

ICAS

INTERNATIONAL COMPETITIONS AND
ASSESSMENTS FOR SCHOOLS

MATHEMATICS

2007

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**.

You may use a ruler and spare paper.

A **CALCULATOR** is required.

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

SIT THIS PAPER

1. The pictures show the masses of four objects.



mouse 0.12 kg



pen 0.05 kg



scissors 0.07 kg



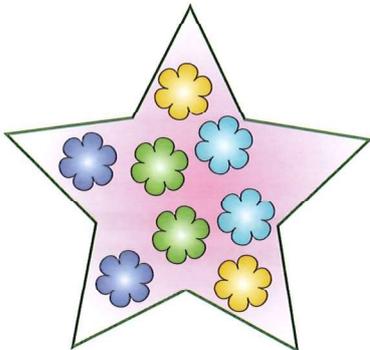
stapler 0.20 kg

The objects are put in order of mass from smallest to largest.

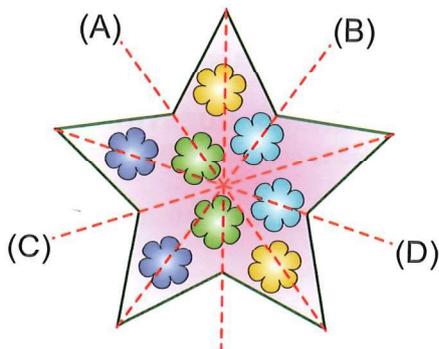
What is the order?

- (A) pen, scissors, mouse, stapler
- (B) pen, stapler, mouse, scissors
- (C) scissors, pen, mouse, stapler
- (D) scissors, mouse, pen, stapler

2. Sue made this design.



Which line is a line of symmetry of Sue's design?

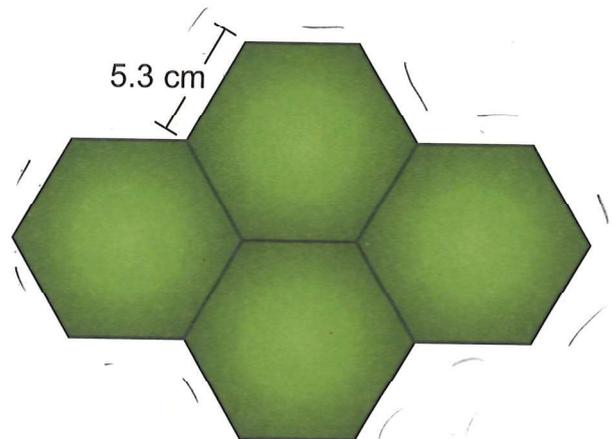


3. What is the size of the angle between the two forks?



- (A) 40°
- (B) 80°
- (C) 120°
- (D) 160°

4. Gary laid four regular hexagonal tiles to make the pattern in this figure.



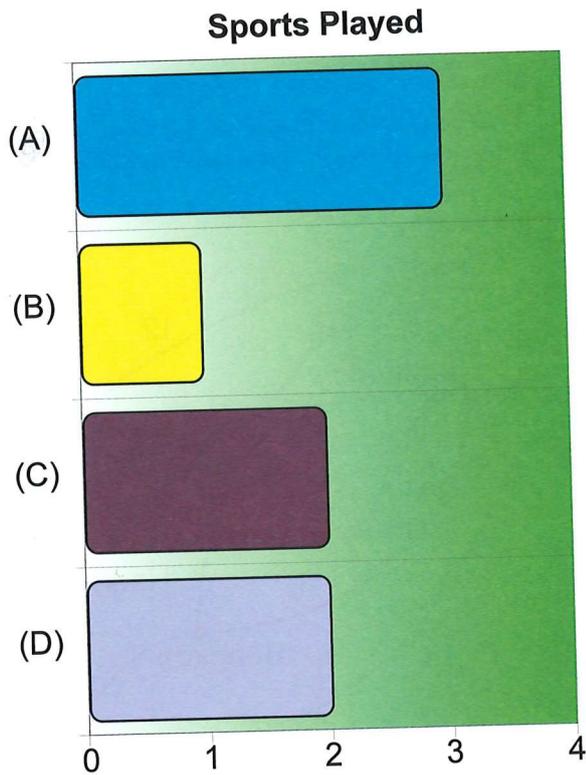
What is the perimeter of the pattern?

- (A) 63.6 cm
- (B) 74.2 cm
- (C) 84.8 cm
- (D) 127.3 cm

5. The table shows the two sports played by four students.

Ahmed	football and basketball
Clare	football and tennis
Ellen	basketball and tennis
Joe	golf and tennis

Which bar on this graph represents tennis?

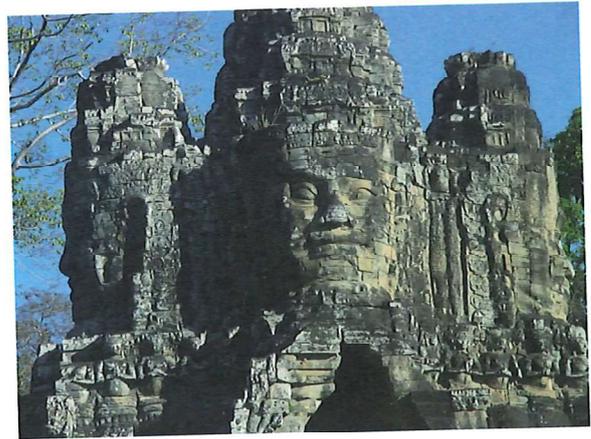


6. $x = 7, y = 4$

$x + 3y = ?$

- (A) 10
 (B) 11
 (C) 19
 (D) 41

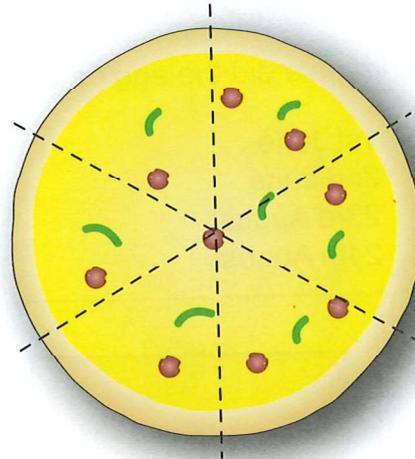
7. This picture is 7.5 cm wide.



How wide is the picture in metres?

- (A) 75
 (B) 0.75
 (C) 0.075
 (D) 0.0075

8. Sam made some pizzas. He cut up each pizza into 6 slices. He ate 16 slices.



How many pizzas did Sam eat?

- (A) 96 (B) 10
 (C) $2\frac{1}{6}$ (D) $2\frac{2}{3}$

9. In a pre-school class there are 20 children and 5 teachers.

What is the ratio of teachers to children in its simplest form?

- (A) 1:4
(B) 1:5
(C) 15:1
(D) 20:5

10. Bella bought a surfboard that is one-third taller than her height.

Bella is 156 cm tall.

What is the height of her surfboard?

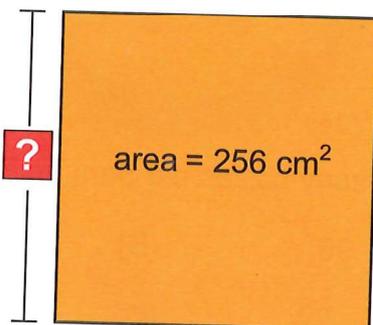
- (A) 208 cm (B) 189 cm
(C) 104 cm (D) 52 cm

11. An emu laid an egg on 13th July. The egg hatched exactly 6 weeks later.

On what date did the egg hatch?

- (A) 1st June
(B) 2nd June
(C) 23rd August
(D) 24th August

12.



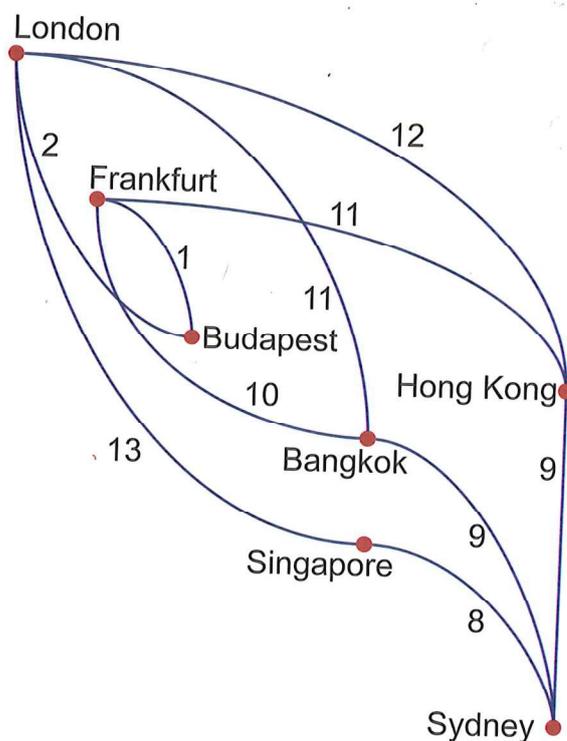
What is the length of the side of the square?

- (A) 16 cm
(B) 32 cm
(C) 64 cm
(D) 128 cm

13. $2x - 4y - 8x + y = ?$

- (A) $10x - 3y$
(B) $10x - 5y$
(C) $-6x - 5y$
(D) $-6x - 3y$

14. Marika visited the city of Budapest in Hungary. She flew from Sydney and stopped off at two other cities on the way. The diagram shows some of the routes and flying times, in hours, between cities.



She took the route that had the shortest flying time.

At which two cities did she stop on this route?

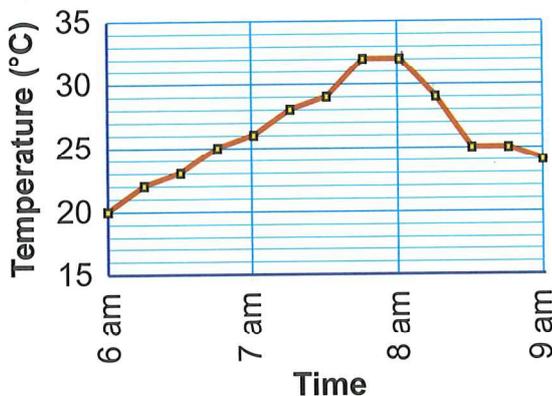
- (A) Bangkok and Frankfurt
(B) Singapore and London
(C) Hong Kong and London
(D) Hong Kong and Frankfurt

15. Ameer is 1.5 m tall. One morning he measured his shadow to be 0.5 m. His sister Sharmila's shadow was 0.3 m at the same time and place.

How tall is Sharmila?

- (A) 0.1 m
 (B) 0.9 m
 (C) 1.3 m
 (D) 1.8 m

16. Sally records the temperature of a room every 15 minutes from 6 am to 9 am.



During which period did the temperature fall by 3 °C?

- (A) 7:30 to 7:45
 (B) 8:00 to 8:15
 (C) 8:15 to 8:30
 (D) 8:45 to 9:00

17. John starts a number pattern using 3 as his first term.

To make any new term in the pattern, John squares the previous term and doubles the answer.

What is the third term in John's pattern?

- (A) 81
 (B) 324
 (C) 648
 (D) 1296

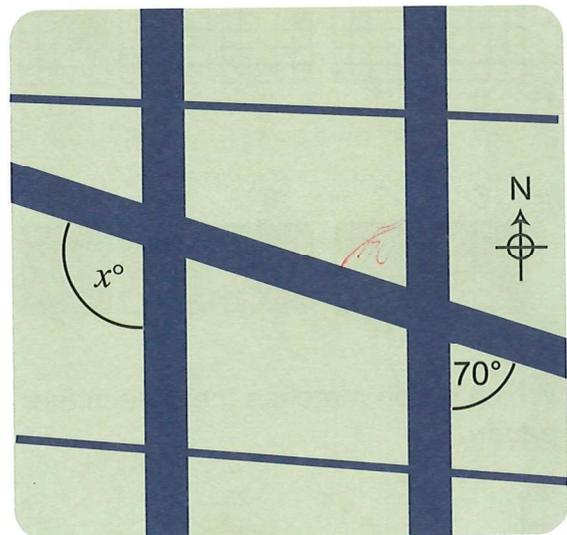
18. Tom and Jack are at opposite ends of an 18 km bush track. They both start walking along the track at the same time and meet after 3 hours.

Tom walked at a speed of x km/h.

Which of these represents the speed, in km/h, at which Jack walked?

- (A) $6 - 3x$
 (B) $6 - x$
 (C) $18 - 3x$
 (D) $18 - x$

19. This map shows the angles between some roads in a town. Two of the large roads head due north.



NOT TO SCALE

What is the value of x ?

- (A) 20
 (B) 70
 (C) 110
 (D) 160

20. Kiri, Joe and Megan have just inherited 3.6 million dollars.

The money is to be divided amongst them in the ratio 2:3:4, with Megan getting the largest share.

How many million dollars will **Megan** receive?

- (A) 0.4
(B) 0.9
(C) 1.2
(D) 1.6

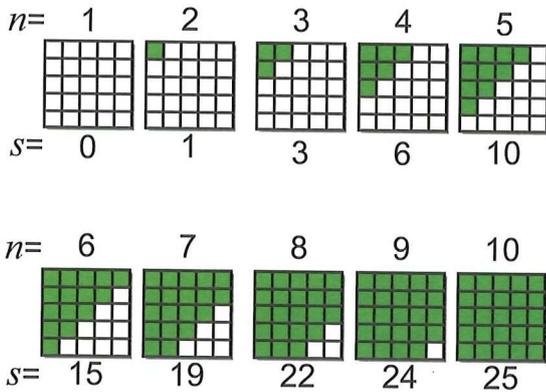
22. Alice had 40 strawberries to share.

She gave each of her friends the same number of strawberries and had 5 left over for herself. Alice had fewer strawberries than each of her friends.

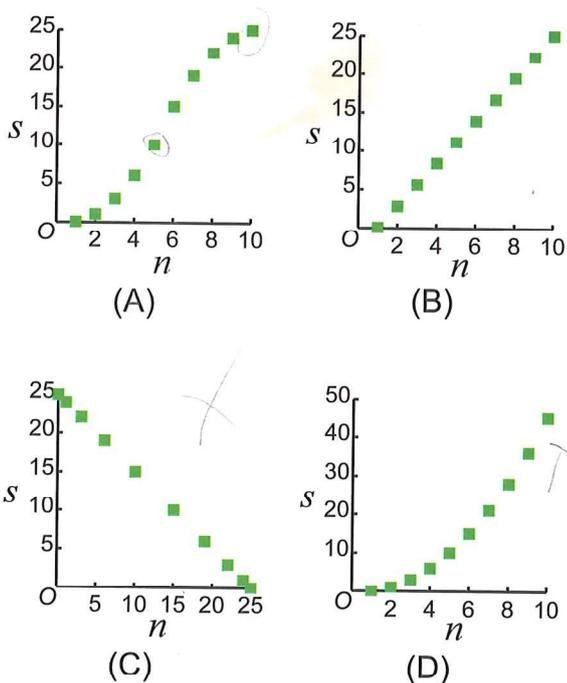
How many friends did Alice share strawberries with?

- (A) 8 (B) 7
(C) 6 (D) 5

21. The diagram shows a pattern of shaded squares.



Which graph matches the data in the pattern?



23. Sophia has two bags. In each bag there are 4 white chess pawns and 4 black chess pawns.



Without looking, Sophia takes a pawn from each bag.

What is the probability that **at least one** of the pawns will be black?

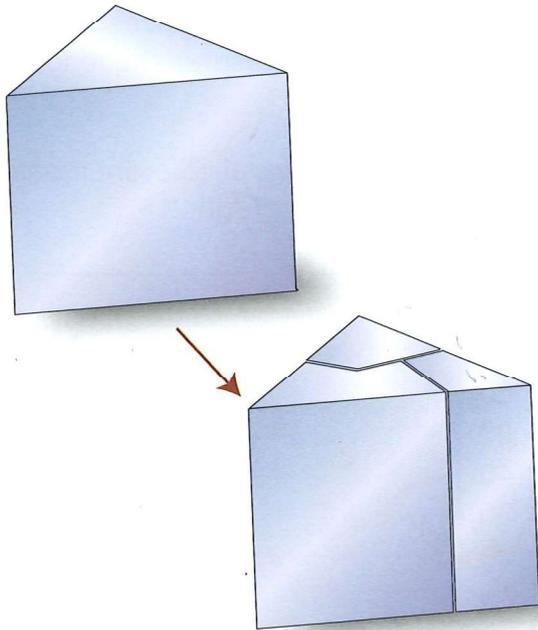
- (A) $\frac{3}{4}$ (B) $\frac{1}{2}$
(C) $\frac{1}{4}$ (D) $\frac{2}{16}$

Handwritten red scribbles and calculations:
 $\frac{2}{5} \times \frac{2}{3} = \frac{4}{15}$
 $1 - \frac{4}{15} = \frac{11}{15}$

24. A fan inside a computer spins at the rate of 4800 revolutions per minute.
How many degrees does the fan turn per second?

- (A) 0.2
- (B) 800
- (C) 28 800
- (D) 103 680 000

25. Chris made a triangular prism and cut it into three pieces.



The pieces are all prisms of the same height.

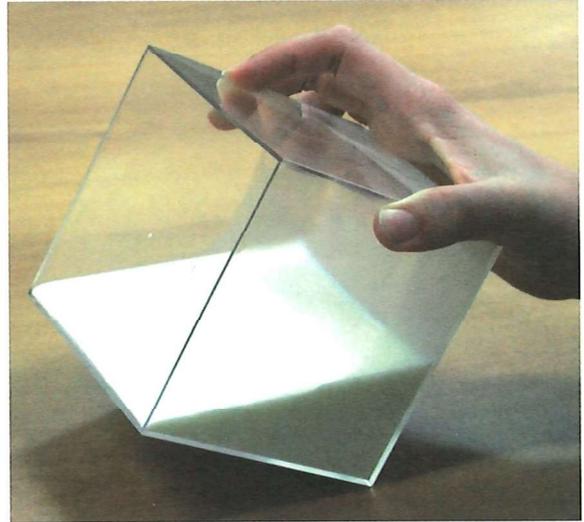
Chris selected the piece with the greatest number of faces.

How many **edges** does this piece have?

- (A) 5
- (B) 7
- (C) 12
- (D) 15

26. Claire has a vase that is a cube with sides of 10 cm.

She put some liquid in the vase. She tilted the vase so that the liquid covered one face and half of the base of the vase.

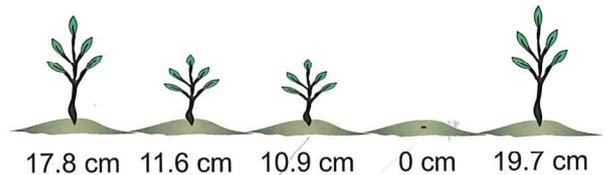


Claire then tilted the vase back so that the base was horizontal.

What was the height of the liquid in the vase when the base was horizontal?

- (A) 1.25 cm
- (B) 2.5 cm
- (C) 5 cm
- (D) 12.5 cm

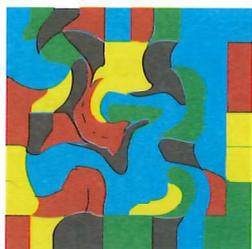
27. Jane planted five seeds which grew into plants. She recorded the height of each plant one month later.



What is the difference between the mean and the median of these five heights?

- (A) 0.4 cm
- (B) 1.1 cm
- (C) 3.4 cm
- (D) 4.1 cm

28. Andrew painted this picture using five different colours.

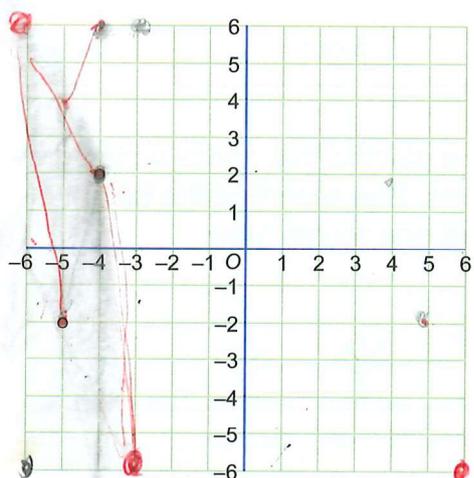


Of the paint he used, $\frac{1}{5}$ was red, $\frac{1}{7}$ was yellow, $\frac{1}{3}$ was blue, and $\frac{1}{6}$ was green.

What fraction of the paint used was black?

- (A) $\frac{1}{7}$
 (B) $\frac{4}{21}$
 (C) $\frac{11}{70}$
 (D) $\frac{177}{210}$

29. The coordinates of two of the vertices of a parallelogram are $(-4, 2)$ and $(-5, -2)$.



Which of these could be the coordinates of the other two vertices?

- ~~(A)~~ $(5, -2)$ and $(4, 2)$
 (B) $(-6, 6)$ and $(-3, -6)$
 (C) $(-4, 6)$ and $(-5, 4)$
~~(D)~~ $(-3, 6)$ and $(-6, -6)$

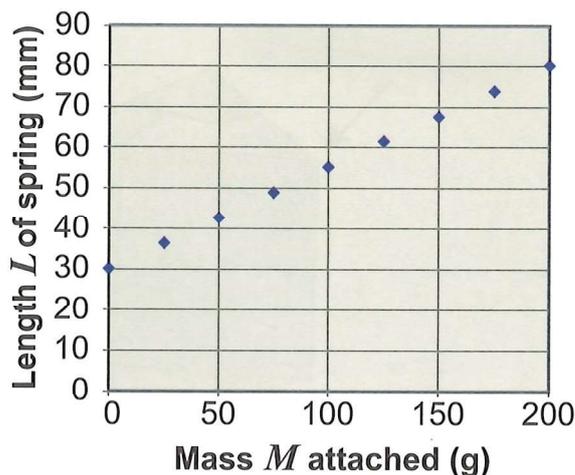
30. John is x years old. Sarah is 5 years older than John. Ben is 3 years older than Sarah. The total of the ages of John, Sarah and Ben is 40.

Which equation best represents this information?

- (A) $x + 8 = 40$
 (B) $x + 13 = 40$
 (C) $3x + 8 = 40$
 (D) $3x + 13 = 40$

31. Simon hangs different masses from a spring and then measures the length of the spring.

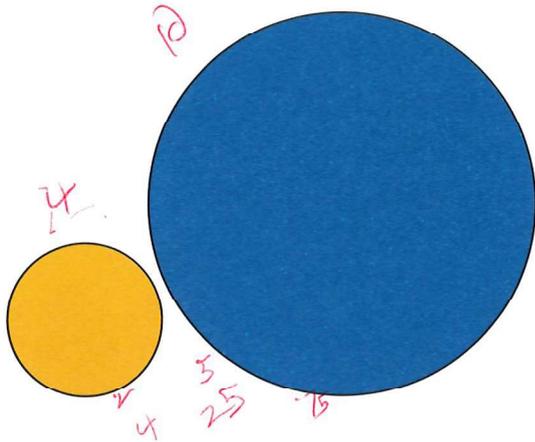
The results for several different masses are shown on this graph.



Which of these formulas best describes the relationship between L and M as shown in the graph?

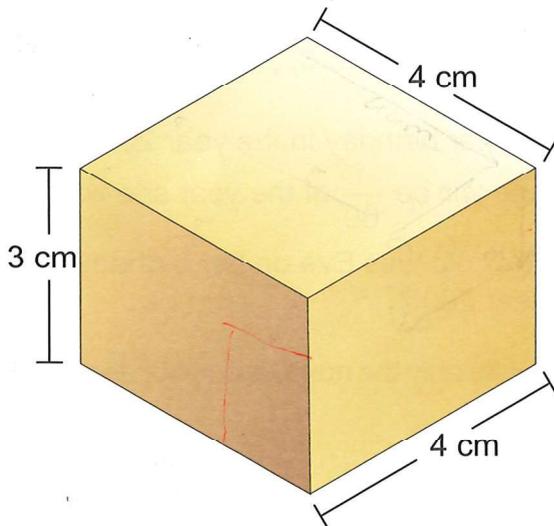
- (A) $L = \frac{1}{4}M + 30$ (B) $L = \frac{1}{4}M$
 (C) $L = \frac{2}{5}M + 30$ (D) $L = \frac{2}{5}M$

32. The diameter of the small circle is 40% of the diameter of the large circle.



What percentage of the area of the large circle is the area of the small circle?

- (A) 60% (B) 40%
 (C) 25% (D) 16%
33. Julie has a piece of wood that is a rectangular prism 4 cm × 4 cm × 3 cm.



She cuts the wood into small blocks, each 2 cm × 1 cm × 4 cm.

How many small blocks can Julie cut from the large piece of wood?

- (A) 4
 (B) 6
 (C) 8
 (D) 12

34. Sandra is going to put a circular pond in her 6 m wide square garden. The diameter of the pond will be the same as the width of the garden.

What area of garden will remain after the pond has been installed, to the nearest m²?

- (A) 8
 (B) 17
 (C) 28
 (D) 77

- 35.

$$F = V^2 - 30V - 4000$$

At what positive value of V does $F = 0$?

- (A) $V = 10$
 (B) $V = 40$
 (C) $V = 50$
 (D) $V = 80$

QUESTIONS 36 TO 40 ARE FREE RESPONSE.

36. ✓ Todd's bike has a combination lock. To unlock his bike Todd has a secret number that is greater than 100 but less than 1000.

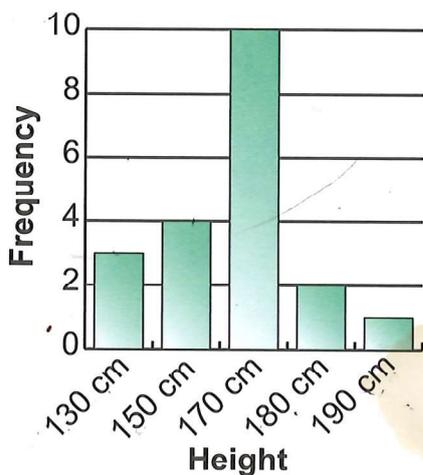
Todd's secret number is a square number and the cube root of his secret number is also a square number.

What is Todd's secret number?

(Write only the number on your answer sheet.)

37. A clothing store displays its clothes on plastic models. The store has models of five different heights.

The graph shows how many of each size of model the store has.

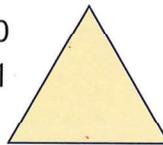


What is the mean height of the models?

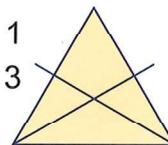
(Write only the number on your answer sheet.)

38. In this pattern t is the number of non-overlapping triangles in each shape and q is the number of non-overlapping quadrilaterals.

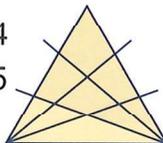
$q = 0$
 $t = 1$



$q = 1$
 $t = 3$



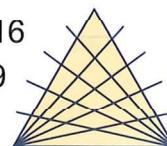
$q = 4$
 $t = 5$



$q = 9$
 $t = 7$



$q = 16$
 $t = 9$



The pattern can be continued for bigger values of t and q .

When $t = 45$ what is the value of q ?

(Write only the number on your answer sheet.)

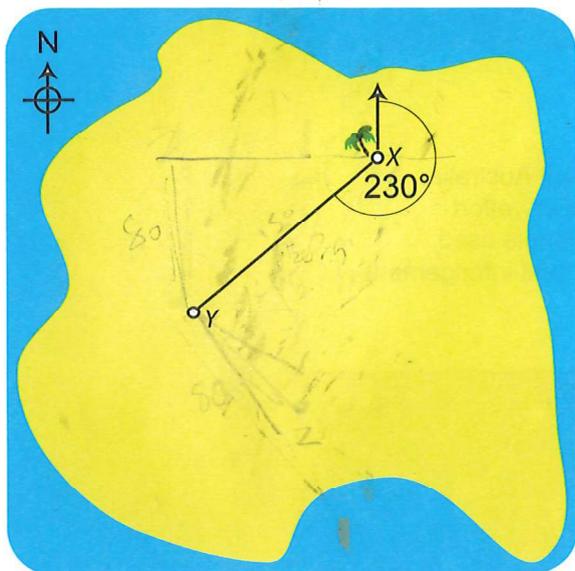
39. ✓ On her birthday in the year 2013, Eve's age will be $\frac{1}{60}$ of the year she was born.

How old was Eve on her birthday in the year 2000?

(Write only the number on your answer sheet.)



40. Ricky is on an island looking for some treasure.



He starts at point X by the palm tree and walks 150 m in a direction of 230° N to point Y. He then walks 80 m in a direction of 140° N to point Z. At point Z he digs and finds the treasure.

How far in metres is point Z from point X?

(Write only the number on your answer sheet.)

ACKNOWLEDGMENT

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