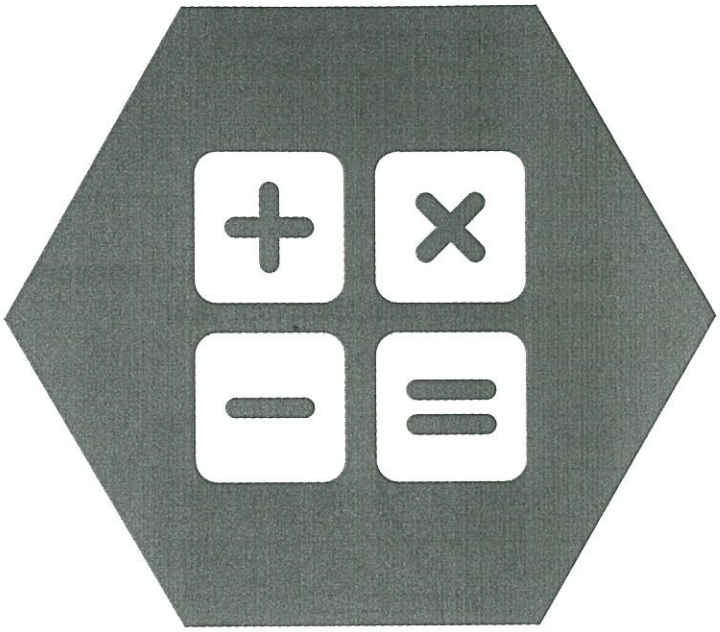
UNSW Global
AUSTRALIA

PAPER H



YEAR 10

2016 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.
A **CALCULATOR** is required.

Educational Assessment Australia
eaa.unsw.edu.au

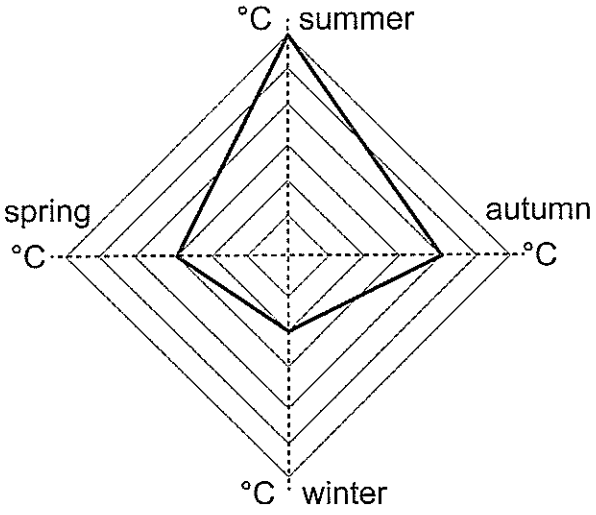
1. Scott needs 120 hours of driving experience before taking his driving test.

He makes a number of trips, driving for 1 hour and 30 minutes each time.

How many of these trips would give Scott a total of 120 hours?

(A) 80
(B) 90
(C) 92
(D) 180

2. This radar chart shows the mean seasonal temperatures in a town last year.

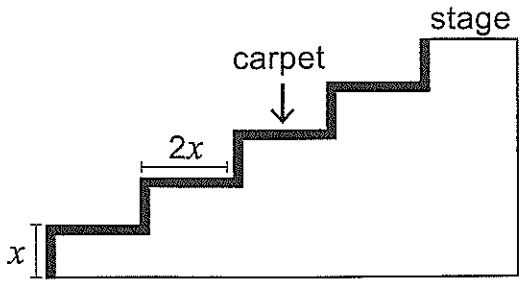


Which consecutive seasons had the greatest difference in mean temperature?

(A) spring and summer
(B) summer and autumn
(C) autumn and winter
(D) winter and spring

3. There are 5 steps leading up to the stage in the school hall. Each step is twice as wide as it is high.

Mr Lo wants to buy a strip of carpet to cover the steps as shown.

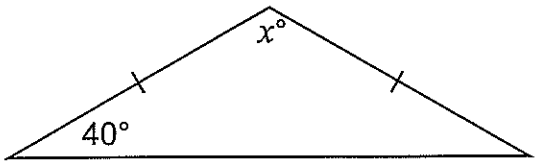


He measures the height of one step. He then calculates the length, l, of carpet required using a formula.

Which formula should Mr Lo use?

(A) $l = 15x$
(B) $l = 13x$
(C) $l = 12x$
(D) $l = 10x$

4. What is the value of x?



NOT TO SCALE

(A) 40
(B) 80
(C) 100
(D) 140

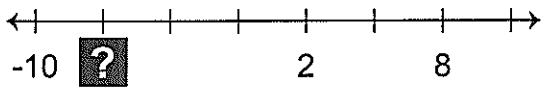
5. When Lynne divides 39 by a number, the remainder is 3.

When she divides 47 by the same number, the remainder is 2.

What is the number?

(A) 4
(B) 5
(C) 7
(D) 9

6. Which number goes at ? on this number line?



(A) -6
(B) -7
(C) -8
(D) -12

7. UTC (Coordinated Universal Time) is the basis for local times worldwide.

The table lists the time zones of three cities.

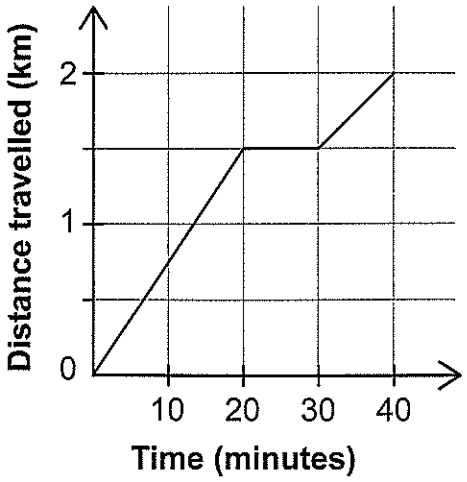
City	UTC
London	0.0 hours
Istanbul	+ 2.0 hours
Adelaide	+ 10.5 hours

It is 7:00 pm on Saturday in Istanbul.

What is the local time in Adelaide?

(A) 8:30 am on Saturday
(B) 10:30 am on Saturday
(C) 3:30 am on Sunday
(D) 5:30 am on Sunday

8. This graph represents Jane's walk to school.



Which table of values matches her graph?

(A)

Time	10	20	30	40
Distance	0.6	1.5	1.75	2

(B)

Time	10	20	30	40
Distance	0.75	1.5	1.75	2

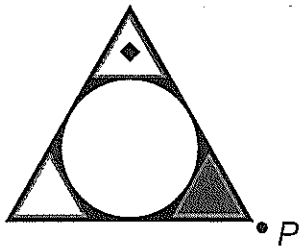
(C)

Time	10	20	30	40
Distance	0.6	1.5	1.5	2

(D)

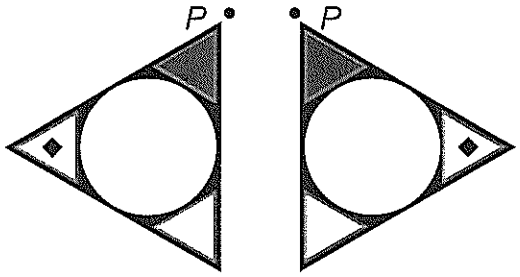
Time	10	20	30	40
Distance	0.75	1.5	1.5	2

9. Jack drew this equilateral triangle.

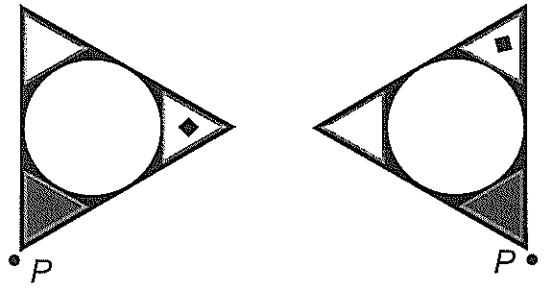


He rotated it 90° clockwise about *P*.

Which of these is Jack's shape after the rotation?

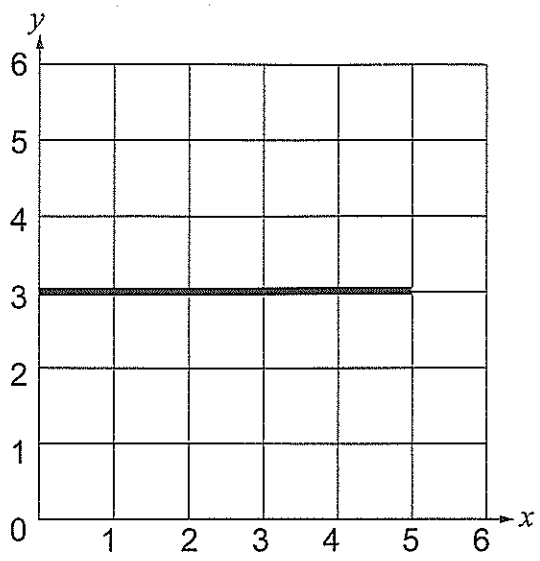


(A) (B)



(C) (D)

10. Danny drew a line from (0, 3) to (5, 3).



Danny drew another line with the same length by connecting two other points.

Which of these points did he connect?

(A) (0, 0) and (5, 5)
(B) (0, 2) and (5, 4)
(C) (1, 5) and (6, 0)
(D) (2, 0) and (5, 4)

11. In the early 20th century, Australian currency was organised as shown.

1 sixpence = 6 pennies
1 shilling = 2 sixpences
1 pound = 20 shillings
20 guineas = 21 pounds

How many pennies are in
2 guineas, 5 shillings and 1 sixpence?

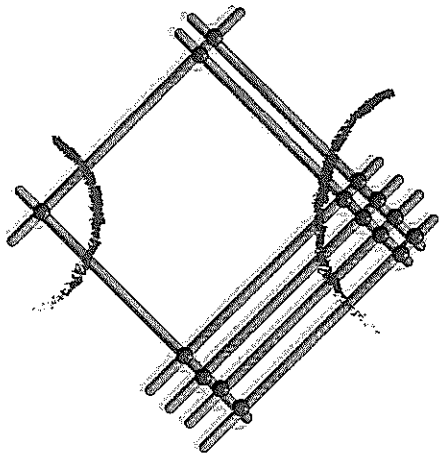
(A) 256
(B) 318
(C) 570
(D) 906

12. $4 - 2x < 3x + 19$

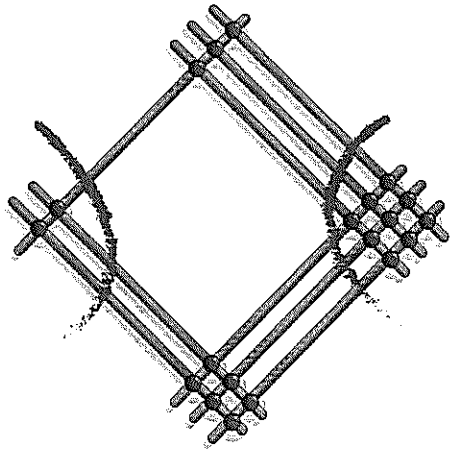
Which of the options is the lowest value of x to satisfy this inequality?

(A) -6
(B) -4
(C) -3
(D) -2

13. Lin multiplied 12 by 14 by using overlapping sticks. The diagram below shows the product to be 168.

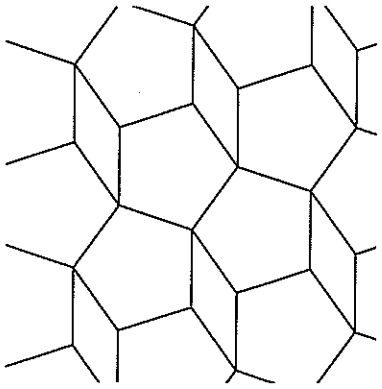


What product is represented by the following diagram?



(A) 299
(B) 269
(C) 263
(D) 236

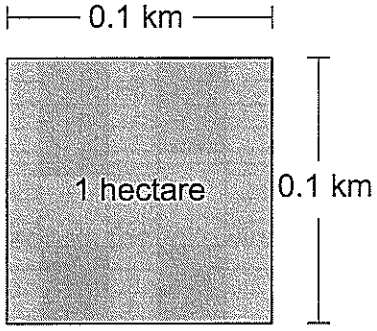
14. Sasi made a pattern using identical rhombuses and identical regular pentagons.



What is the size of each acute angle in the pattern?

(A) 72°
(B) 60°
(C) 36°
(D) 30°

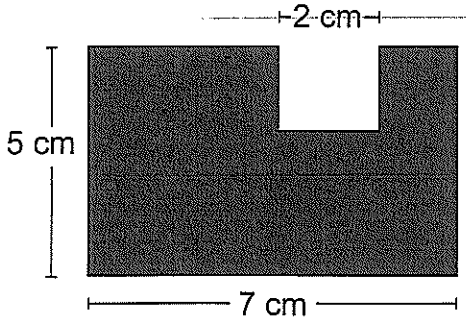
15. Joe owned 3 km^2 of land which he sold for \$5000 per hectare.



For how much money did Joe sell this land?

(A) \$1 500
(B) \$15 000
(C) \$150 000
(D) \$1 500 000

16. The area of this shape is 30 cm^2.

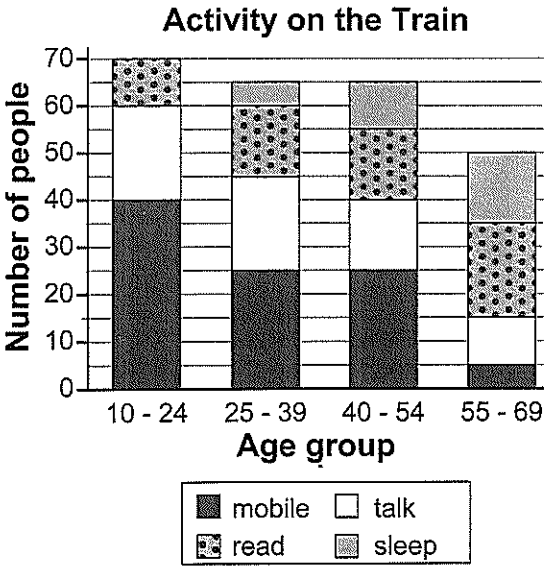


NOT TO SCALE

What is the perimeter of the shape?

(A) 22 cm
(B) 24 cm
(C) 28 cm
(D) 29 cm

17. Bill recorded the main activity of 250 train commuters. He grouped them by age and drew this graph.



What fraction of the commuters were reading?

(A) $\frac{6}{25}$ (B) $\frac{1}{4}$

(C) $\frac{13}{50}$ (D) $\frac{3}{10}$

18. The number 86 is a happy number because the following two-line pattern ends with the number 1.

$8^2 + 6^2 = 64 + 36 = 100$

$1^2 + 0^2 + 0^2 = 1 + 0 + 0 = 1$

How many lines are in the pattern needed to show that 70 is a happy number?

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

19. Four cubic metres of soil containing 35% sand was mixed with six cubic metres of soil containing 25% sand.

What is the percentage of sand in the mixture?

(A) 6
(B) 29
(C) 30
(D) 60

20. Jia has a combination lock with 4 digits.

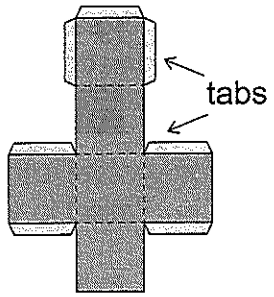
Each week Jia changes the code to her lock.

She always sets the code so that the digits increase in value from left to right and the 4-digit code is divisible by 3.

How many of Jia's codes are greater than 5000?

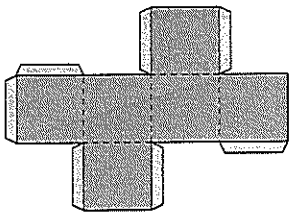
(A) 1
(B) 2
(C) 4
(D) 5

21. Anjali created a cut-out template for a cube. She is using tabs to ensure that all the edges of the cube can be closed.

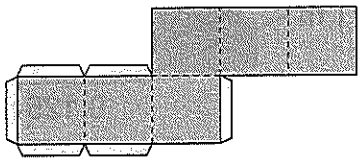


Which of these could also be used for her cube template?

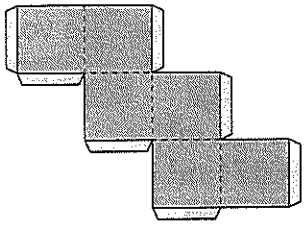
(A)



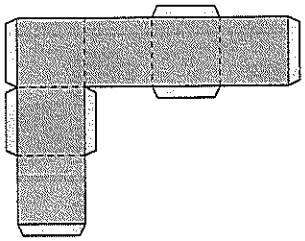
(B)



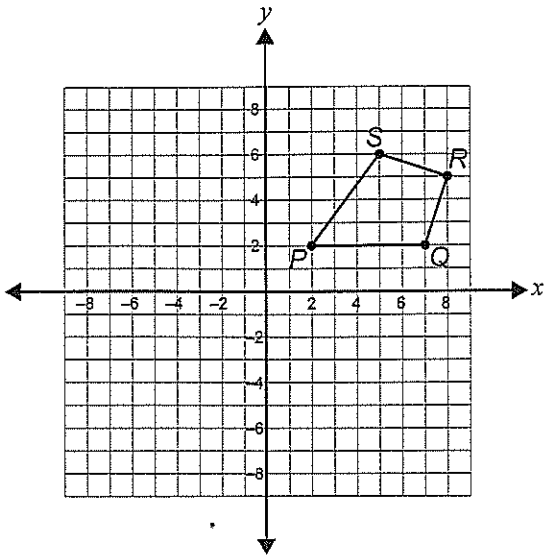
(C)



(D)



22. The quadrilateral *PQRS* was drawn on a number plane.



Sue reflected *PQRS* in the x-axis and then in the y-axis.

What were the coordinates of *S* after the two reflections?

(A) (5, −6)
(B) (−5, 6)
(C) (−5, −6)
(D) (−6, −5)

23. Jim solves the following equation.

$$\frac{(2x+5)}{3} = 3 - \frac{(x-4)}{2}$$

Which of these is a possible line of working used in obtaining the correct solution?

(A) $2x + 5 = 21 - 3x$
(B) $4x + 10 = 6 - 3x$
(C) $2x + 5 = 10 - x$
(D) $4x + 10 = 30 - 3x$

24. Marnie found a magic carpet.

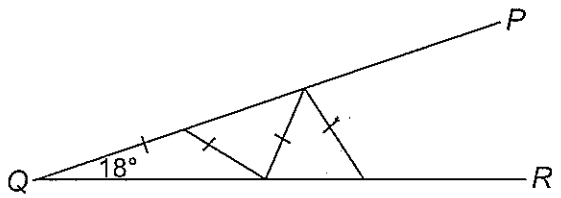
Each time Marnie used the carpet, it would shrink to one-half of its length and one-third of its width.

After three uses, the area of the carpet had shrunk to 250 cm^2.

What was the original area of the magic carpet?

(A) 5.4 m^2
(B) 1.2 m^2
(C) 0.45 m^2
(D) 0.14 m^2

25. In the figure below, $\angle PQR = 18°$. Three adjacent isosceles triangles have been drawn by joining points on PQ to points on QR with lines of equal length.



NOT TO SCALE

What is the maximum number of isosceles triangles that can be drawn in this way?

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

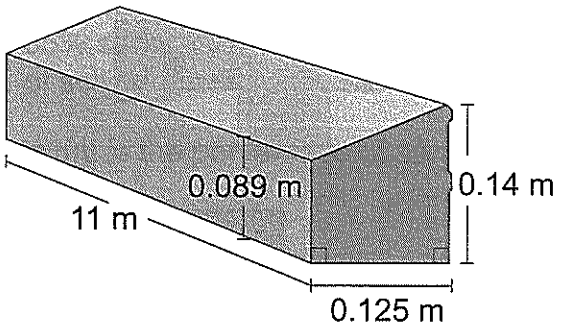
26. In this number pattern, the difference between consecutive numbers increases by a constant amount.

5, __ , ? , __ , 19

What value must ? be?

(A) 9.5
(B) 10
(C) 12
(D) 14.5

27. This closed gutter runs for 11 m along one side of the roof on Jake's house.



NOT TO SCALE

What is the approximate volume of the gutter?

(A) 0.0143 m^3
(B) 0.0171 m^3
(C) 0.157 m^3
(D) 0.165 m^3

28. $\frac{10}{x} + \frac{20}{x} + \frac{30}{x} + \frac{40}{x} = \frac{5}{2}$

What is the value of x?

(A) 10
(B) 40
(C) 200
(D) 250

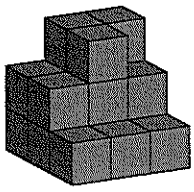
29. A factory has 600 bolts in stock and uses 20 bolts every day. The stock of bolts must not fall below 100 at any time.

This factory needs to keep its stock of bolts as low as possible. It takes 7 days for a new delivery of bolts to arrive.

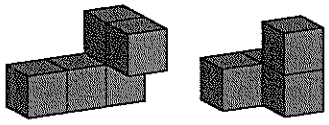
When does the factory need to order the next delivery of bolts?

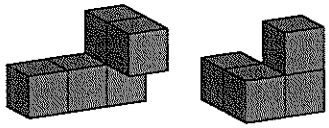
(A) after 30 days
(B) after 25 days
(C) after 23 days
(D) after 18 days

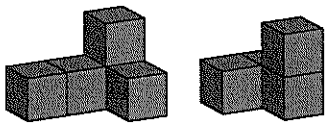
30. Sam is using 27 small cubes to build a large cube.

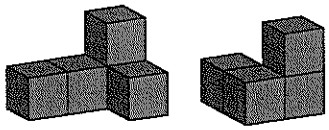


Which two parts will complete the cube?

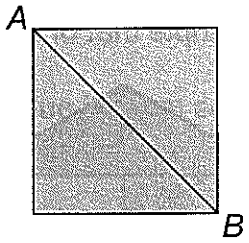
(A) 

(B) 

(C) 

(D) 

31. Edward walked around two edges of a square field from *A* to *B*. Mia walked diagonally from *A* to *B*.



Approximately what percentage of the distance Edward walked was the distance Mia walked?

(A) 50 %
(B) 71 %
(C) 100 %
(D) 141 %

32. Susi correctly rearranged this formula to make v the subject.

$$s = \frac{1}{2}(u+v)\,t$$

Which is Susi's rearranged formula?

(A) $v = \frac{2s}{t} - u$ (B) $v = \frac{2s-u}{t}$

(C) $v = \frac{2s-t}{u}$ (D) $v = \frac{2s}{u} - t$

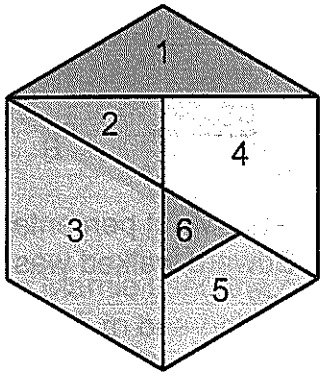
33. At Hayfield Senior High School

- 65% of students study History
- 40% of students study Geography
- 30 students study both subjects
- 10% of students study neither subject.

How many students are there at Hayfield Senior High?

(A) 95 (B) 200
(C) 300 (D) 600

34. This dartboard is a regular hexagon which is divided into different sections numbered from 1 to 6. The area of section 1 is double that of section 2. The area of section 5 is triple that of section 6.



Aditi is blindfolded. She throws two darts at the board. If a dart doesn't land in one of the numbered sections she throws it again.

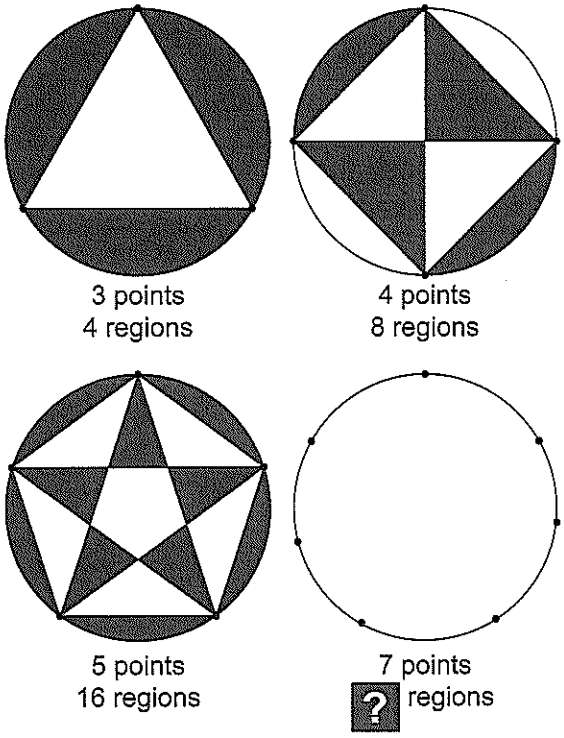
Aditi adds the two section numbers together.

What is the probability that this total is 10?

(A) $\frac{7}{192}$ (B) $\frac{7}{36}$

(C) $\frac{5}{96}$ (D) $\frac{1}{12}$

35. Jane is investigating the maximum number of regions formed by joining points on a circle.



She used this formula to find the maximum number of regions, R, formed by joining n points, where $n > 4$.

$$R = \frac{n!}{4!(n-4)!} + \frac{n!}{2!(n-2)!} + 1$$

where

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

What is the maximum number of regions formed by joining 7 points on a circle?

(A) 32 (B) 57

(C) 63 (D) 64

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. Pete runs a dog-walking service. He charges \$36 to walk a group of dogs and \$20 to walk one dog.

His income for the year was \$5760.

The group walks earned Pete \$1800 more than the individual walks.

How many dog walks did Pete get paid for that year?

37. An ant and a lizard were 10.2 m apart. The lizard spotted the ant moving towards him at 4 cm per second. The lizard moved at 2 m per second towards the ant.

How many centimetres will the ant have moved by the time the lizard catches it?

38. A data set with three scores is shown in increasing order.

$$x, 6, y$$

The range of the scores is 9, and the mean of the scores is 7.

What is the product of the three scores?

39. Amy and Mel are on a treasure hunt. They start at the same point and run in straight lines to each clue. They follow different routes based on their clues, which are not the same.

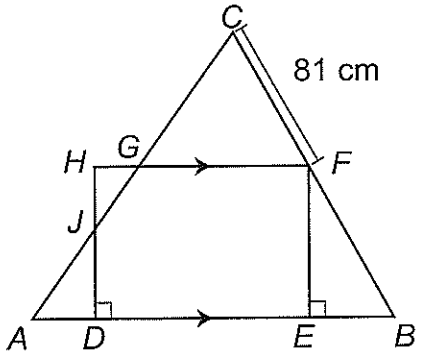
Amy's first clue is 50 m south-west of the starting point.

Mel reaches her first clue when she is 120 m north-west of Amy's first clue.

Mel then makes a quarter turn clockwise and runs the same distance to her second clue as she ran to her first clue.

How far is Mel's second clue from the starting point, to the nearest metre?

40. ΔABC is equilateral. $GJ = 16$ cm, $CF = 81$ cm and $HF \parallel AB$.



NOT TO SCALE

What is the length of DE, in cm?

PAPER **H**

M 2016 ICAS

International Competitions and Assessments for Schools

UNSW Global AUSTRALIA

HOW TO FILL OUT THIS SHEET:

USE A 2B OR HB PENCIL

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

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: _____

Town / suburb: _____

Today's date: ___/___/___ **Postcode:** _____

DATE OF BIRTH

Day	Month	Year

CLASS (optional)

TO ANSWER THE QUESTIONS

MULTIPLE CHOICE
Questions 1 to 35

Example: 4 + 6 =

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

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

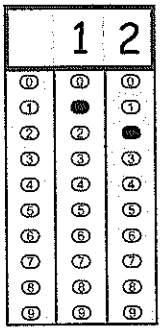
Ⓐ Ⓑ ● Ⓓ

USE A 2B OR B PENCIL

FREE RESPONSE
Questions 36 to 40

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 ovals, as shown.



START

1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ	21	Ⓐ	Ⓑ	Ⓒ	Ⓓ	31	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ	22	Ⓐ	Ⓑ	Ⓒ	Ⓓ	32	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	13	Ⓐ	Ⓑ	Ⓒ	Ⓓ	23	Ⓐ	Ⓑ	Ⓒ	Ⓓ	33	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	14	Ⓐ	Ⓑ	Ⓒ	Ⓓ	24	Ⓐ	Ⓑ	Ⓒ	Ⓓ	34	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	15	Ⓐ	Ⓑ	Ⓒ	Ⓓ	25	Ⓐ	Ⓑ	Ⓒ	Ⓓ	35	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	16	Ⓐ	Ⓑ	Ⓒ	Ⓓ	26	Ⓐ	Ⓑ	Ⓒ	Ⓓ					
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	17	Ⓐ	Ⓑ	Ⓒ	Ⓓ	27	Ⓐ	Ⓑ	Ⓒ	Ⓓ					
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	18	Ⓐ	Ⓑ	Ⓒ	Ⓓ	28	Ⓐ	Ⓑ	Ⓒ	Ⓓ					
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ	19	Ⓐ	Ⓑ	Ⓒ	Ⓓ	29	Ⓐ	Ⓑ	Ⓒ	Ⓓ					
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ	20	Ⓐ	Ⓑ	Ⓒ	Ⓓ	30	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

36 37 38 39 40