UNSW Global
THE UNIVERSITY OF NEW SOUTH WALES
S Y D N E Y • A U S T R A L I A

PAPER E
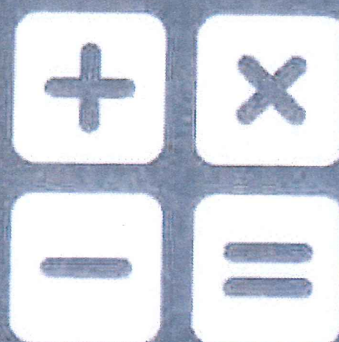
2012
ICAS

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.
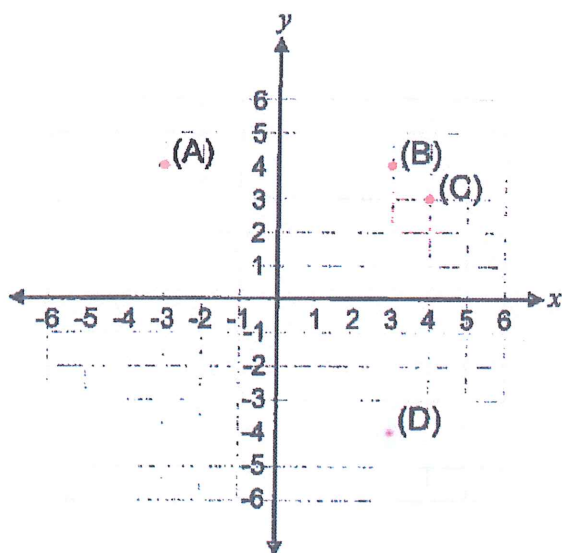On your **ANSWER SHEET** fill in the oval that matches your answer.

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.

1. $214 \times \boxed{?} = 1284$

    (A)   1
    (B)   2
    (C)   4
    (D)   6

2. Which point has the coordinates (3, 4)?

3. $$\begin{array}{r} 15\,000 \\ -\ \ 3\,768 \\ \hline \end{array}$$

    (A)   11 232
    (B)   11 238
    (C)   11 342
    (D)   12 768

4. $7^2 + 3^2 = \boxed{?}$

    (A)   20
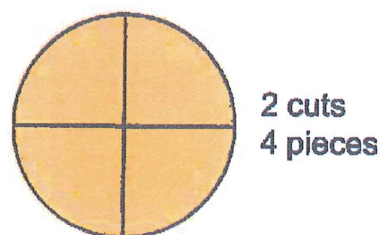   (B)   58
    (C)   100
    (D)   104

5. Mike was facing north. Then he turned 270° in a clockwise direction.

    What direction was Mike facing after completing the turn?

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

6. Sasi divided some pies into pieces by cutting each pie through its centre.

    She cut the first pie twice making 4 pieces as shown.

    2 cuts
    4 pieces

    In the same way, she cut a second pie 8 times.

    How many pieces did she make from the second pie?

    (A)   8
    (B)   10
    (C)   14
    (D)   16

7. Sam bought a bicycle for his son and a car for himself. The bicycle cost $800 and the car cost $8 000.

    How many times greater than the cost of the bicycle was the cost of the car?

    (A)   10
    (B)   80
    (C)   100
    (D)   7 200

8. Ann has a bag with a large number of coloured pencils in it. The pencils come in five different colours.
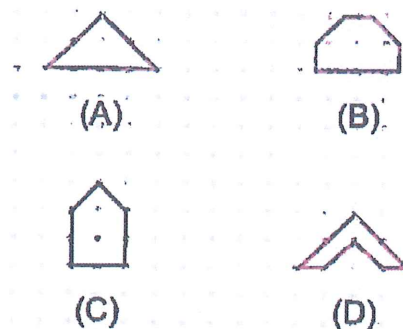
Ann takes a handful of pencils out of the bag without looking.

What is the smallest number of pencils that Ann needs to take so that she is certain she has two pencils that are the same colour?
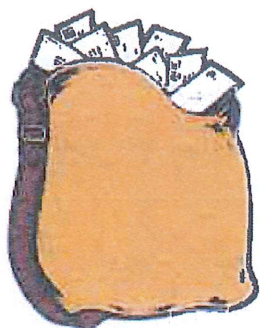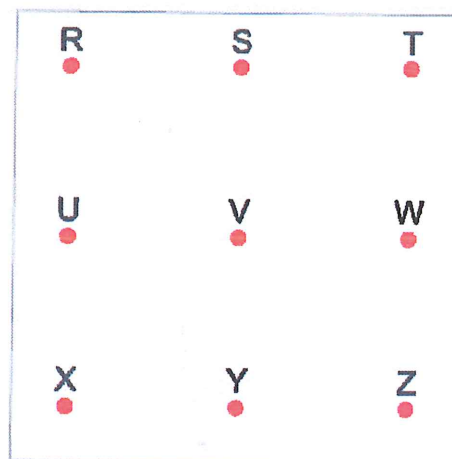
(A)   2
(B)   6
(C)   7
(D)   10

9. The letters in this postal sack have a total mass of 3 kg. Each letter has a mass of 20 g.

How many letters are in the sack?

(A)   15
(B)   60
(C)   150
(D)   600

10. Four shapes were drawn on square dot paper.

Which shape has the largest perimeter?

(A)   (B)

(C)   (D)

11. The points on the square dot paper below are labelled from R to Z.

Point X is north of Point T.

Which point is south-east of Point V?

(A)   Point R
(B)   Point S
(C)   Point W
(D)   Point Z

3

12. 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
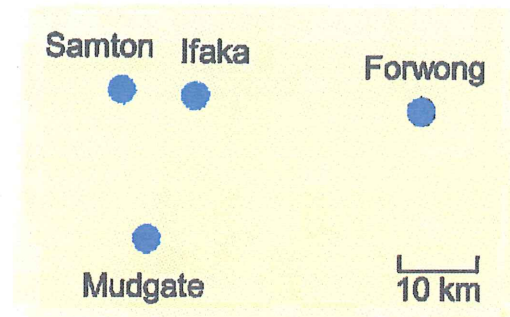(C)   1 hour 18 minutes
(D)   1 hour 26 minutes

13.   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

14.   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		

15. Fadi wants to buy some pizzas for his party.

Seafood pizza - $9.50 each
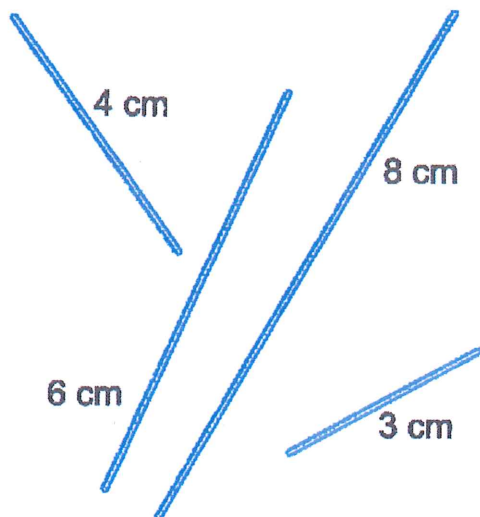

Vegetarian pizza - $6.20 each

Fadi bought 8 seafood pizzas and 12 vegetarian pizzas.

How much did Fadi spend on pizzas?

(A) $15.04
(B) $15.70
(C) $150.40
(D) $163.60

16. Lin has four rods as shown.

4 cm

8 cm

6 cm

3 cm

Lin wants to form a triangle using three rods. The rods should not overlap.
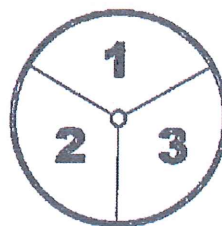
Which three rods CANNOT be used to form a triangle?

(A)   3 cm, 4 cm, 6 cm
(B)   3 cm, 4 cm, 8 cm
(C)   3 cm, 6 cm, 8 cm
(D)   4 cm, 6 cm, 8 cm

17. What is the missing number?

$$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}, \frac{5}{16}, \boxed{?}$$

(A) $\frac{5}{4}$

(B) $\frac{3}{4}$

(C) $\frac{5}{8}$

(D) $\frac{3}{8}$

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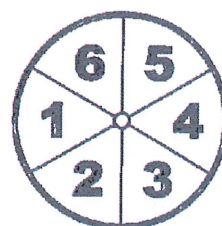
Spinner X   Spinner Y

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.

19. Lin has two dice numbered from 1 to 6. One die is red and the other is green.

Lin rolls the two dice together. One possible outcome is 6 on the red die and 1 on the green die.
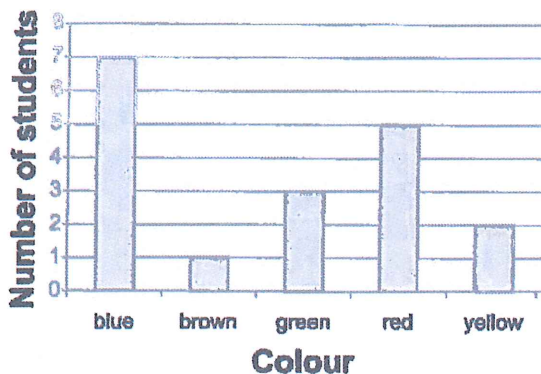

red   green

How many different outcomes are possible when Lin rolls the two dice together?

(A)   36
(B)   21
(C)   12
(D)   6

20. Students in a class were asked to choose their favourite colour from five options.

This graph shows the results.

The teacher wants to use a sector graph to show the same results.

What size angle must represent the colour green in the sector graph?

(A)   3°
(B)   30°
(C)   54°
(D)   60°

21. There are fewer than 30 students in Mr Chan's mathematics class. On his students' reports Mr Chan gives a grade of A, B, C, D or E.

This year, one third of the class got an A, one quarter of the class got a B, four students got a C and three students got an E.

How many students got a D?

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

22. The discs in this array have a number on one side. Some discs have been turned over.
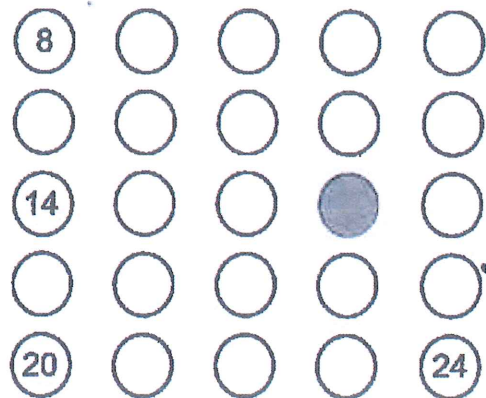
A disc halfway between any two other discs has a number that is halfway between the numbers on those discs. For example, 14 is halfway between 8 and 20.

What number is on the other side of the shaded disc?

(A)   15
(B)   16
(C)   17
(D)   18

23. Joe has a rectangular block of wood with the measurements shown in the diagram.
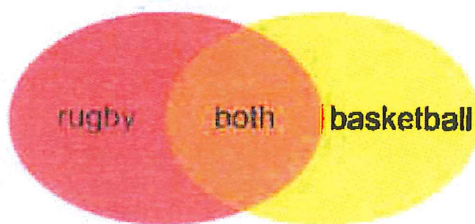

900 mm

36 cm

1.8 m

NOT TO SCALE
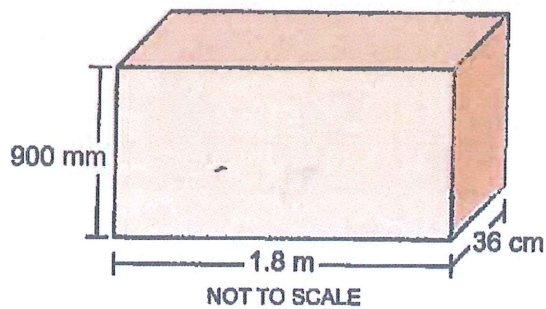
Joe wants to cut the block into cubes with side lengths of 18 cm.

How many of these cubes can Joe cut from the block?

(A)   10
(B)   20
(C)   100
(D)   1000

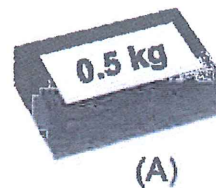**24.** At the local school there are 500 students. Every student plays rugby or basketball or both.

rugby   both   basketball

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

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

Which box has the largest mass?

0.5 kg

0.25 kg

(A)   (B)

50 g

2.500 g
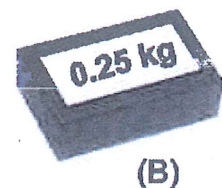
(C)   (D)

26. Last Monday, the price of gold for one troy ounce was $1 550.

One troy ounce is approximately 31 grams.

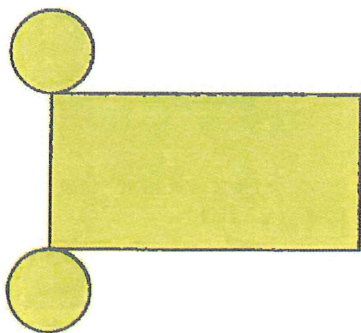What was the approximate price of one kilogram of gold last Monday?

(A) $50 000
(B) $48 050
(C) $5 000
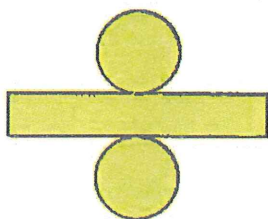(D) $4 805

27. Which of these is a net of a cylinder?

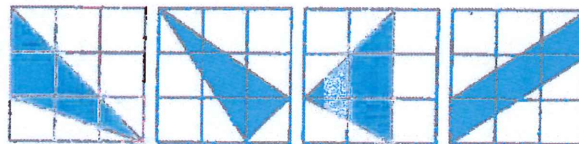(A)

(B)

(C)

(D)

28. Which of the following shaded regions has a different area from the other shaded regions?
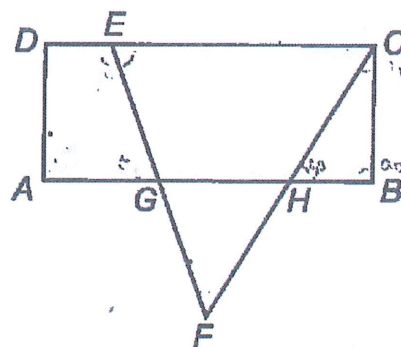
(A)   (B)   (C)   (D)

29. *ABCD* is a rectangle.

EF and *CF* are straight lines intersecting *AB* at *G* and *H* respectively.

$\angle HCB = 40°$ and $\angle AGE = 75°$

NOT TO SCALE

What is the size of $\angle EFC$?

(A)   35°
(B)   55°
(C)   65°
(D)   75°

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. A number is called abundant if the sum of its factors, not including the number itself, is greater than the number.

For example, the sum of the factors of the number 12 (not including the number 12 itself) is 1 + 2 + 3 + 4 + 6 = 16. This sum is greater than 12 so the number 12 is an abundant number.

How many abundant numbers are there between 15 and 25?

(A) 11
(B) 4
(C) 3
(D) 0

32. A rubbish bin can hold 1 m³ of rubbish.

1 cm³ = 1 mL

What is the capacity of the rubbish bin, in litres?

(A) 10
(B) 100
(C) 1 000
(D) 10 000

33. Ann is given this equation.

$$1000 \div \blacksquare = \blacktriangle$$

Ann knows that $\blacksquare$ is a positive whole number and $\blacktriangle$ is a 2-digit positive whole number.

How many combinations of numbers for $\blacksquare$ and $\blacktriangle$ are possible to solve the equation?

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

**34.** Lin's journey from City X to City Y took 23 hours and 15 minutes.

City Y is 14 hours behind City X.
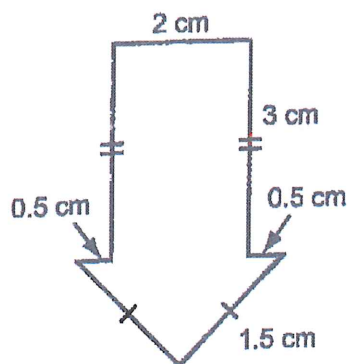
She left City X at 7:55 am on 12 June, City X time.

What was the date and time in City Y when Lin arrived?

(A) 12 June at 5:10 pm
(B) 12 June at 9:10 pm
(C) 13 June at 7:10 am
(D) 13 June at 5:10 pm

35. Sasi used some wire to make shapes. She made two shapes, as shown.

2 cm
1 cm
2.5 cm
1 cm
2 cm

Shape X

2 cm
3 cm
0.5 cm
0.5 cm
1.5 cm
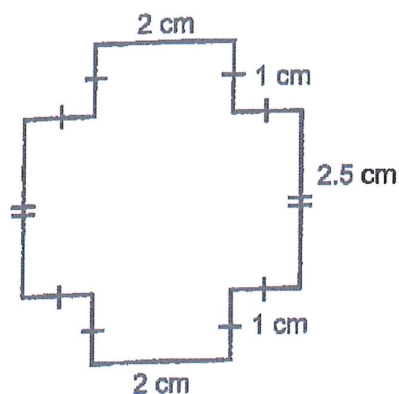
Shape Y

Sasi used exactly 302 cm of wire.

How many of each shape did she make?

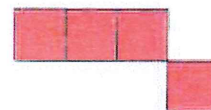|	Shape X	Shape Y
(A)	10	11
(B)	10	12
(C)	11	10
(D)	12	10

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 tetromino is a shape made of 4 squares of equal size. Each of the squares must have a common side with at least one other square.

This is a tetromino.
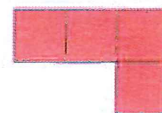
This is NOT a tetromino.

Two tetrominoes are the same if one is a reflection and/or rotation of the other.
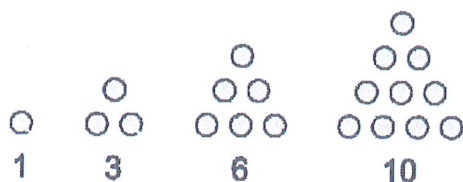
How many different tetrominoes can be drawn?

37. Lin has a rectangular piece of paper measuring 320 mm by 240 mm.

She folds the paper in half seven times making a smaller rectangle each time.

What is the area of the smallest rectangle, in mm^2?

38. The diagram below shows the 1st, 2nd, 3rd and 4th triangular numbers.


```
                              O
                  O          O O
        O        O O        O O O
O      O O      O O O      O O O O
1       3         6           10
```
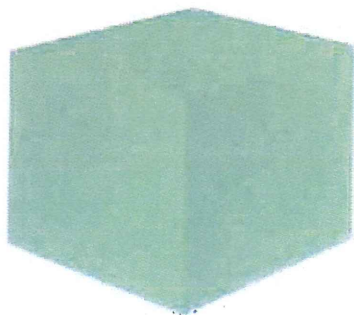
The formula $\dfrac{n(n+1)}{2}$ can be used to find the nth triangular number.

For example the 5th triangular number is

$$\frac{5(5+1)}{2} = \frac{5 \times 6}{2} = 15$$

How many of the triangular numbers that are less than 2 000 are odd?
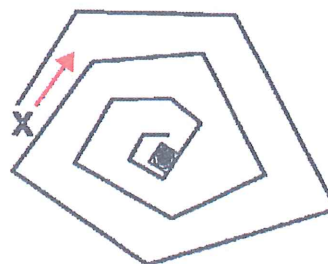
39. A line of symmetry divides a 2D shape into two mirror images. For example, a rectangle has two lines of symmetry.

A plane of symmetry divides a 3D shape into two mirror images.

How many planes of symmetry does a cube have?

40. Lin started walking from Point X. She stopped when she first reached the sundial.

KEY
🖼 Sundial

At all times, Lin kept her left hand on the wall to her left and turned only when she reached a corner.

What was the total size of the angle through which Lin turned to reach the sundial?

MIX
Paper from
responsible sources
FSC C014842

The following year levels should sit THIS Paper:

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

PAPER E

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