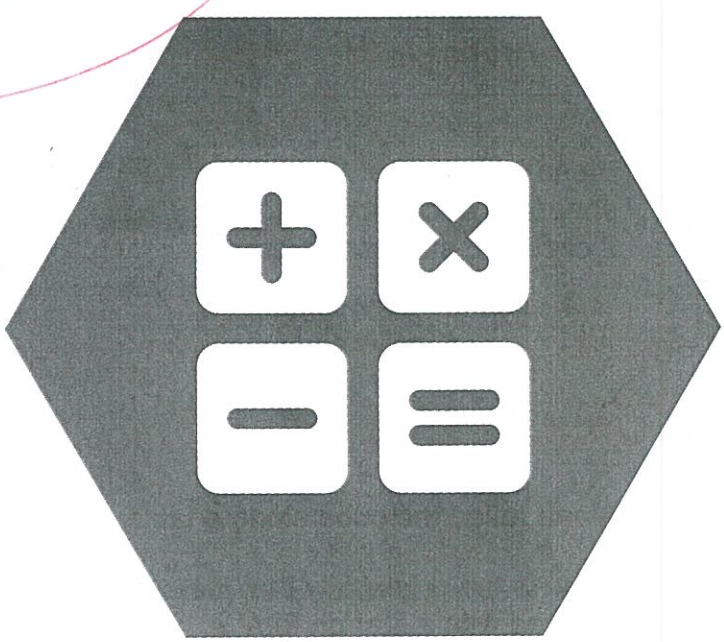
UNSW Global
AUSTRALIA

SOLUTIONS

PAPER E



2016 ICAS

International Competitions and Assessments for Schools

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**.

MATHEMATICS

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.

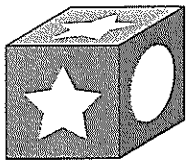
There are **5 FREE-RESPONSE QUESTIONS** (36–40).
Write your answer in the boxes provided on the **ANSWER SHEET** and fill in the ovals that match your answer.

1. Joe's son is arriving at the airport at 19:45. Joe leaves home 1 hour and 15 minutes before arrival time.

At what time did Joe leave home?

(A) 6:30 pm
(B) 8:30 pm
(C) 9:00 pm
(D) 11:00 pm

2. Alana had a cube. She painted one shape on each face. Alana painted 2 circles, 3 stars and 1 cross.



Alana rolled the cube along a table.

What is the probability that the cube finished with a star on top?

(A) $\frac{2}{6}$ (B) $\frac{3}{6}$
(C) $\frac{2}{3}$ (D) $\frac{3}{3}$

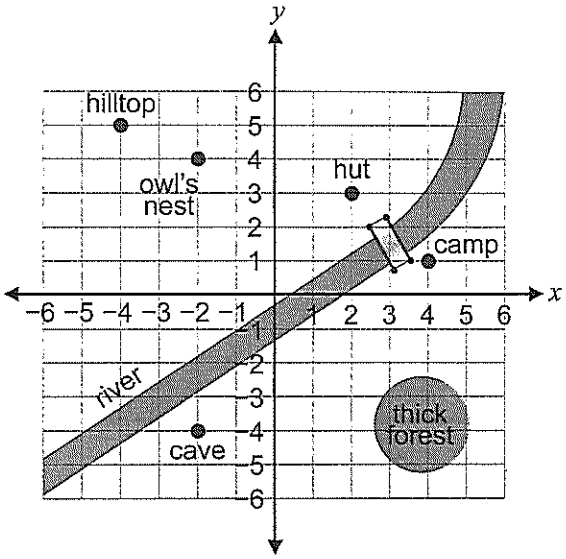
3. Twelve members of a football squad were girls.

Two-thirds of the squad were boys.

How many members are in this football squad?

(A) 36
(B) 24
(C) 20
(D) 18

4. Sara plotted places of interest on her map.



At which point on her map is the owl's nest located?

(A) (−2, −4) (B) (4, −2)
(C) (−4, −2) (D) (−2, 4)

5. Ali grew this sunflower plant for a competition. It was just over 240 cm tall.

What was the approximate diameter of Ali's flower as shown by the marker?

(A) 24 cm
(B) 25 cm
(C) 32 cm
(D) 40 cm

6. The numbers 4, 6, 10, 16, ? form a pattern.

What number must ? be?

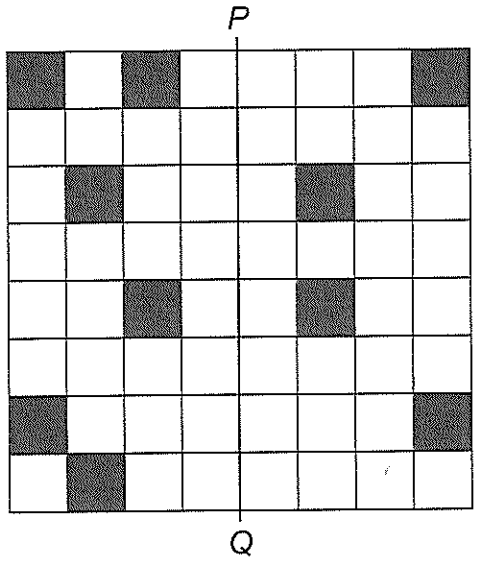
(A) 20
(B) 22
(C) 24
(D) 28

7. Abby is calculating $6015 \times 98 \div 49$.

What is a good estimate for Abby's answer?

(A) 12
(B) 120
(C) 1 200
(D) 12 000

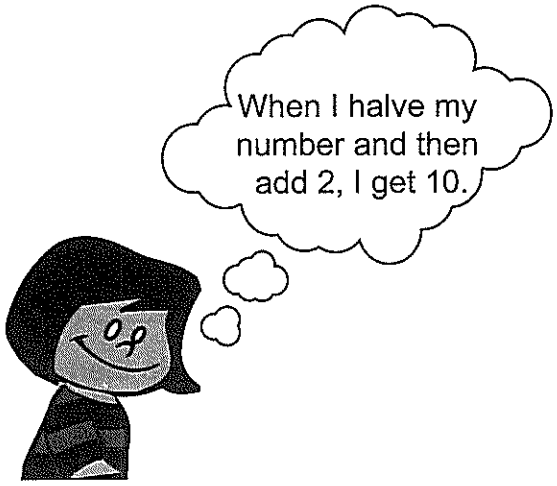
8. Dani is making a design with PQ as the line of symmetry.



What is the minimum number of squares that Dani still needs to shade?

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

9. Lin is thinking of a number.



What is Lin's number?

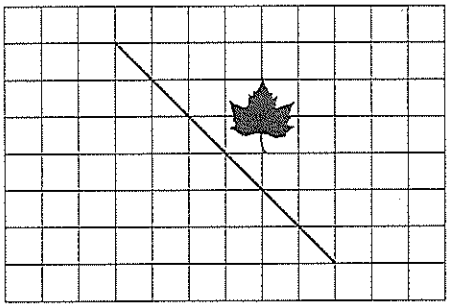
(A) 22
(B) 16
(C) 7
(D) 6

10. One year, 23 September was a Monday.

What day of the week was 10 November that year?

(A) Sunday
(B) Monday
(C) Thursday
(D) Saturday

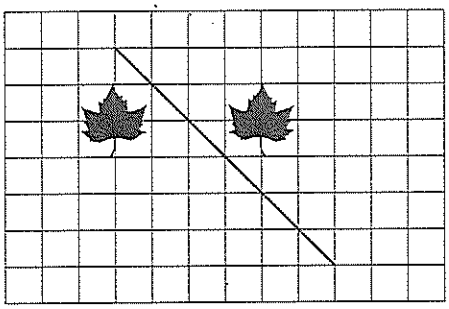
11. Danny drew a leaf on grid paper.



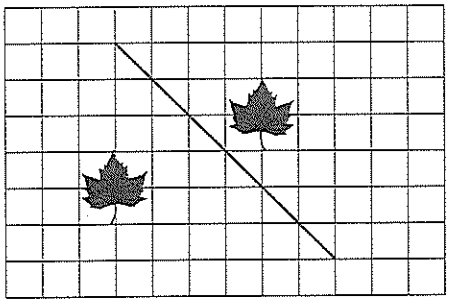
He reflected it in the line. He then translated it two squares to the left.

Which of these shows the leaf before and after the two transformations?

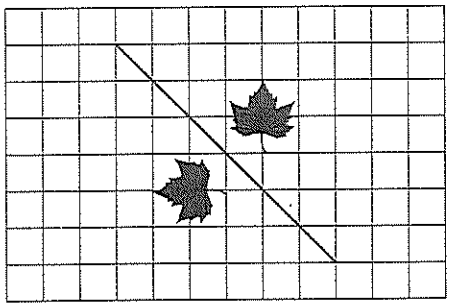
(A)



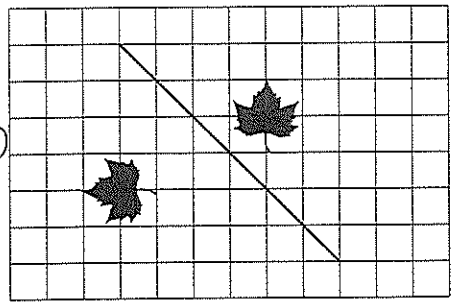
(B)



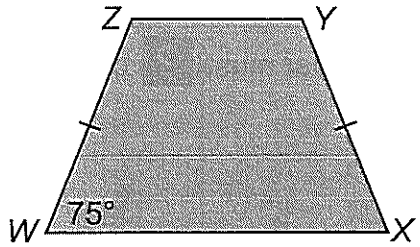
(C)



(D)



12. *WXYZ* is a trapezium.



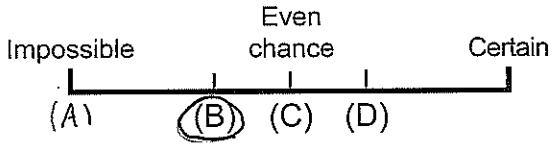
NOT TO SCALE

What are the sizes of the other three angles in the trapezium?

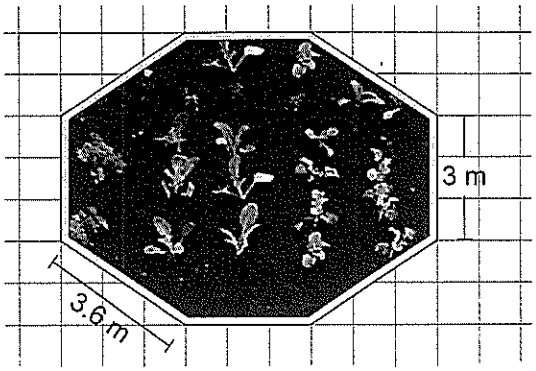
	Angle *X*	Angle *Y*	Angle *Z*
(A)	75°	95°	95°
(B)	75°	105°	105°
(C)	95°	75°	95°
(D)	105°	75°	105°

13. It is likely that it will rain tomorrow.

Which position on the line represents the chance that it will **NOT** rain tomorrow?



14. Leila wanted to build a fence to enclose her octagonal vegetable garden as shown.



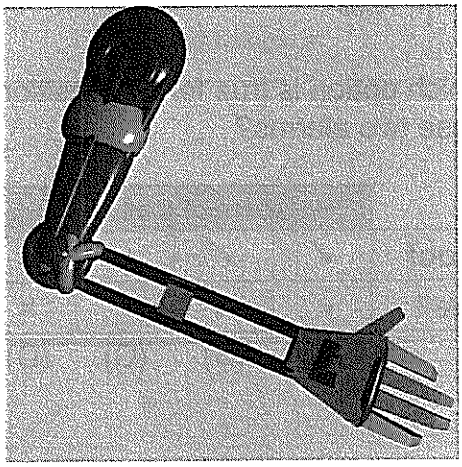
Leila calculated the total length of fencing required.

At the hardware store, this total length was rounded up to the nearest metre. Leila paid $5 per metre.

What was the cost of fencing for the vegetable garden?

(A) $123
(B) $130
(C) $132
(D) $135

15. It is now possible to make an artificial arm using a 3-D printer.

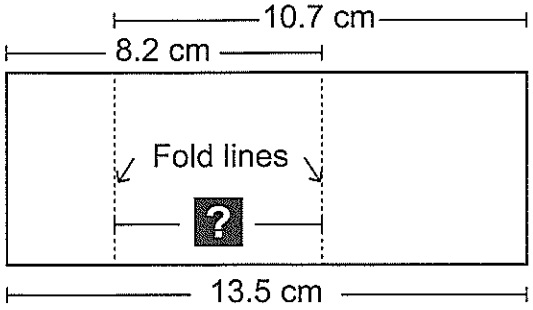


This has reduced the cost of an artificial arm from $40 000 to just $400.

What is the new cost as a percentage of the old cost?

(A) 0.01%
(B) 0.1%
(C) 1%
(D) 10%

16. Min folded a piece of paper twice.



What distance must ? be?

(A) 2.8 cm
(B) 3.5 cm
(C) 5.3 cm
(D) 5.4 cm

17. Five identical squares are joined together to form a rectangle.

The area of the rectangle is 245 cm^2.

What is the perimeter of the rectangle?

(A) 49 cm
(B) 84 cm
(C) 112 cm
(D) 140 cm

18. In Australian currency, $1 equals 100 cents.

Over the past two years, the Government made a loss of 2 cents for every five-cent coin it produced. During this time, 64 million of these coins were made.

What was the total loss?

(A) $128 000 000
(B) $12 800 000
(C) $1 280 000
(D) $12 800

19. One weekend, Ravi played his guitar at the market to raise money for charity.

Ravi raised $180 on Saturday. This was 75% of the total amount he raised.

How much money did Ravi raise on Sunday?

(A) $135 (B) $60
(C) $45 (D) $36

20. Tala is sending three parcels.

The middle-sized parcel is twice the mass of the smallest parcel and half the mass of the largest parcel.

The total mass of the parcels is 840 grams.

What is the mass of Tala's largest parcel?

(A) 360 grams
(B) 420 grams
(C) 480 grams
(D) 560 grams

21. The Blue team played three games of basketball on Saturday and three games on Sunday. Overall the team scored an average of 16 points in their games.

The table shows their scores in five of the games.

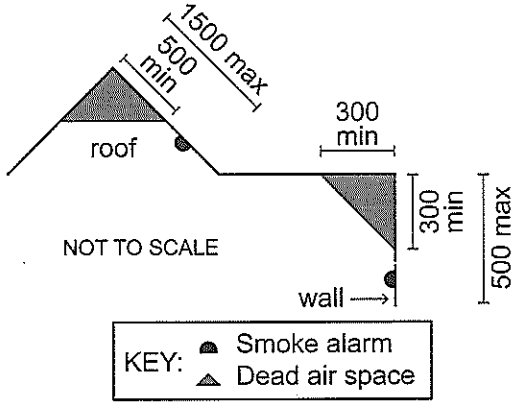
	Game 1	Game 2	Game 3
Saturday	24	20	16
Sunday	17	13	?

How many points did the Blue team score in Game 3 on Sunday?

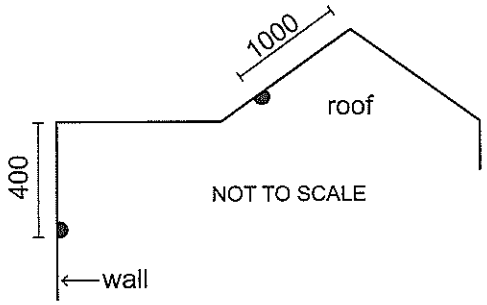
(A) 6
(B) 9
(C) 16
(D) 18

22. Smoke alarms in buildings should not be installed in a corner or 'dead air space'.

The diagram represents the zones within which smoke alarms should be installed. They should be installed between the maximum and minimum distances shown, in mm.



Pete installed two alarms of diameter 80 mm in the positions shown below.



Which option is true for the position of these two alarms?

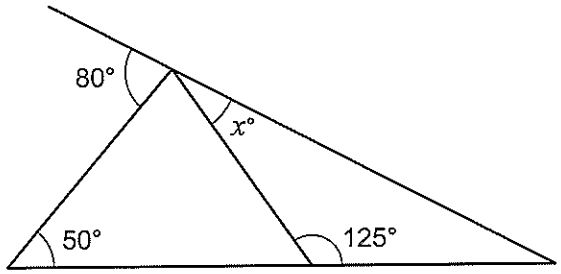
	Correct position			
Roof	✓	✓	×	×
Wall	✓	×	✓	×
	(A)	(B)	(C)	(D)

23. Aidan made a decoration. He used a 990 cm piece of string and three different types of crystals. Every 15 cm he put a crystal onto the string in the sequence shown. He did this until he reached the end of the string.

How many crystals like this  did Aidan use?

(A) 66
(B) 44
(C) 33
(D) 22

24. What is the value of x?



NOT TO SCALE

(A) 55
(B) 50
(C) 25
(D) 20

25. Kate is using a rule to generate her code.

For each letter, she uses the number of its position in the alphabet, doubles this number and then subtracts 3.

For example, B is in position 2 so:

$$\boxed{B} = 2 \times 2 - 3 = \boxed{1}$$

What code will Kate use for F U N ?

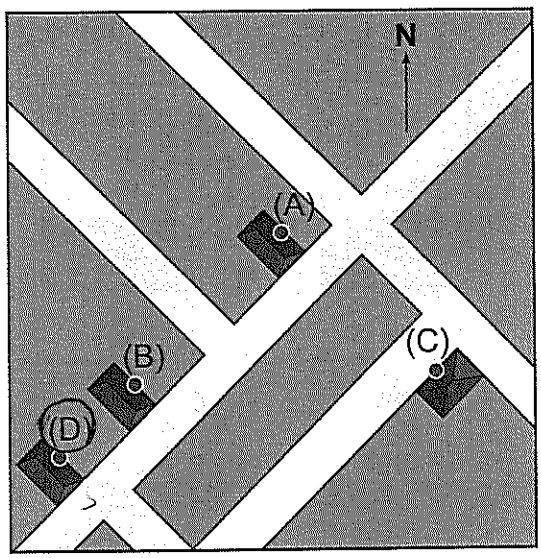
(A) 6 21 14 (B) 6 36 22

(C) 9 37 23 (D) 9 39 25

26. Below is a map of Smithvale.

The library is located to the north-east of the school and to the south-west of the fire station. The mall is located to the south-east of the fire station.

Which building is the school?



27. A digital timer counts down from 3 minutes to zero, one second at a time.

For how many seconds does at least one of these digits show a 5?

(A) 45
(B) 36
(C) 24
(D) 18

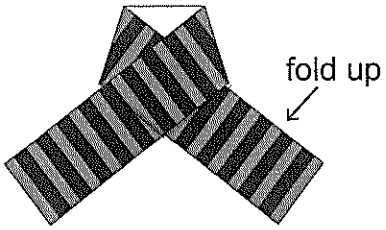
28. Liam is doing interval training for one hour. Each interval consists of four 15-second sprints with a 1-minute jog between sprints. Liam has a 2-minute rest after each interval.

How many rests BETWEEN intervals will Liam have in this training session?

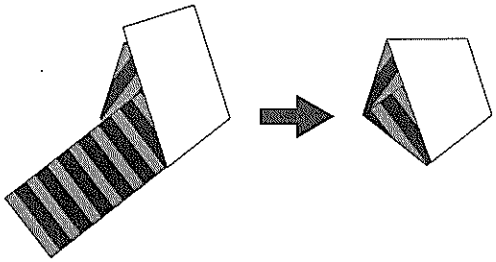
(A) 8
(B) 9
(C) 10
(D) 14

29. Cai had a rectangular strip of paper with stripes on one side.

He made two folds and formed this shape.



Cai made one more fold then cut off the ends of his strip to leave this folded regular pentagon.



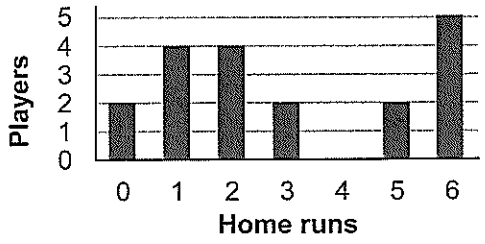
What shape did Cai have when he unfolded this pentagon?

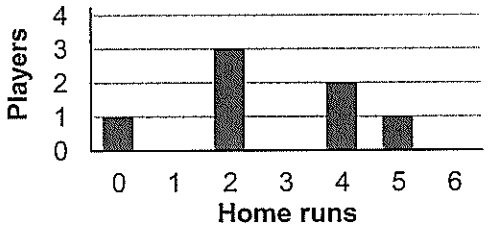
(A) parallelogram
(B) rectangle
(C) rhombus
(D) trapezium

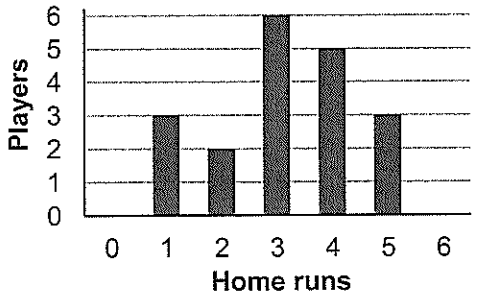
30. This table shows the number of home runs scored by some players in a softball team.

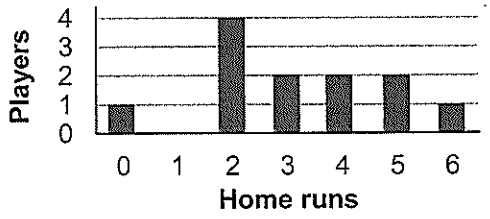
	Game					
Player	**1**	**2**	**3**	**4**	**5**	**Total**
Milly	0	1	0	0	1	**2**
Pam	1	0	0	2	1	**4**
Jane	1	1	2	0	0	**4**
Ruby	0	0	1	1	0	**2**
Alison	0	0	0	0	0	**0**
Jess	0	0	1	1	0	**2**
Liz	1	0	2	1	1	**5**
Total	**3**	**2**	**6**	**5**	**3**	**19**

Which graph shows the number of players who scored a given number of home runs?

(A)


(B)


(C)


(D)


31. Anjali wanted to make the colour purple using different amounts of red, green and blue as shown.

	Red	Green	Blue
Decimal number	149	61	126
Hexadecimal number	?	3×13 3D	7×14 7E

Instead of using a decimal number, each colour code requires a hexadecimal number. There are 16 digits in this system, so the letters A to F are used.

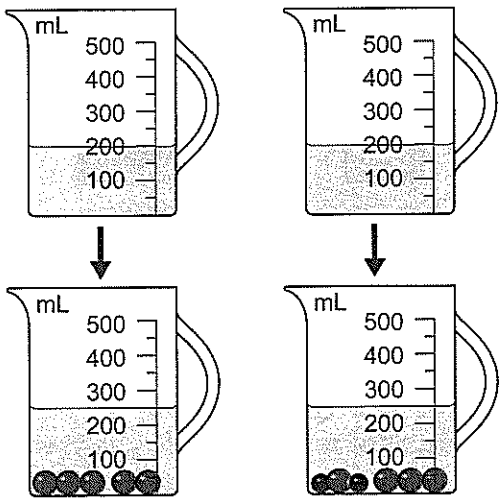
A=10, B=11,...., F=15.

What is the hexadecimal number for the amount of red needed to make purple?

(A) AB (B) 9E
(C) 95 (D) E9

32. Anna has two jugs. Each jug contains 200 mL of water.

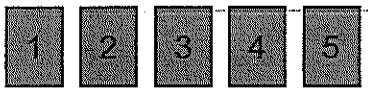
Anna dropped 5 red balls in one jug. She also dropped 4 red and 2 black balls in the other jug.



What is the volume of one black ball?

(A) 5 cm^3
(B) 8 cm^3
(C) 10 cm^3
(D) 25 cm^3

33. Tom had these cards.



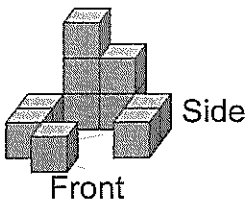
He turned them over and mixed them up.

Tom picked a card at random and placed it face up. He then selected another card.

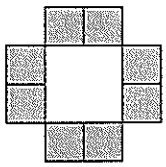
How many ways could the first card he picked be higher than the second card he picked?

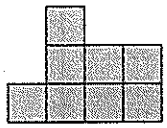
(A) 4
(B) 10
(C) 12
(D) 20

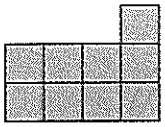
34. Ben stacked his cubes to make this pattern.



He wants to add more cubes so his pattern matches these views.


Top view

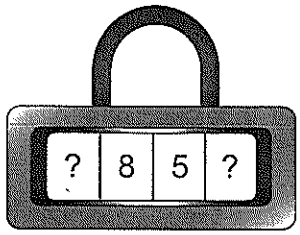

Front view


Side view

What is the minimum number of cubes Ben needs to add?

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

35. Mary has a 4-digit code for her lock but she has forgotten two of the digits.



Mary knows that her 4-digit code is

- less than 4000
- odd
- divisible by 3
- made up of 4 different digits.

How many 4-digit codes are possible?

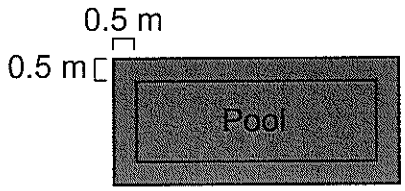
(A) 3 (B) 5
(C) 6 (D) 10

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.

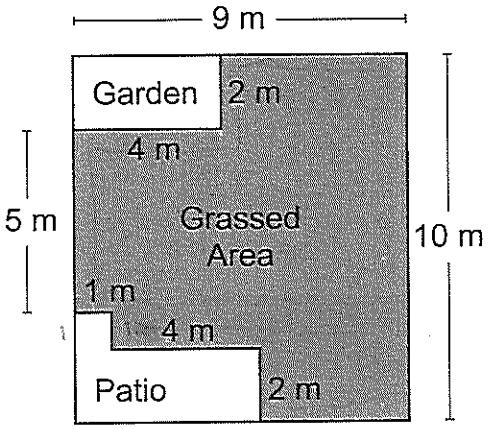
36. Joe wants to build a rectangular swimming pool in his backyard.

He needs to allow 0.5 m on each side of the pool for paving.



Joe's pool needs to fit in the grassed area.

PLAN OF JOE'S BACKYARD



What is the maximum area of Joe's swimming pool in square metres?

35 m²

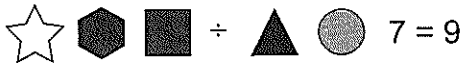
37. Billy and his grandmother, Oma, have the same birthday. From the age of 1 to 6, Billy's age divided exactly into Oma's age.

The next year, Billy's age did not divide exactly into Oma's age.

How old was Oma when Billy was 7?

67

38. Mrs Li gave her class this problem involving division of one three-digit number by another.



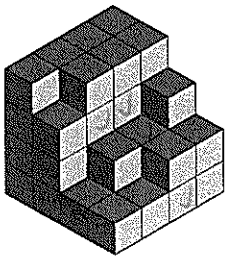
What number is represented

by  ?

963

39. Sue-Min made this shape using cubes.

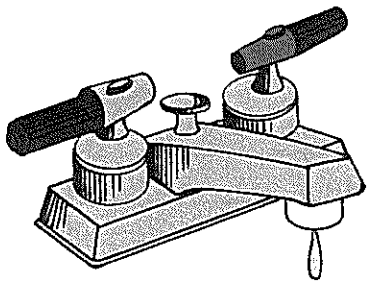
She painted the outside of the shape, including the base.



How many cubes had paint on only one face?

14

40. A tap leaks 5 drops every second.



Three drops measure 2 mL.

How many litres of water leak out of the tap in one day?

288L