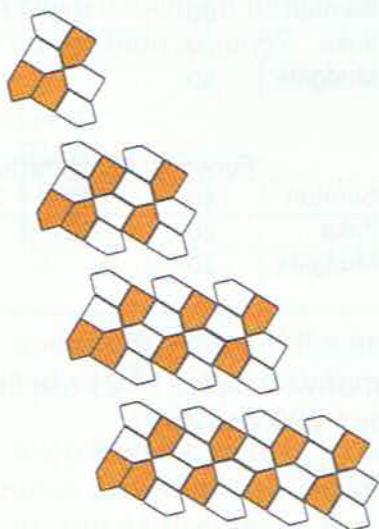


The small cube has a mass of 13 g. The height of the large cube is three times that of the small cube.

What is the mass of the large cube?

- (A) 27 g
- (B) 39 g
- (C) 117 g
- (D) 351 g

22. Each shape in this pattern uses orange and white tiles.



Which rule gives the number of white tiles in relation to the number of orange tiles?

- (A)  $2 \times (\text{orange tiles} - 1)$
- (B)  $\text{orange tiles} - 1 \times 2$
- (C)  $2 \times \text{orange tiles} - 1$
- (D)  $(\text{orange tiles} \times 2) - 1$

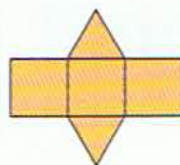
23. A teacher wishes to store folders upright in a bookcase.

Each folder is 7 cm wide. The bookcase has 3 shelves and each shelf is 1.3 m wide.

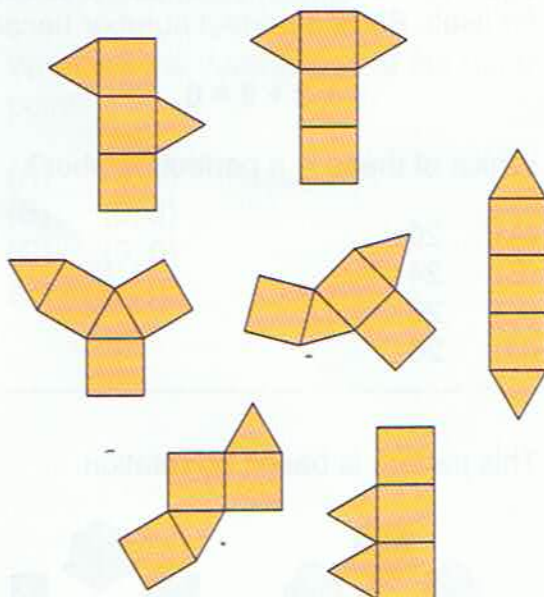
How many folders can she store in the bookcase?

- (A) 56
- (B) 54
- (C) 19
- (D) 18

24. Jose drew this net of a solid with five faces.



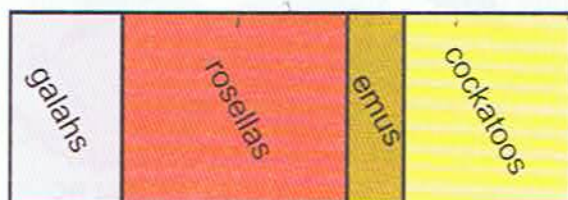
How many of these are nets of the same solid?



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

25. Bill went on a walk in an Australian national park.

He drew a graph to show the proportion of different birds he saw on his walk.



Approximately what fraction of the birds were rosellas?

- (A)  $\frac{1}{4}$  (B)  $\frac{2}{5}$   
(C)  $\frac{2}{4}$  (D)  $\frac{3}{5}$

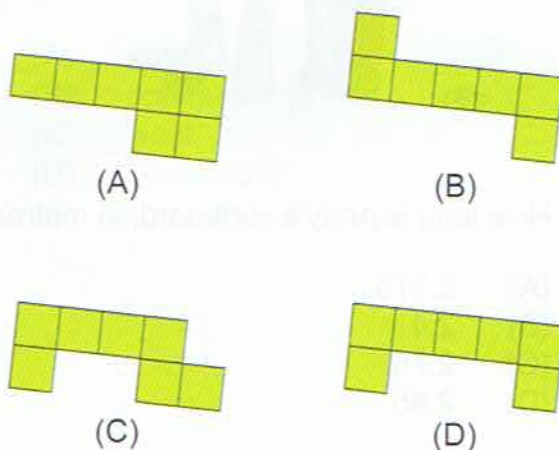
26. Calvin and Steven are standing on steps of different heights.



What is the distance between the top of Calvin's head and the top of Steven's head?

- (A) 33 cm (B) 45.33 cm  
(C) 78 cm (D) 91.33 cm

27. Which of these shapes does **NOT** tessellate?



28. Some countries use feet and inches to measure length.

These are the approximate conversions.

$$1 \text{ foot} = 0.3 \text{ metres}$$

$$1 \text{ inch} = 2.5 \text{ centimetres}$$

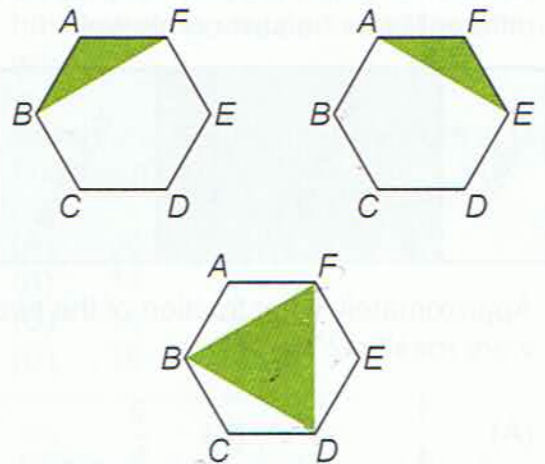
Andy's surfboard is 7 feet and 3 inches long.



How long is Andy's surfboard, in metres?

- (A) 2.175
- (B) 2.4
- (C) 2.75
- (D) 2.85

29. The diagram shows three different triangles  $ABF$ ,  $AEF$ ,  $BDF$  that can be drawn by joining the corners of a hexagon.



How many different triangles can be drawn in this hexagon?

- (A) 26
- (B) 24
- (C) 20
- (D) 18

30. A school bought red and blue pens in separate boxes.



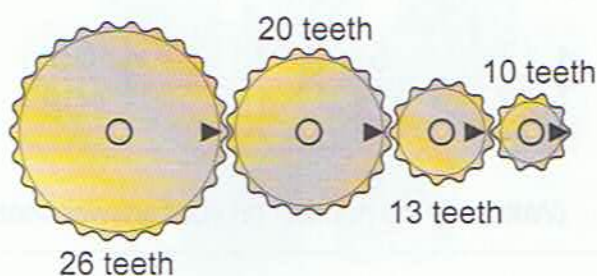
All the boxes of red pens held the same number of pens. Each box of blue pens held 70. The school bought 300 pens in total.

Which of these could **not** be the number of red pens in a box?

- (A) 32
- (B) 36
- (C) 45
- (D) 46



31. The diagram shows the starting position of four gears and the number of teeth on each.



When one gear moves by one tooth, the gear next to it moves by one tooth. The smallest gear moves by one tooth every second.

After how many seconds will all the arrows be back in their starting position?

- (A) 36  
(B) 69  
(C) 130  
(D) 260

33. When Rema took this picture of a sculpture her camera was facing north-east.



Which direction was her camera facing when she took this picture?



32. Shane's age is  $\frac{1}{6}$  of his grandfather's age.

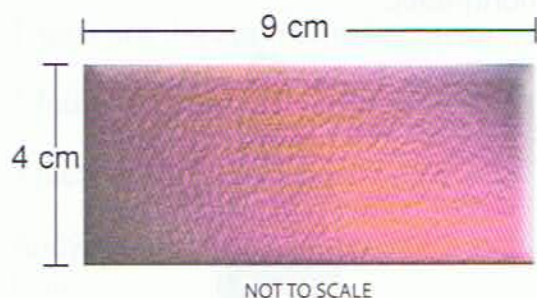
Shane's mother is  $\frac{2}{3}$  the age of Shane's grandfather.

What fraction is Shane's age of his mother's age?

- (A)  $\frac{5}{6}$                       (B)  $\frac{2}{3}$   
(C)  $\frac{1}{4}$                       (D)  $\frac{1}{9}$

- (A) east  
(B) south-east  
(C) west  
(D) south-west

34. Simon has some rectangular tiles the same size as this.



He uses the tiles to cover a square section of floor. He can do this without cutting, overlapping or leaving any gaps between the tiles.

What is the smallest possible area of the square section?

- (A) 36 cm<sup>2</sup>  
 (B) 81 cm<sup>2</sup>  
 (C) 169 cm<sup>2</sup>  
 (D) 1296 cm<sup>2</sup>

35. Eddie had 3 identical cakes. He sliced the first cake into 8 equal pieces, the second cake into 10 equal pieces and the third cake into 12 equal pieces.



Eddie ate one slice from each cake. In total he ate 111 grams of cake.

Altogether how much cake **remains**?

- (A) 969 g  
 (B) 360 g  
 (C) 333 g  
 (D) 249 g

36. What is the missing number in this equation?

$$1\frac{17}{27} - \frac{5}{?} \times \frac{11}{15} = 1\frac{65}{108}$$

(Write only the number on your answer sheet.)

37. Andy appeared in a TV quiz show. He won 200 points for each correct answer and lost 300 points for each incorrect answer.

After 30 questions his score was zero.

How many of the 30 questions did he answer correctly?

(Write only the number on your answer sheet.)

38. Sam took 160 minutes to erect a fence around a garden with a perimeter of 42 metres.

Sam and his friend then put a fence around another garden with a perimeter of 210 metres. They were able to erect this fence at twice the rate of the first fence.

How many minutes did it take for Sam and his friend to erect the second fence?

(Write only the number on your answer sheet.)



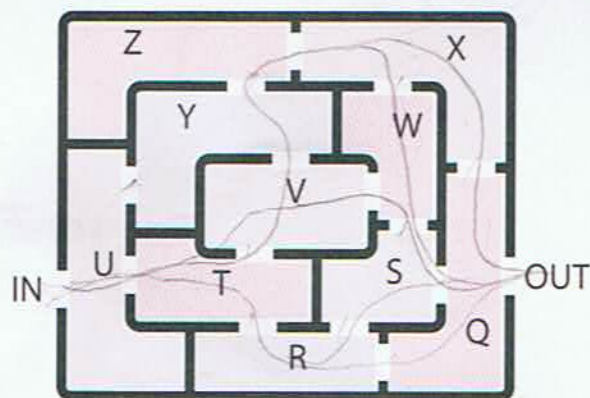
39. Sophia has one of each of these cards.



How many three digit numbers divisible by three can she make with her cards?

(Write only the number on your answer sheet.)

40. Tina is playing a computer game. In the game she has to go through this maze of rooms, marked by the letters Q to Z.



Tina has to get from the door marked 'IN' to the door marked 'OUT'.

She can only pass through a particular door once and she cannot be in the same room more than once.

How many different routes can she take?

(Write only the number on your answer sheet.)

$$\begin{aligned} x \times 200 - (30 - x) \times 300 &= 0 \\ 200x - (9000 - 300x) &= 0 \\ 200x - 9000 + 300x &= 0 \\ 500x &= 9000 \\ x &= 18 \end{aligned}$$

$$\text{rate} = \frac{42}{160} \text{ metres/min}$$

$$2 \text{ people rate} = \frac{2 \times 42}{160} \text{ m/min}$$

$$\begin{aligned} \text{to erect } 210 \text{ m} &= \frac{210}{\frac{2 \times 42}{160}} \\ &= \frac{210 \times 160}{2 \times 42} \\ &= 400 \text{ min} \end{aligned}$$



## ACKNOWLEDGMENT

Copyright in this booklet is owned by Educational Assessment Australia, UNSW Global Pty Limited unless otherwise indicated. Every effort has been made to trace and acknowledge copyright for materials used. Educational Assessment Australia apologises for any accidental infringement and welcomes information to redress the situation.

### 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

