



Young Lives 2016-17 School Surveys

Item level analysis

India

Wave 2

Subject: Mathematics

This booklet contains Maths items administered to students in Grade 9 at Wave 2 of Young Lives' school survey in India. This survey took place in 2016-17.

The item-level analyses in this booklet were undertaken by Educational Initiatives, Ahmedabad, India.

Items were selected following extensive piloting. For more details on item sources and the test development process, see Moore et al, 2017. Young Lives School Survey, 2016–17: Evidence from India.

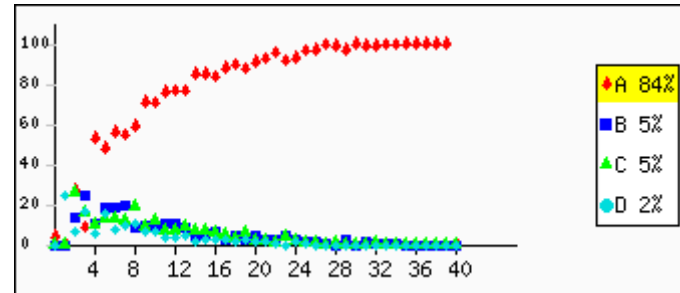
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Question no: 1

Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

Which of the following is a prime number?

- A: 5
- B: 15
- C: 25
- D: 35



Overall	A: 84.9%	B: 5.4%	C: 5.3%	D: 2.6%	Invalid Answer: 0.4%	Not Attempted: 1.5%
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Question no: 2

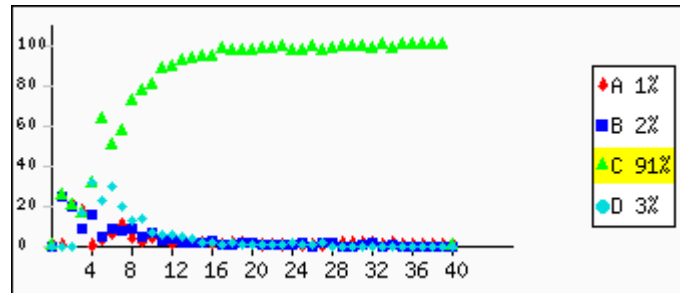
Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

A number when added to 35 gives 56.

$$\begin{array}{r} 35 \\ + \boxed{?} \\ \hline 56 \end{array}$$

What is the number?

- A: 12
- B: 20
- C: 21
- D: 91



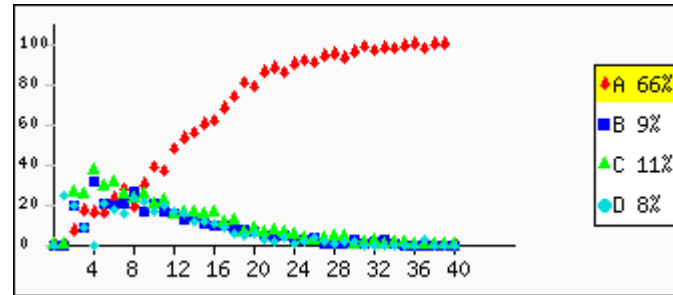
Overall	A: 1.2%	B: 2.1%	C: 91.9%	D: 3.4%	Invalid Answer: 0.5%	Not Attempted: 0.9%
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Question no: 3

Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

7341 is completely divisible by _____.

- A: 3
- B: 5
- C: 7
- D: 9



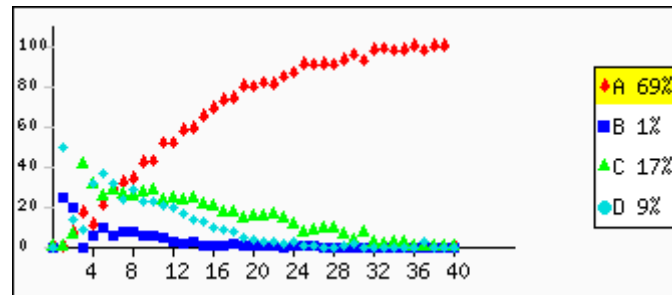
Overall	A: 66.9%	B: 9.3%	C: 11.8%	D: 8.8%	Invalid Answer: 0.5%	Not Attempted: 2.7%
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Question no: 4

Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

3 ones + 7 tens = _____.

- A: 73
- B: 40
- C: 37
- D: 10



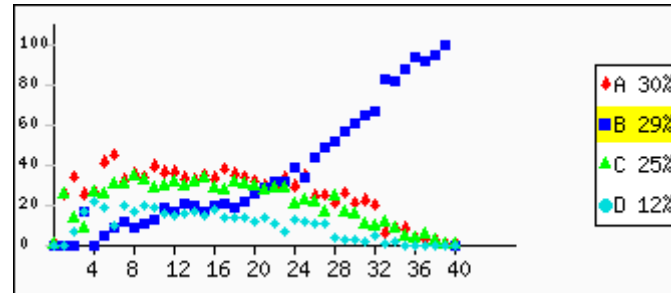
Overall	A: 69.7%	B: 1.8%	C: 17.0%	D: 9.8%	Invalid Answer: 0.5%	Not Attempted: 1.2%
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Question no: 5

Skill: Integers and Rational numbers, Powers and Bases **Paper Set: A, Medium: English**

$-4 - (-5) = \underline{\hspace{2cm}}$.

- A: -1
- B: 1
- C: -9
- D: 9



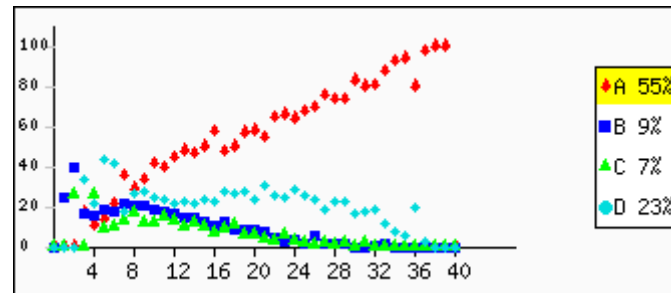
Overall	A: 30.2%	B: 29.4%	C: 25.9%	D: 12.4%	Invalid Answer: 0.4%	Not Attempted: 1.7%
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Question no: 6

Skill: Integers and Rational numbers, Powers and Bases **Paper Set: A, Medium: English**

Which of these is the cube root of 729?

- A: 9
- B: 13
- C: 19
- D: 27



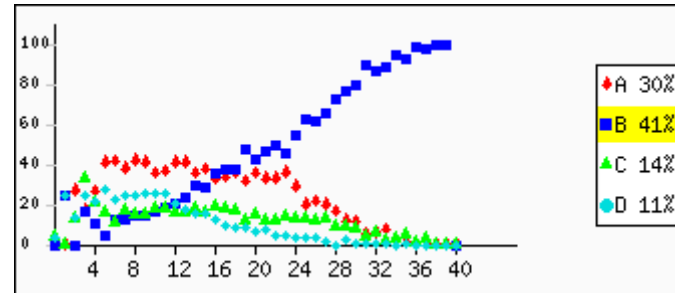
Overall	A: 55.2%	B: 10.0%	C: 7.7%	D: 23.3%	Invalid Answer: 0.4%	Not Attempted: 3.5%
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Question no: 7

Skill: Integers and Rational numbers, Powers and Bases **Paper Set: A, Medium: English**

$(-35) + 27 = \underline{\hspace{2cm}}$.

- A: -62
- B: -8
- C: 8
- D: 62



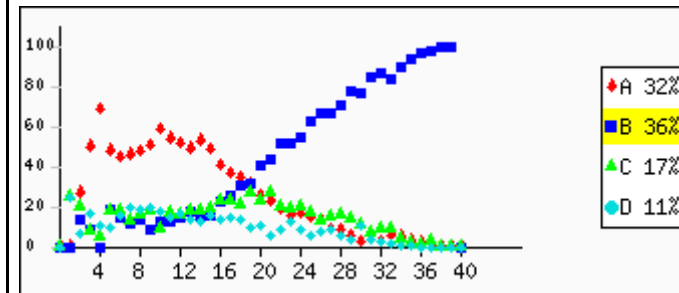
Overall	A: 30.1%	B: 42.0%	C: 14.3%	D: 11.8%	Invalid Answer: 0.4%	Not Attempted: 1.5%
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Question no: 8

Skill: Integers and Rational numbers, Powers and Bases **Paper Set: A, Medium: English**

If the numerals 15, -12, -22 & 23 are arranged in ascending (increasing) order, the numerals will be written as:

- A: -12, 15, -22, 23.
- B: -22, -12, 15, 23.
- C: -12, -22, 15, 23.
- D: 23, 15, -12, -22.

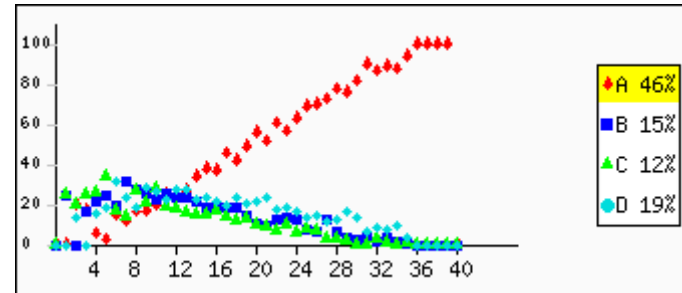


Overall	A: 32.6%	B: 36.7%	C: 17.4%	D: 11.4%	Invalid Answer: 0.4%	Not Attempted: 1.4%
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Question no: 9

Skill: Integers and Rational numbers, Powers and Bases **Paper Set: A, Medium: English**

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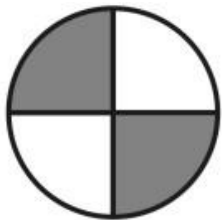


Overall A: **46.6%** B: **15.9%** C: **12.7%** D: **19.8%** Invalid Answer: **0.3%** Not Attempted: **4.7%**

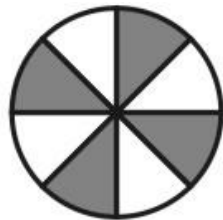
Question no: 10

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**

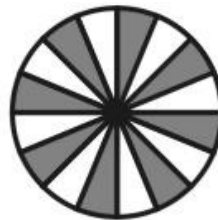
Which of the following fractions is the greatest?



$$\frac{2}{4}$$

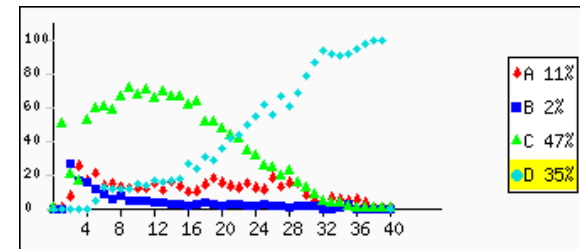


$$\frac{4}{8}$$



$$\frac{8}{16}$$

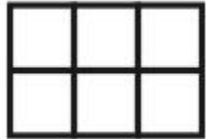
- A: 24
- B: 48
- C: 816
- D: (all are equal)

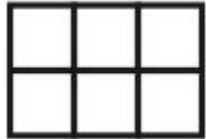


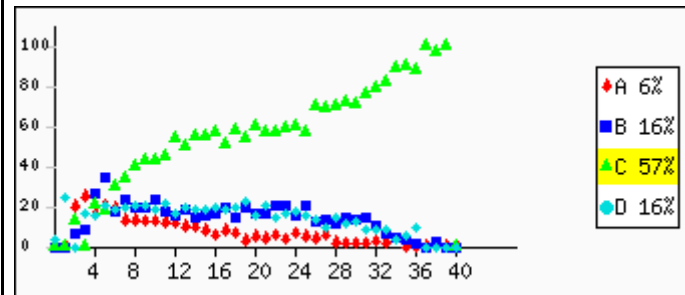
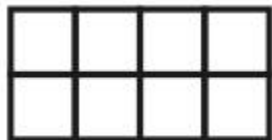
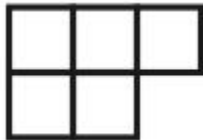
Overall A: **11.7%** B: **2.8%** C: **47.9%** D: **35.9%** Invalid Answer: **0.5%** Not Attempted: **1.2%**

Question no: 11

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**



If  represents 75%, which of the following represents 125%?



Overall	A: 7.0%	B: 16.2%	C: 57.0%	D: 16.8%	Invalid Answer: 0.4%	Not Attempted: 2.5%
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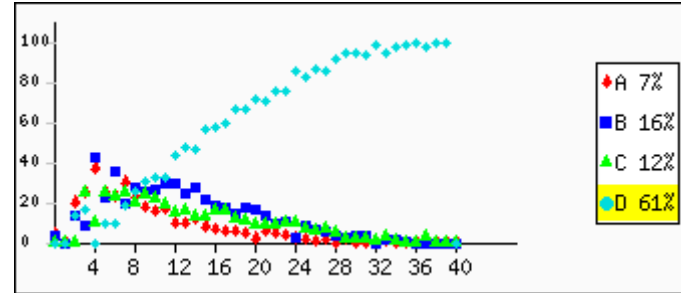
Question no: 12

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**

What fraction of the shape below is shaded?



- A: 1
- B: 12
- C: more than 12
- D: less than 12



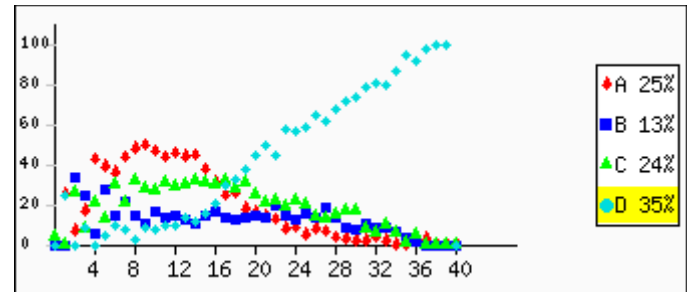
Overall A: 7.4% B: 16.7% C: 12.4% D: 61.5% Invalid Answer: 0.6% Not Attempted: 1.5%

Question no: 13

Skill: Algebra: concepts and applications **Paper Set: A, Medium: English**

$2a^2 \times 3a = \text{_____}$.

- A: $5a^2$
- B: $5a^3$
- C: $6a^2$
- D: $6a^3$

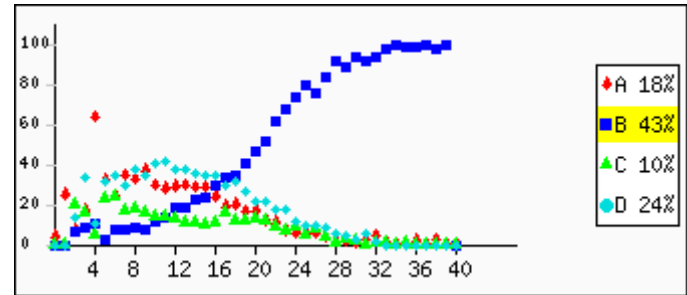


Overall A: 25.4% B: 13.2% C: 24.4% D: 35.2% Invalid Answer: 0.6% Not Attempted: 1.1%

Question no: 14

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**

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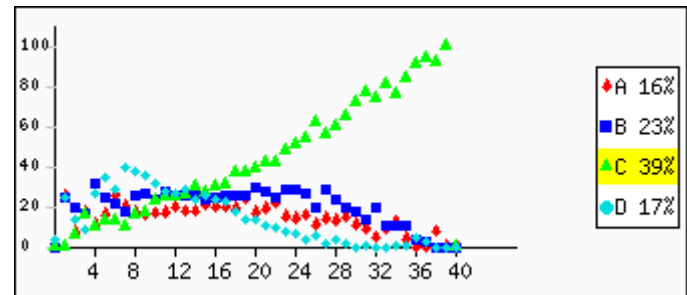
Overall	A: 18.3%	B: 43.5%	C: 10.4%	D: 24.9%	Invalid Answer: 0.4%	Not Attempted: 2.4%
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Question no: 15

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**

$0.99 + \text{_____} = 1$

- A: 1
- B: 0.1
- C: 0.01
- D: 0.001

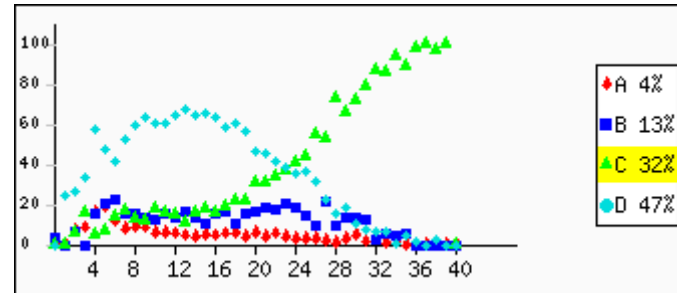


Overall	A: 16.3%	B: 23.8%	C: 39.5%	D: 17.7%	Invalid Answer: 0.4%	Not Attempted: 2.4%
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Question no: 16

Skill: Algebra: concepts and applications **Paper Set: A, Medium: English**

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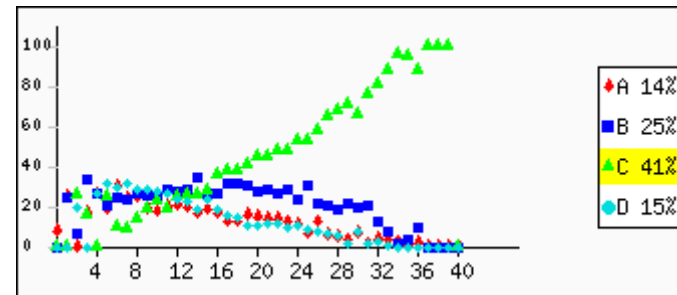
Overall	A: 4.5%	B: 13.9%	C: 32.4%	D: 47.4%	Invalid Answer: 0.5%	Not Attempted: 1.3%
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Question no: 17

Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

A company produced 17,175 cars in 1996. For a report, this number was rounded to the nearest hundred. Which was the number of cars given in the report?

- A: 17,000
- B: 17,100
- C: 17,200
- D: 17,270

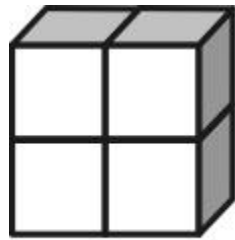


Overall	A: 14.0%	B: 25.4%	C: 41.4%	D: 15.6%	Invalid Answer: 0.3%	Not Attempted: 3.2%
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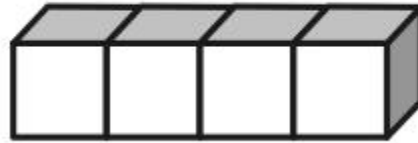
Question no: 18

Skill: Mensuration - Area and Perimeter, Volume and Surface Area **Paper Set: A, Medium: English**

Cuboid x and Cuboid y below are both made of 4 identical unit cubes each.



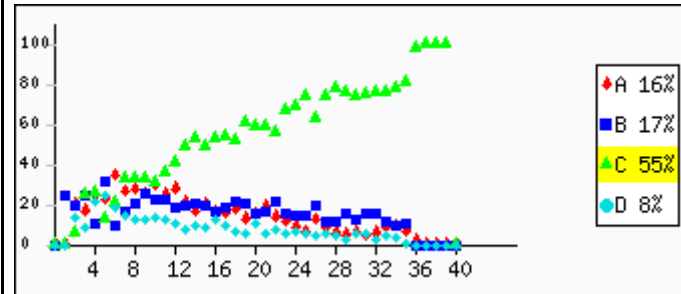
x



y

What can be said about volume of x and y?

- A: Volume of x is greater than volume of y.
- B: Volume of x is less than volume of y.
- C: Volume of x is same as volume of y.
- D: Volume of x and volume of y can't be determined.

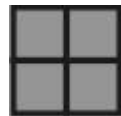


Overall A: 16.4% B: 17.7% C: 55.1% D: 8.4% Invalid Answer: 0.4% Not Attempted: 2.1%

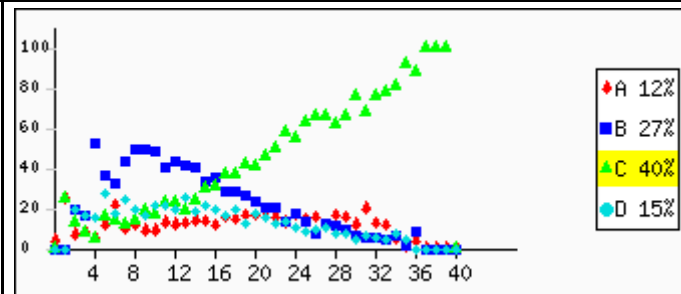
Question no: 19

Skill: Mensuration - Area and Perimeter, Volume and Surface Area **Paper Set: A, Medium: English**

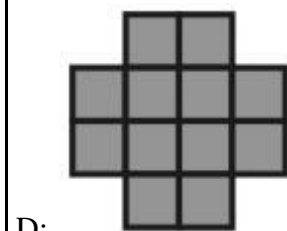
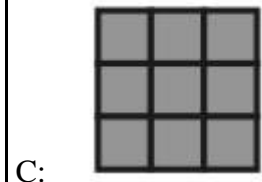
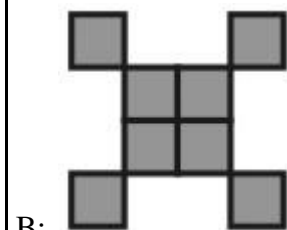
4 identical tiles are used to form the shape shown below. The area of the shape is 16 sq cm.



Some more identical tiles were added to the above shape to form another



shape with area 36 sq cm. Which of the following could be the new shape formed?

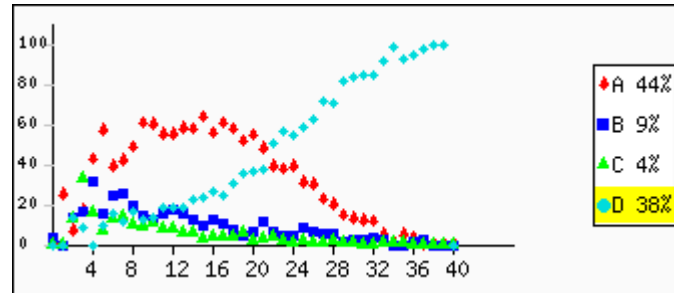


Overall	A: 12.9%	B: 28.0%	C: 40.7%	D: 15.8%	Invalid Answer: 0.4%	Not Attempted: 2.3%
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Question no: 20

Skill: Number sense, related concepts and basic number competency **Paper Set: A, Medium: English**

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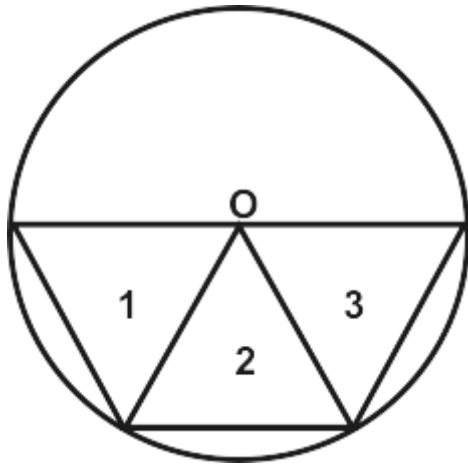


Overall	A: 44.5%	B: 10.0%	C: 4.9%	D: 38.9%	Invalid Answer: 0.5%	Not Attempted: 1.3%
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Question no: 21

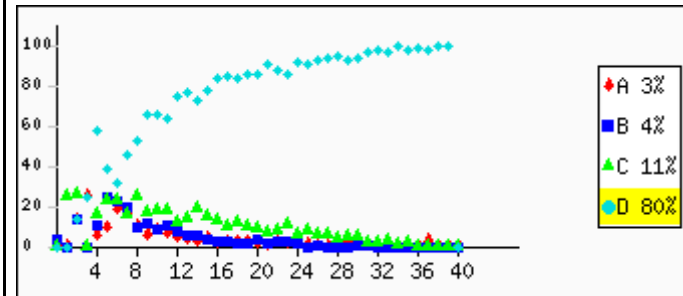
Skill: Basic Shapes, Geometry and Visual estimation **Paper Set: A, Medium: English**

Three equilateral triangles are inscribed in a circle with center O as shown below.



Which of the three triangles are congruent?

- A: triangles 1 and 2 only
- B: triangles 2 and 3 only
- C: triangles 1 and 3 only
- D: all the three triangles

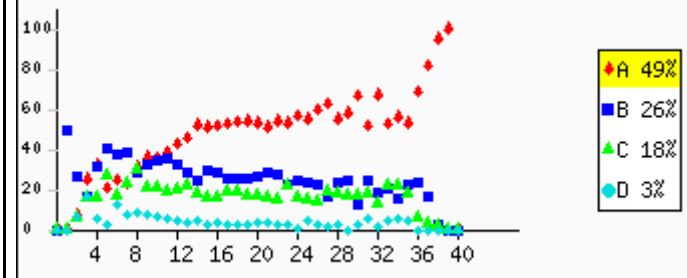


Overall	A: 3.2%	B: 4.1%	C: 11.6%	D: 80.1%	Invalid Answer: 0.3%	Not Attempted: 0.7%
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Question no: 22

Skill: Basic Shapes, Geometry and Visual estimation **Paper Set: A, Medium: English**

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Overall	A: 49.3%	B: 26.7%	C: 18.4%	D: 3.8%	Invalid Answer: 0.4%	Not Attempted: 1.5%
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Question no: 23

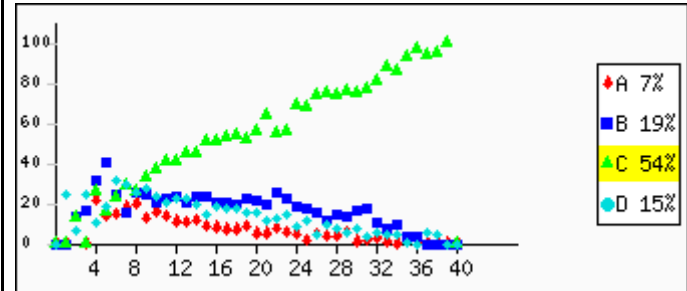
Skill: Basic Shapes, Geometry and Visual estimation **Paper Set: A, Medium: English**

Look at the map below.



Which of these streets are perpendicular to each other?

- A: MG Road and LBS Marg
- B: Market Road and MG Road
- C: LBS Marg and Nehru Road
- D: (None of the streets shown in the map are perpendicular to each other)



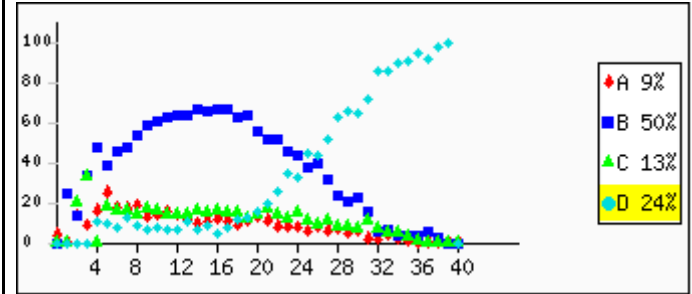
Overall	A: 7.9%	B: 19.7%	C: 54.5%	D: 15.6%	Invalid Answer: 0.4%	Not Attempted: 1.9%
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Question no: 24

Skill: Fractions, Decimals, Ratios and Percentages **Paper Set: A, Medium: English**

What is $35 + 36$?

- A: 311
- B: 611
- C: 930
- D: 3330



Overall	A: 9.8%	B: 50.3%	C: 13.2%	D: 24.7%	Invalid Answer: 0.4%	Not Attempted: 1.6%
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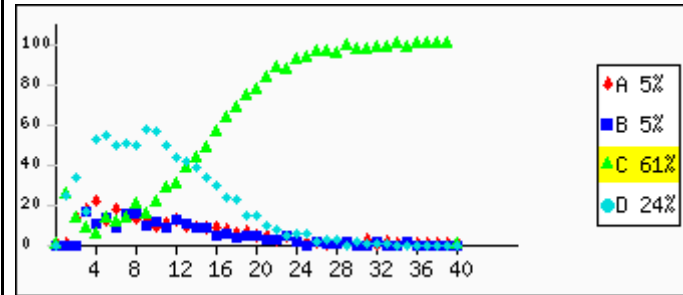
Question no: 25

Skill: Reasoning and Problem Solving (Advanced or challenging problems) Paper Set: A, Medium: English

Farida has made a pattern with pieces of chart paper.



What will come next in the pattern?

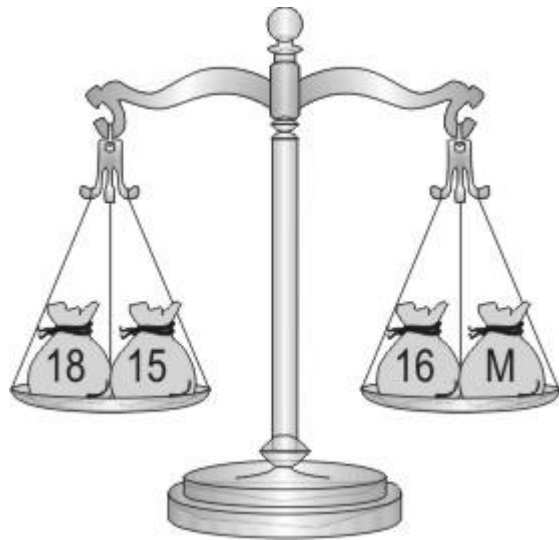


Overall	A: 6.0%	B: 5.9%	C: 61.4%	D: 24.9%	Invalid Answer: 0.4%	Not Attempted: 1.5%
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Question no: 26

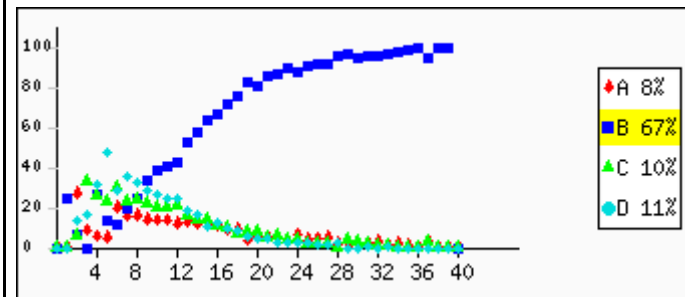
Skill: Algebra: concepts and applications **Paper Set: A, Medium: English**

Jim has balanced some bags of marbles. All the marbles are of the same weight. The number of marbles in each bag is written on it.



How many marbles are there in the bag marked M?

- A: 13
- B: 17
- C: 33
- D: 49

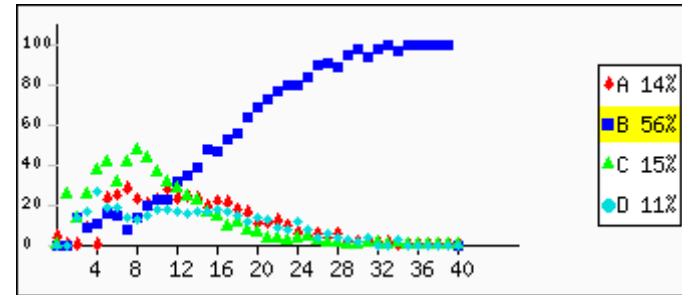


Overall	A: 8.1%	B: 67.9%	C: 10.8%	D: 11.7%	Invalid Answer: 0.4%	Not Attempted: 1.0%
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Question no: 27

Skill: Algebra: concepts and applications Paper Set: A, Medium: English

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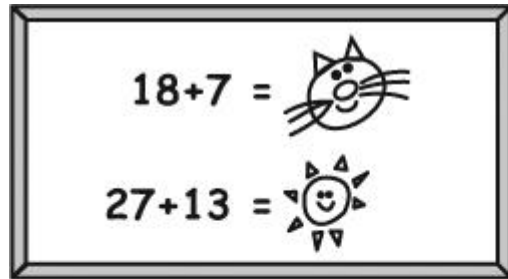


Overall	A: 15.0%	B: 56.1%	C: 15.1%	D: 12.0%	Invalid Answer: 0.4%	Not Attempted: 1.4%
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Question no: 28

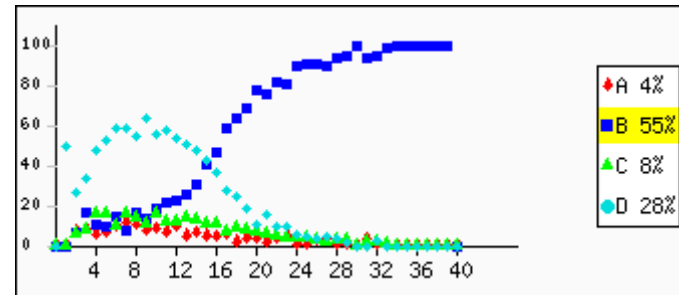
Skill: Algebra: concepts and applications Paper Set: A, Medium: English

Look at the picture below.



What is

- A: 6
- B: 15
- C: 20
- D: 40



Overall	A: 4.4%	B: 55.9%	C: 8.5%	D: 29.0%	Invalid Answer: 0.7%	Not Attempted: 1.5%
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Question no: 29

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

Bowler	No. of wickets
Zaheer Khan	8
Harbhajan Singh	7
SCJ Broad	7
MM Patel	5
Yuvraj Singh	5

A teacher gave the table shown above and asked to represent the data in some other way. Given below is the way Vandana, Asif, Devpal and Aasma represented it.

VANDANA

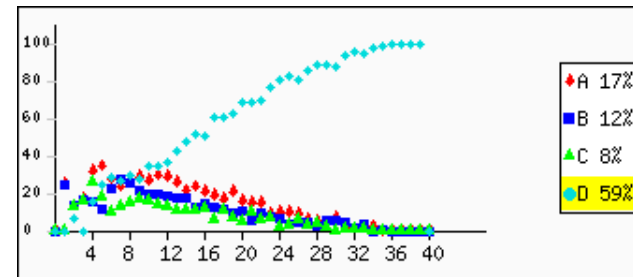
ASIF

DEVPAL

Bowlers	No. of wickets
Zaheer Khan	
Harbhajan Singh	
SCJ Broad	
MM Patel	
Yuvraj Singh	

AASMA

Bowlers	No. of wickets (○ = 2 wickets)
Zaheer Khan	○○○○
Harbhajan Singh	○○○○○
SCJ Broad	○○○○○
MM Patel	○○○○
Yuvraj Singh	○○○○



Who has represented it correctly?
A: only Vandana

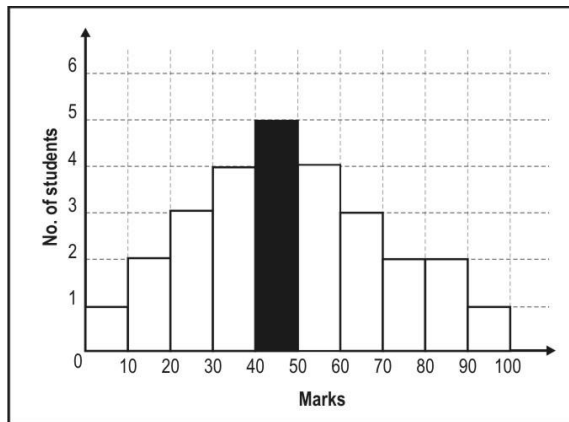
B: only Vandana and Asif
C: only Vandana and Aasma
D: all of them

Overall A: 17.5% B: 12.1% C: 8.7% D: 59.6% Invalid Answer: 0.4% Not Attempted: 1.7%

Question no: 30

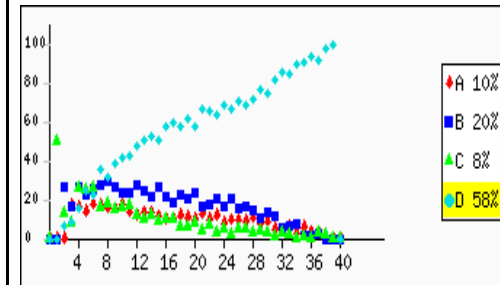
Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

A histogram is a graphical representation of grouped data, with the bars showing the frequency of the class interval. The following is a histogram showing the distribution of marks of 27 students in a test. Study the histogram and answer the following question based on it.



What does the bar shaded black represent?

- A: The maximum marks scored by a student.
- B: The average marks scored by 5 students.
- C: The number of students who scored 45 marks.
- D: The number of students who scored marks between 40 and 50.

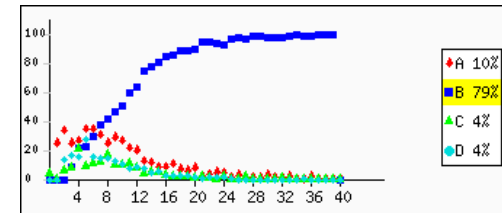
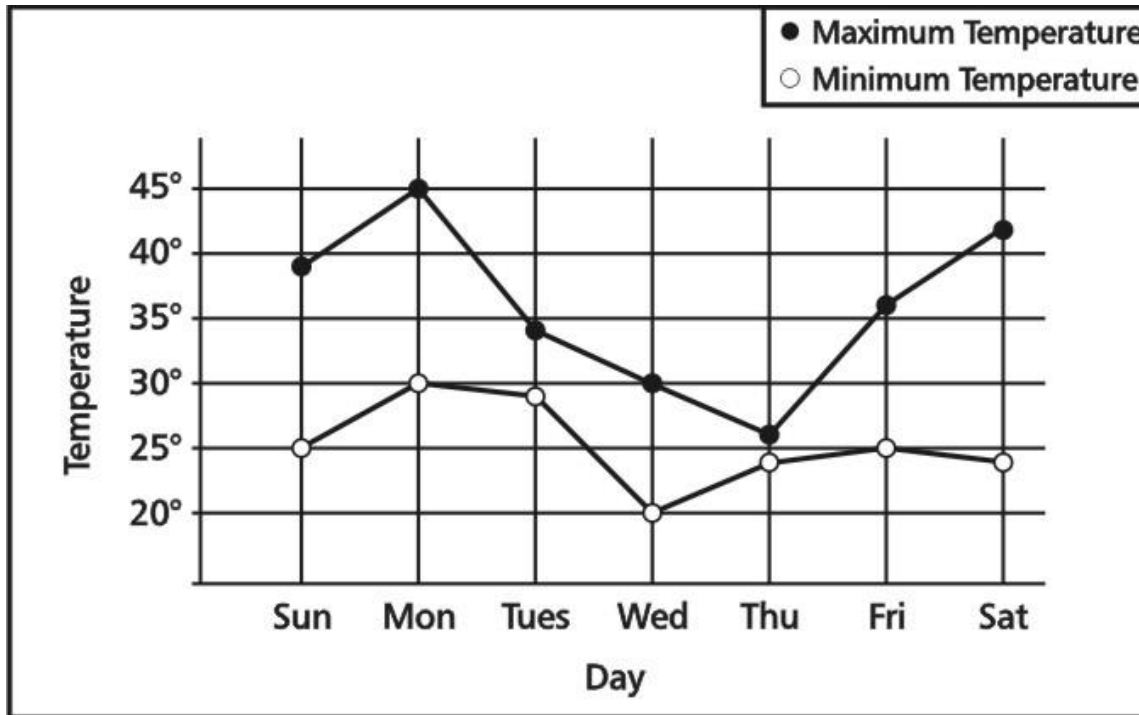


Overall A: 11.0% B: 20.1% C: 8.9% D: 58.1% Invalid Answer: 0.4% Not Attempted: 1.7%

Question no: 31

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

Shown below is the graph representing the highest and the lowest temperature recorded in a day for a week. Study it and answer the question.



On which day of the week was the HIGHEST temperature recorded?

- A: Sunday
- B: Monday
- C: Wednesday
- D: Saturday

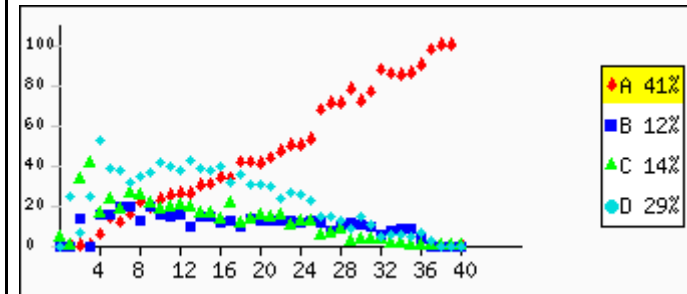
Overall	A: 10.4%	B: 79.7%	C: 4.3%	D: 4.4%	Invalid Answer: 0.4%	Not Attempted: 0.9%
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Question no: 32

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

Rahul is older than Ramesh and Ramesh is older than Peter. Which statement must be true?

- A: Rahul is older than Peter.
- B: Rahul is younger than Peter.
- C: Rahul is the same age as Peter.
- D: We cannot tell who is the oldest from the information.



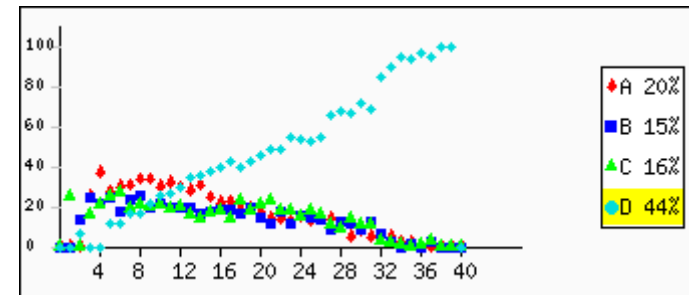
Overall	A: 42.0%	B: 12.4%	C: 14.1%	D: 29.4%	Invalid Answer: 0.7%	Not Attempted: 1.4%
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Question no: 33

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

Rahul's father is 6 times as old as Rahul. Rahul's mother is 25 years old. The average age of this family of three is 20 years. How old is Rahul?

- A: 15 years
- B: 10 years
- C: 7 years
- D: 5 years



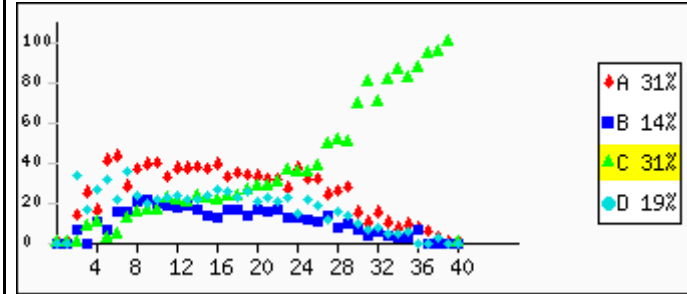
Overall	A: 20.1%	B: 15.8%	C: 16.5%	D: 44.4%	Invalid Answer: 0.5%	Not Attempted: 2.7%
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Question no: 34

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

A sheet of paper is 0.012 cm thick. What would be the height of a stack of 400 sheets of this paper?

- A: 0.048 cm
- B: 0.48 cm
- C: 4.8 cm
- D: 48 cm

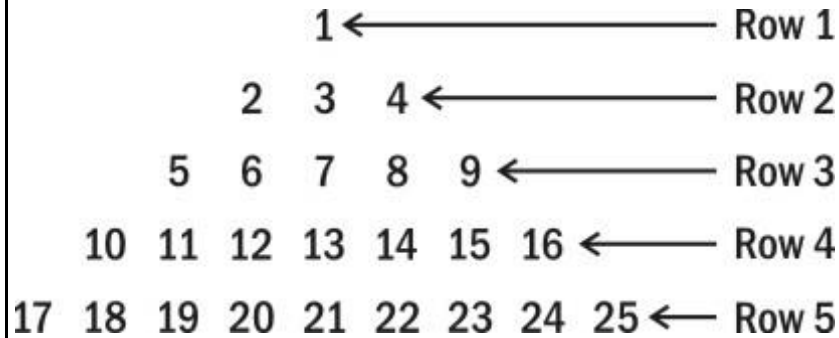


Overall	A: 31.0%	B: 14.0%	C: 31.7%	D: 19.9%	Invalid Answer: 0.6%	Not Attempted: 2.8%
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Question no: 35

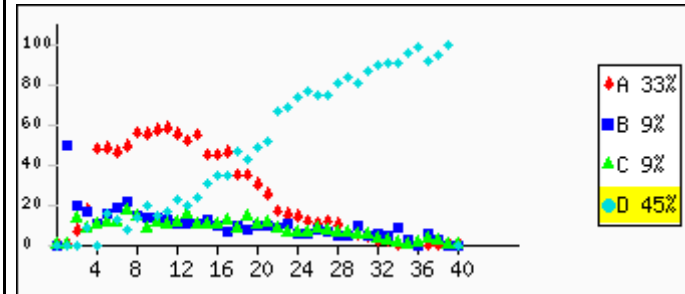
Skill: Reasoning and Problem Solving (Advanced or challenging problems) Paper Set: A, Medium: English

Observe the number pattern in the number triangle below.



If it is extended, what will be the last number (on the right) in the 9th row?

- A: 25
- B: 36
- C: 61
- D: 81



Overall	A: 33.8%	B: 9.6%	C: 9.4%	D: 45.0%	Invalid Answer: 0.3%	Not Attempted: 1.9%
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Question no: 36

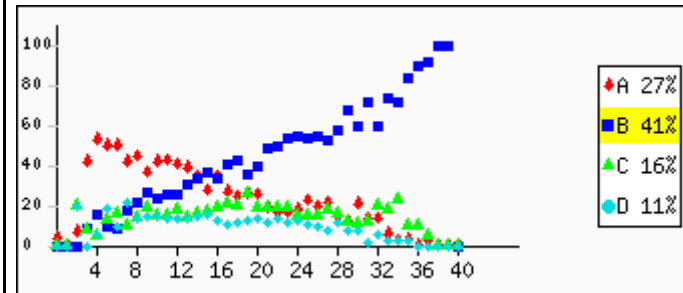
Skill: Reasoning and Problem Solving (Advanced or challenging problems) **Paper Set: A, Medium: English**

Here is a letter pattern.

a
aba
abcba
abcdcba
⋮

How many times would you have written the letter 'c' if you complete writing this pattern up to the end of the TENTH row?

- A: 10
- B: 15
- C: 19
- D: 45

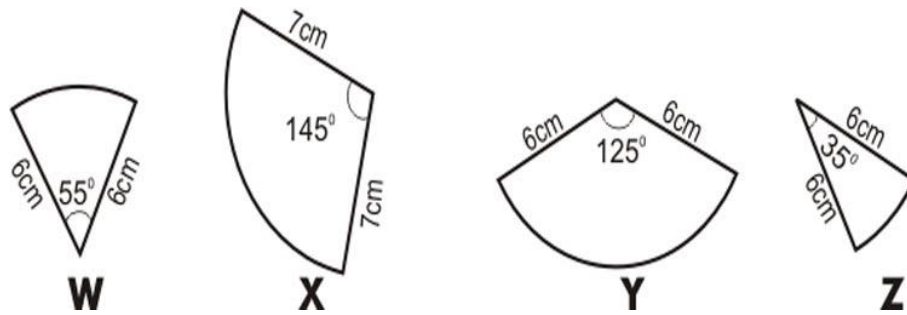


Overall	A: 27.3%	B: 41.5%	C: 17.0%	D: 11.7%	Invalid Answer: 0.6%	Not Attempted: 2.0%
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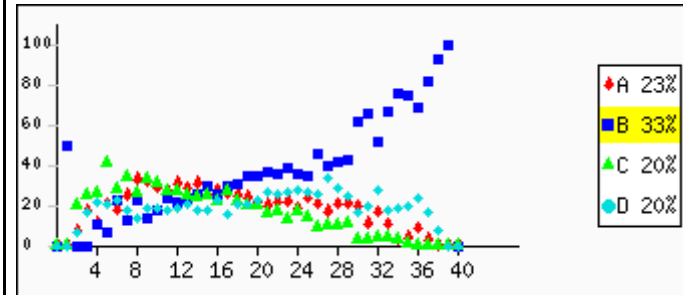
Question no: 37

Skill: Basic Shapes, Geometry and Visual estimation **Paper Set: A, Medium: English**

Of the pieces shown here, which two could form a semicircle when placed next to each other with their edges touching?



- A: Z and W
- B: W and Y
- C: Y and Z
- D: Z and X



Overall	A: 23.3%	B: 33.1%	C: 20.0%	D: 20.8%	Invalid Answer: 0.6%	Not Attempted: 2.2%
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Question no: 38

Skill: Algebra: concepts and applications **Paper Set: A, Medium: English**

The table below shows the relationship between the x and y .

x	2	3	4	5
y	4	7	10	13

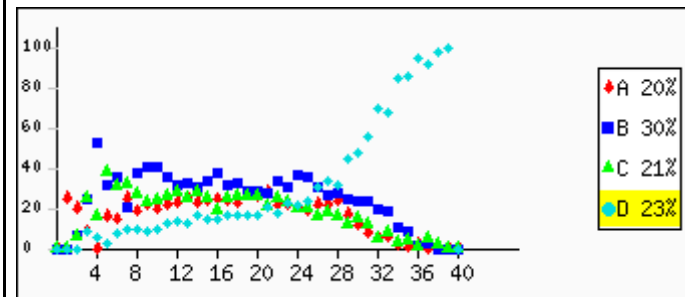
Which of these equations expresses this relation?

A: $y = 2x + 2$

B: $y = x + 2$

C: $y = 4x - 4$

D: $y = 3x - 2$

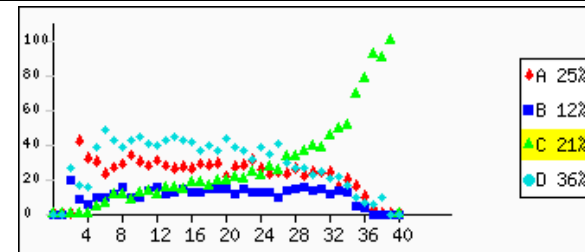


Overall A: 20.4% B: 30.6% C: 21.9% D: 23.1% Invalid Answer: 0.6% Not Attempted: 3.4%

Question no: 39

Skill: Reasoning and Problem Solving (Advanced or challenging problems) **Paper Set: A, Medium: English**

This redacted item is not for public release.

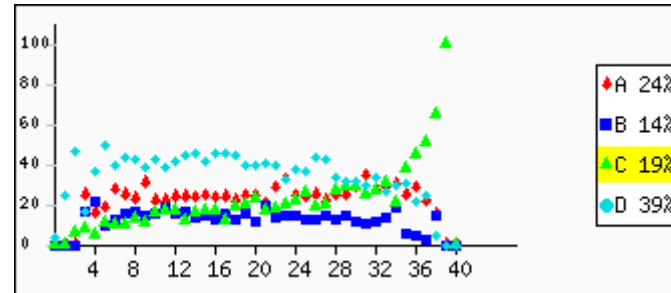


Overall A: 25.9% B: 12.6% C: 21.8% D: 36.5% Invalid Answer: 0.6% Not Attempted: 2.7%

Question no: 40

Skill: Applications in daily life, commercial Maths, word and visual problems **Paper Set: A, Medium: English**

This redacted item is not for public release.



Overall	A: 24.4%	B: 14.3%	C: 19.2%	D: 39.5%	Invalid Answer: 0.4%	Not Attempted: 2.3%
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Note: For each question, options marked with **RED** letters shows % of students who gave wrong answers, options marked with **GREEN** letters shows % of students who gave correct answers.