UNSW Global
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA

PAPER J

Practice Questions

ICAS International Competitions and Assessments for Schools

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

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**.

MATHEMATICS

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

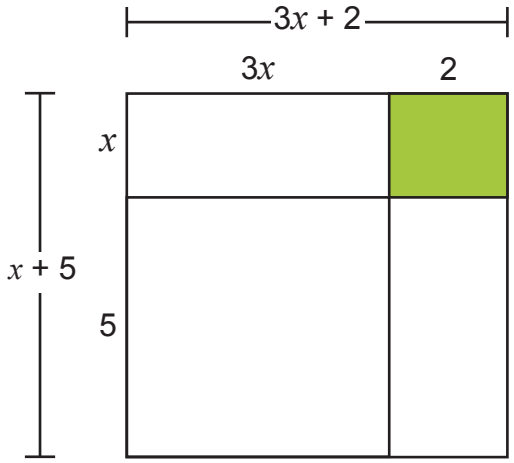
MULTIPLE-CHOICE QUESTIONS:
Use the information provided to choose the **BEST** answer from the four possible options.
On your **ANSWER SHEET** fill in the oval that matches your answer.

FREE-RESPONSE QUESTIONS:
Write your answer in the boxes provided on the **ANSWER SHEET** and fill in the oval that matches your answer

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

Educational Assessment

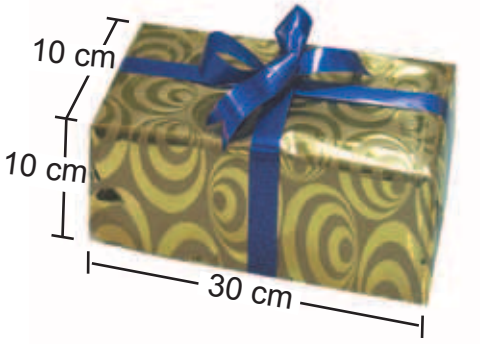
1. The diagram below represents the products of $(x + 5)$ and $(3x + 2)$.



What product is represented by the shaded rectangle?

(A) $2x$
(B) $6x$
(C) x^2
(D) $3x^2$

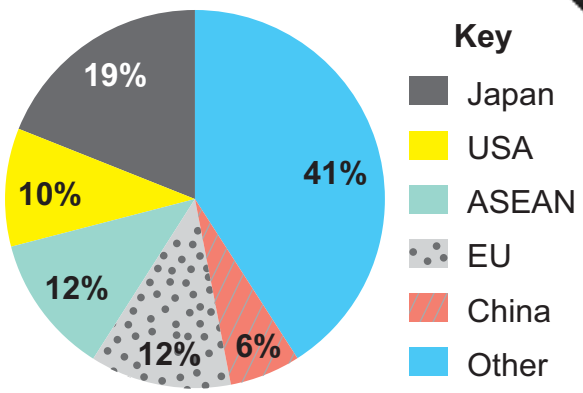
2. Jules has a package gift-wrapped, as shown.



What is the volume, in cm^3, of the package?

(A) 50
(B) 300
(C) 1400
(D) 3000

3. During 2001, Australia ex… …ods to a total value of $123 000 m… The graph shows the percenta… …e goods exported to different parts… world.



What was the value, in millions of dollars, of the goods exported to China?

(A) 7 380
(B) 12 300
(C) 14 760
(D) 23 370

4. Jane was tossing a coin, but one side of the coin was weighted more heavily than the other.

Here are the results she obtained.

	Heads 	Tails 
100 tosses	67	33
500 tosses	286	214
1000 tosses	581	419
5000 tosses	2989	2011

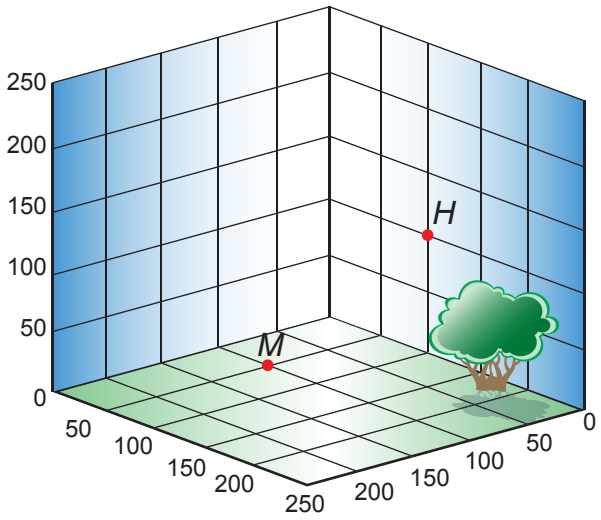
Based on her results, which of these is the best estimate of the probability of getting a head in a single toss of Jane's coin?

(A) 0.4
(B) 0.5
(C) 0.6
(D) 0.7

QUESTION 5 IS FREE RESPONSE.

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

5. In the diagram *H* represents the position of a hawk hovering above the ground, and *M* the position of a mouse on the ground.



ALL MEASUREMENTS IN CENTIMETRES

The mouse moves to a new position *N*, which is 50 cm from position *M*.

What is the maximum possible distance, in cm, from *H* to the new position *N* correct to the nearest whole number?

Acknowledgment

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The following year levels should sit THIS Paper:

Australia	Year 12
Brunei	Pre-University 2
Malaysia	Upper 6
New Zealand	Year 13
Pacific	Year 12
Singapore	Junior College 1
South Africa	Grade 12

PAPER **J**

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PAPER **J** | **M**

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UNSW THE UNIVERSITY OF SYDNEY

HOW TO FILL OUT THIS SHEET:

USE 2B OR B PENCIL

- Rub out all mistakes completely.
- Print your details clearly in the boxes provided.
- Make sure you fill in only one oval in each column.

EXAMPLE 1: Debbie Bach

FIRST NAME	LAST NAME
DEBBIE	BACH

EXAMPLE 2: Chan Ai Beng

FIRST NAME	LAST NAME
CHAN	AI BENG

EXAMPLE 3: Jamal bin Abas

FIRST NAME	LAST NAME
JAMAL BIN	ABAS

FIRST NAME to appear on certificate

LAST NAME to appear on certificate

Are you male or female?

○ Male ○ Female

Does anyone in your home usually speak a language other than English?

○ Yes ○ No

School name: _____

DATE OF BIRTH

Day	Month	Year
0 1 2 3	0 1	0 1 2 3 4 5 6

CLASS (optional)

TO ANSWER THE QUESTIONS

MULTIPLE CHOICE

Example: 6 + 4 =

(A) 2
(B) 9
(C) 10
(D) 24

START

The answer is 10, so fill in the oval Ⓒ, as shown.

Ⓐ Ⓑ ● Ⓓ

USE 2B OR B PENCIL

1 Ⓐ Ⓑ Ⓒ Ⓓ

2 Ⓐ Ⓑ Ⓒ Ⓓ

3 Ⓐ Ⓑ Ⓒ Ⓓ

4 Ⓐ Ⓑ Ⓒ Ⓓ

5

⓪	⓪	⓪
①	①	①
②	②	②
③	③	③
④	④	④
⑤	⑤	⑤
⑥	⑥	⑥
⑦	⑦	⑦
⑧	⑧	⑧
⑨	⑨	⑨

FREE RESPONSE

Example: 6 + 6 =

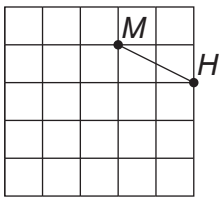
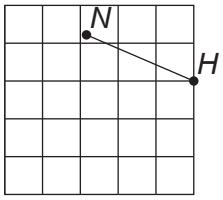
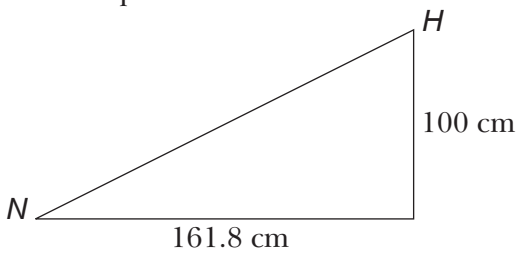
- The answer is 12, so WRITE your answer in the boxes.
- Write only ONE digit in each box, as shown, and fill in the correct oval, as shown.

	1	2
⓪	⓪	⓪
①	●	①
②	②	●
③	③	③
④	④	④
⑤	⑤	⑤
⑥	⑥	⑥
⑦	⑦	⑦
⑧	⑧	⑧
⑨	⑨	⑨

PAPER

International

QUESTION	KEY	SOLUTION	STRAND	OF TY
1	A	The shaded rectangle has a side of 2 and a side of x. Therefore, the product of these two sides is $2x$.	Algebra and Pattern	Easy
2	D	Volume of a box = length × width × height V = 30 × 10 × 10 V = 3000 cm^3	Measurement	Easy
3	A	6% of the total products are exported to China. 6% of 123 000 million = 0.06 × 123 000 million = $7380 million	Chance and Data	Easy
4	C	Experimental Probability equals: $\frac{\text{Number of times an event has occurred}}{\text{Number of trials}}$ Applying this formula: $\frac{67 + 286 + 581 + 2989}{100 + 500 + 1000 + 5000} = 0.59$ Therefore, the best estimate is 0.6.	Chance and Data	Medium

5	190	Apart from reading 3D coordinates the main mathematics in this question is Pythagoras' Theorem. If we look at the mouse and the hawk from above we would see this:  The line shows the hawk's path. The distance along the ground of this path (the horizontal component) is $\sqrt{100^2 + 50^2}$. This is about 111.8 cm. The mouse runs 50 cm away from the hawk to a new position 'N'. The mouse can run in any direction but wants to maximise the distance from the hawk. This means he should run in the same direction as the line NH in the diagram below.  Along the ground this gives a distance of 111.8+50=161.8 cm This is just the horizontal distance. Fortunately for the mouse, the hawk is further away than that because it is hovering above the ground at a height of 100 cm. We can show this on a new diagram from a different point of view.  We can now use Pythagoras' Theorem again to find the distance from the hawk to the mouse. $\sqrt{161.8^2 + 100^2}$ This gives an answer of 190.2 cm. To the nearest whole number this is 190. **Comment** The underlying mathematics in this problem is not very difficult and boils down to two instances of Pythagoras' Theorem. As a problem, though, the question is more difficult. Students have to realise that Pythagoras' Theorem is the appropriate piece of mathematics to use and have to extract information presented in an unusual	Measurement	Hard

Level of difficulty refers to the expected level of difficulty for the question.

Easy	more than 70% of candidates will choose the correct option
Medium	about 50–70% of candidates will choose the correct option
Medium/Hard	about 30–50% of candidates will choose the correct option
Hard	less than 30% of candidates will choose the correct option