1

The three digits of a three-digit number add up to 25. How many such three-digit numbers are there?

Source: AMESA Mathematics Challenge 2006 Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

2

I multiplied two consecutive numbers (e.g. 4 and 5) on my calculator and got the answer 702. What is the sum of the two numbers?

Source: AMESA Mathematics Challenge 2004, Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

3

Split the number 18 into two whole numbers (e.g. 3 and 15). Now multiply these two numbers. What is the largest possible answer?

Source: AMESA Mathematics Challenge 2002, Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

4

20 can be written as the sum of two squares, e.g. $20 = 4 + 16 = 2^2 + 4^2$

In how many different ways (ignore the order) can 85 be written as the sum of two squares?

Source: AMESA Mathematics Challenge 2002, Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

5

How many two-digit numbers are there with both digits even?

Source: AMESA Mathematics Challenge 2002 Grade 7 Final Round

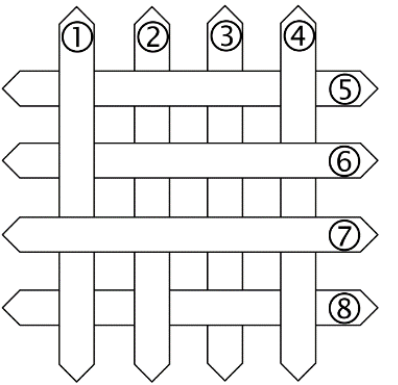
NumberSense

Mathematics Programme

Breezy

6

The sketch shows eight lolly sticks. If you must pick up the top one each time, in what order will you pick them up?



Source: AMESA Mathematics Challenge 2001 Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

7

What is the smallest ten-digit number that has exactly two digits that are the same and all other digits are different? Note: Numbers cannot start with zero!

Source: Wits Mathematics Competition 2022 Grade 6/7 Final Round

NumberSense

Mathematics Programme

Breezy

8

The digits of the year 2020 add up to 4. In how many other years (starting from 1), before 2020, has this happened?

Source: Wits Mathematics Competition 2020 Grade 6/7 Qualifying Round

NumberSense

Mathematics Programme

Breezy

9

There are 60 learners in a class. Always two students share a desk. Every boy shares a desk with a girl. Exactly half the girls share a desk with a boy. How many boys are in the class?

Source: Wits Mathematics Competition 2022 Grade 6/7 Final Round

NumberSense

Mathematics Programme

Breezy

10

Terri's birthday is on 3 December. On 1 August 2012 she was 11-years-old. In which year will she have her 21st birthday?

Source: Wits Mathematics Competition 2021 Grade 6/7 Qualifying Round

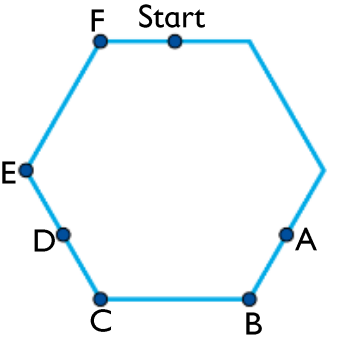
NumberSense

Mathematics Programme

Breezy

11

A running track is in the shape of a hexagon with equal sides. Kerri started running from the start flag. She ran an anti-clockwise direction (that is towards F) and stopped one-third of the way around the track.



At which point (A, B, C, D or E) did she stop?

Source: Wits Mathematics Competition 2021 Grade 6/7 Qualifying Round

NumberSense

Mathematics Programme

Breezy

12

The inter-school soccer league consists of 8 teams. How many matches will each team play if every team plays against every other team twice – once at home and once away?

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round

NumberSense

Mathematics Programme

Breezy

13

Mr Safe has a 4-digit combination that opens his lock. He remembers that the four digits are 3, 5, 7 and 9, but he has forgotten the correct order. What is the most different combinations that he must try to open the safe?

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round

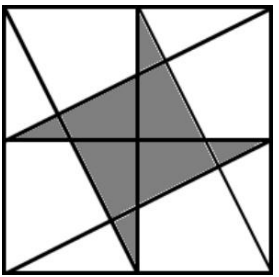
NumberSense

Mathematics Programme

Breezy

14

In the diagram, a corner of the shaded star touches the middle of each side of the large square.



What fraction of the large square is NOT shaded?

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

15

Today is a Monday. Thabo starts to read a book with 290 pages today. On Mondays he reads 25 pages and on every other day he reads 4 pages. On which day of the week does he finish reading the book?

Source: Wits Mathematics Competition 2022 Grade 6/7 Final Round

NumberSense

Mathematics Programme

So-So

16

There are 14 people at a party. Every pair of people shakes hands exactly once. How many handshakes occur?

Source: Wits Mathematics Competition 2019 Grade 4/5 Final Round

NumberSense

Mathematics Programme

So-So

17

A painter takes two days to paint a room (all four walls and the ceiling). If he works at the same pace, how many days will he take to paint a room that is twice as wide, twice as long and twice as high?

Source: AMESA Mathematics Challenge 2001, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

18

Check this number pattern:

$$1 = 1 \times 1$$
$$1 + 3 = 2 \times 2$$
$$1 + 3 + 5 = 3 \times 3$$
$$1 + 3 + 5 + 7 = 4 \times 4$$

Now calculate 1 + 3 + 5 + 7 + ... all the way up to ... + 97 + 99

Source: AMESA Mathematics Challenge 2007, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

19

What is the difference between the sum of the even numbers and the sum of the odd numbers from 1 to 100, both included?

Source: AMESA Mathematics Challenge 2008, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

20

What is the 83rd number in the following pattern: 1 ; 3 ; 5 ; 7 ; ....?

Source: AMESA Mathematics Challenge 2011, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

Consider the following pattern:

$$1^3 + 2^3 = 3^2$$
$$1^3 + 2^3 + 3^3 = 6^2$$
$$1^3 + 2^3 + 3^3 + 4^3 = 10^2$$
$$1^3 + 2^3 + 3^3 + 4^3 + \ldots + 10^3 = n^2$$

What is the value of n?

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

22

The Olympic committee printed numbered bibs for each of the athletes competing in the ski jump event, starting from the number 1. If 234 digits were printed overall, how many athletes competed?

Source: Wits Mathematics Competition 2022 Grade 6/7 Qualifying Round

NumberSense

Mathematics Programme

So-So

23

The product of two positive integers is equal to twice their sum. The same product is also equal to six times the difference between the two integers. What is the sum of the integers?

Source: Wits Mathematics Competition 2022 Grade 6/7 Qualifying Round

NumberSense

Mathematics Programme

So-So

24

What is the value of a in the table?

1	2	3	4	...	a
4	6	8	10	...	64

Source: AMESA Mathematics Challenge 2012, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

25

Which one of the following numbers will appear in the sequence: 2; 5; 10; 17; 26; 37; ...?

(A) 901
(B) 902
(C) 903
(D) 904
(E) None of these

Source: *AMESA Mathematics Challenge 2012, Grade 7 Final Round*

NumberSense

Mathematics Programme

So-So

26

A series of 10 books were published at 2-year intervals. The sum of the publication years is 20 000. When was the first book published?

Source: Wits Mathematics Competition 2022 Grade 6/7 Final Round

NumberSense

Mathematics Programme

So-So

27

How many of the 5-digit numbers which consist of the five digits 1, 2, 3, 4 and 5 are divisible by all of 1, 2, 3, 4 and 5?

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round

NumberSense

Mathematics Programme

So-So

28

Arnie, Bender and Cross are three robots. They are weighed two at a time. Here are the results:

- A + B = 12 kg
- B + C = 14 kg
- C + A = 16 kg

How much will all three weigh together?

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round

NumberSense

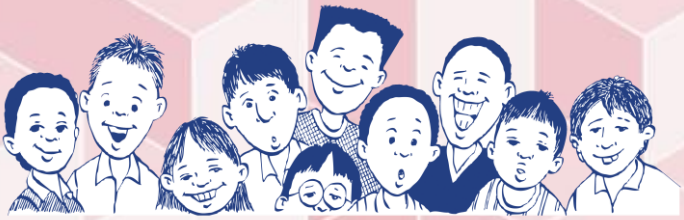
Mathematics Programme

So-So

Calculate:

$$\frac{1 + 3 + 5 + 7 + \ldots + 97 + 99}{2 + 4 + 6 + 8 + \ldots + 98 + 100}$$

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round



NumberSense

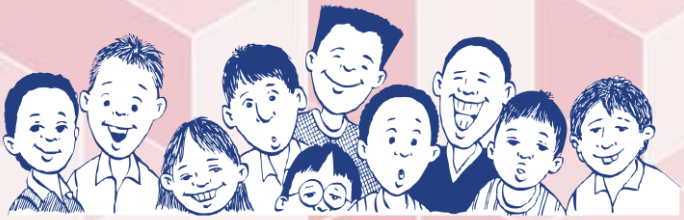
Mathematics Programme

Fiendish

30

Xolile has a bag of marbles. He gave $\frac{1}{3}$ of them to Baba and then $\frac{1}{4}$ of the remaining marbles to Sam. If there are now 24 marbles in the bag, how many marbles did Xolile give to Baba?

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round



NumberSense

Mathematics Programme

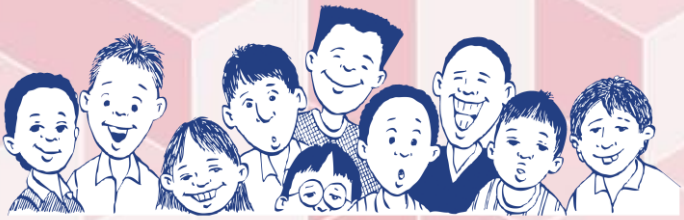
Fiendish

Numbers are arranged in the following patterns:

1	2	3	4	5	6	row 1
7	8	9	10	11	12	row 2
13	14	15	16	17	18	row 3
…	…	…	…	…	…	row 4

What will the third number in row 81 be?

Source: AMESA Mathematics Challenge 2005, Grade 7 Final Round



NumberSense

Mathematics Programme

Fiendish

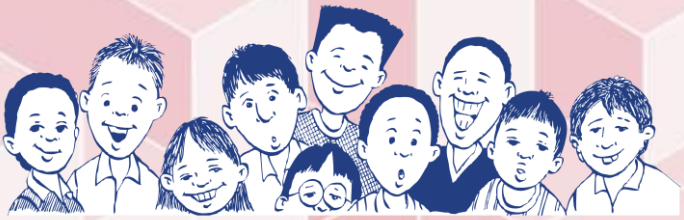
32

All the counting numbers are arranged in columns as shown below.

A	B	C	D	E	F	G
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
…	…	…	…	…	…	…

In which column is 500?

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round



NumberSense

Mathematics Programme

Fiendish

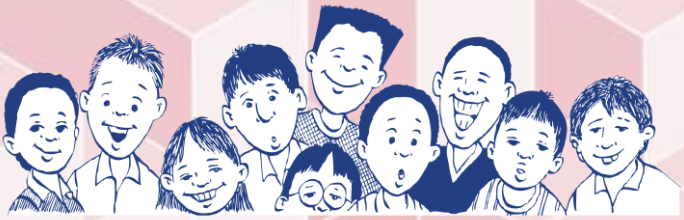
a, b, c and d are four adjacent dates in a calendar as shown.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
		a	b			
		c	d			

Which statement is true for **any** calendar?

(A) $a + c = b + d$
(B) $a + d = b + c$
(C) $c - b = a - d$
(D) $a + b = c + d$
(E) $d - a = c + b$

Source: AMESA Mathematics Challenge 2014, Grade 7 Final Round



NumberSense

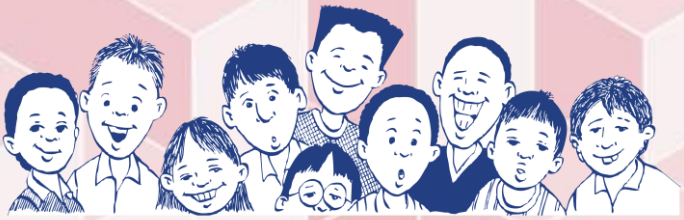
Mathematics Programme

Fiendish

a, b, c and d are four adjacent dates in a calendar as shown.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
		a	b			
		c	d			

What is the value of a if $a + b + c + d = 52$?



NumberSense

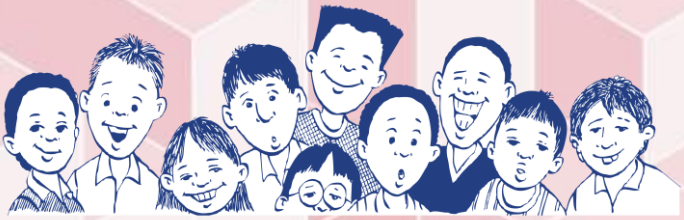
Mathematics Programme

Fiendish

35

30 students wrote a mathematics exam out of 100 marks. The average score was 50. The average score of those who passed was 60 and the average score of those who failed was 45. How many students passed?

Source: Wits Mathematics Competition 2022 Grade 6/7 Qualifying Round



NumberSense

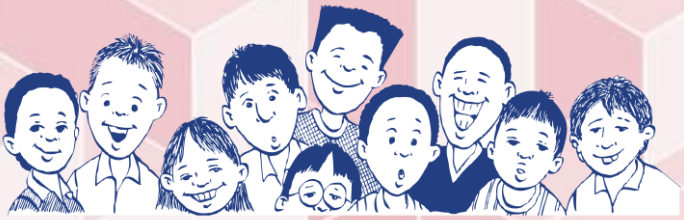
Mathematics Programme

Fiendish

36

The average of eleven numbers is 8. If a twelfth number is added to these numbers, the average of all twelve numbers is now 11. What is the twelfth number?

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round



NumberSense

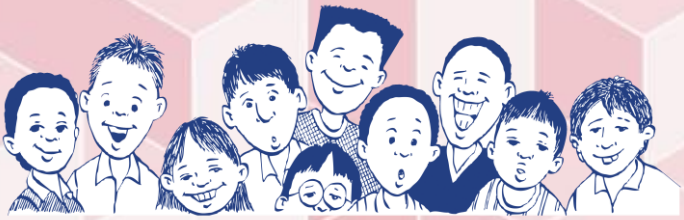
Mathematics Programme

Fiendish

37

A bath fills in 12 minutes if the plug is in. It empties in 18 minutes when the tap is off. If the tap is running and the plug is out, how long will it take to fill the bath?

Source: AMESA Mathematics Challenge 2006, Grade 7 Final Round

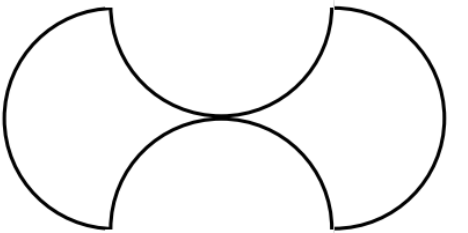


NumberSense

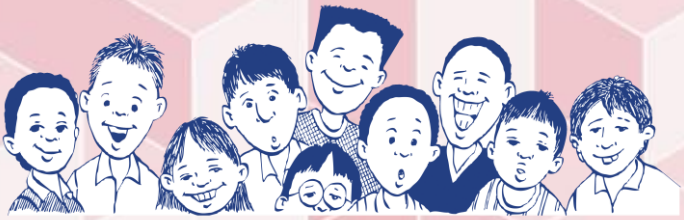
Mathematics Programme

Fiendish

The figure is a combination of four semi-circles, each with a radius of 3 cm. What is the area of the figure?



Source: AMESA Mathematics Challenge 2001, Grade 7 Final Round



NumberSense

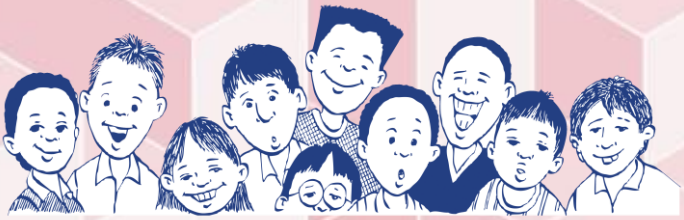
Mathematics Programme

Fiendish

39

A water tank is $\frac{7}{8}$ full. After 420 litres had been drawn from it, it is half full. How many litres does the tank hold when it is full?

Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round



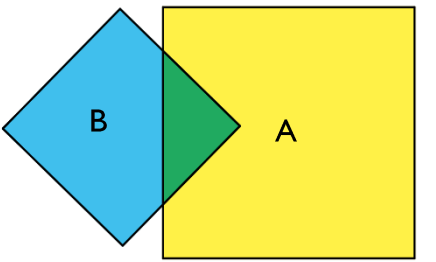
NumberSense

Mathematics Programme

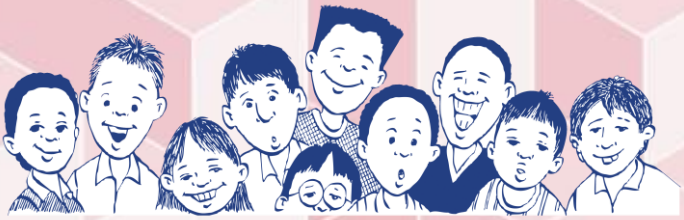
Fiendish

40

Two squares with lengths 4 cm and 6 cm respectively, partially overlap as shown in the diagram. What is the difference between shaded area A and shaded area B?



Source: AMESA Mathematics Challenge 2013, Grade 7 Final Round



NumberSense

Mathematics Programme

Fiendish