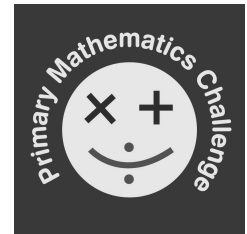


Primary Mathematics Challenge Bonus Paper



6 February 2019

Name Class

Please do not start to answer questions until you are told to do so. When you do turn over the page you will have 45 minutes for the challenge.

You must do all the work on your own. You should use rough paper for your working out.

Write down A B C D or E in the space for each answer. When you have finished **use a B or an HB pencil** to copy your answer onto the machine-readable sheet, which will be sent in for marking.

Each correct answer gains one mark.

Practice Questions

P1 Which of the following statements is correct?

- A $12 \times 3 = 4$ B $12 = 4 \div 3$ C $3 \times 12 = 4$
D $3 \div 12 = 4$ E $12 = 3 \times 4$

P2 There are approximately 166 million nesting birds in the UK and about 66 million people.

How many more nesting birds than people is that?

- A 100 000 B 1 000 000 C 10 000 000 D 100 000 000 E 1 000 000 000



MATHEMATICAL ASSOCIATION



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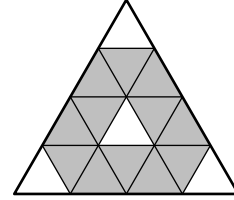
1. Which of the following numbers is closest to 2019?

- A 1029 B 1902 C 2190 D 2901 E 9210

2. In the diagram the large equilateral triangle is divided into a number of smaller equilateral triangles.

What percentage of the larger triangle is shaded?

- A 60% B 65% C 70% D 75% E 80%



3. Paula wishes to insert the digit 5 between the digits of the four-digit number 4637 to make it a five-digit number.

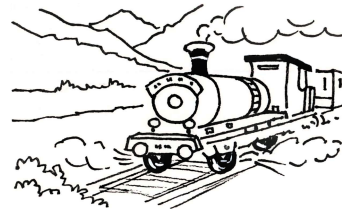
Where should she insert the digit 5 if she wants the five-digit number to be as small as possible?

- A before the 4 B after the 4 C after the 6 D after the 3
E after the 7

4. Glasgow, Stirling, Perth, Aberdeen and Thurso are the only stations on the *Scotmost* train line.

In how many ways can a passenger choose a pair of *Scotmost* stations, one from which to begin a journey and one at which to end it?

- A 5 B 10 C 20 D 25 E 30



5. What number should go in the box?

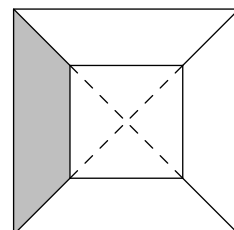
$$10 \times 30 \times 50 \times 70 = 1 \times 30 \times 500 \times \square$$

- A 0.07 B 0.7 C 7 D 70 E 700

6. The outer square has sides of 8 cm and the inner square has sides of 4 cm.

What is the area of the shaded trapezium?

- A 4 cm^2 B 6 cm^2 C 8 cm^2 D 10 cm^2
E 12 cm^2



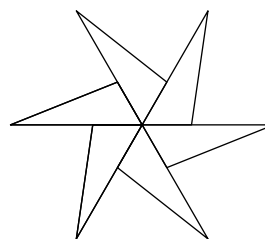
7. The Kit-Clat factory in Britain makes 2000 Kit-Clat bars every minute. Every second, 50 Kit-Clat bars are eaten in Britain.

How long does the Kit-Clat factory have to operate to provide an hour of Kit-Clat eating?

- A 90 seconds B 4 minutes C 15 minutes D 90 minutes
E 2 hours

8. The diagram shows six triangles, each having sides of 3 cm, 7 cm and 8 cm.

What is the perimeter of this 12-sided shape?

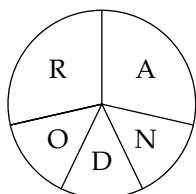


- A 60 cm B 66 cm C 72 cm D 90 cm E 108 cm

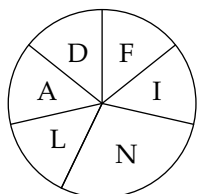
9. Which one of the five numbers below is **not** a multiple of 7?

- A 2345 B 2352 C 2359 D 2366 E 2374

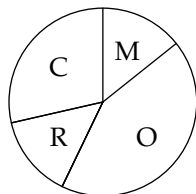
10. The pie-charts below indicate the number of each letter in the name of five countries.



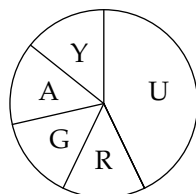
ANDORRA



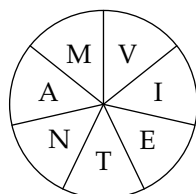
FINLAND



MOROCCO



URUGUAY



VIETNAM

Which one of these would look like the pie-chart for CROATIA?

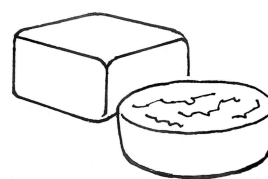
- A ANDORRA B FINLAND C MOROCCO D URUGUAY
E VIETNAM

11. Agnijo has half as many apps as Sam who has a third as many apps as Naomi. Altogether, they have 180 apps.

How many apps does Sam have?

- A 20 B 30 C 40 D 60 E 90

12. 20% of Pete's Cheddar is the same weight as half of Erica's Camembert.
10% of the Camembert weighs 28 g.



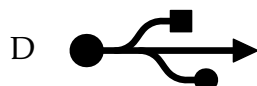
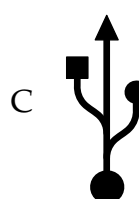
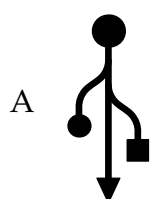
How much does Pete's Cheddar weigh in total?

- A 70 g B 280 g C 700 g D 1400 g E 14 kg

13. The diagram shows the standard USB logo.

Which of the following diagrams does not show a *reflection* of this logo?

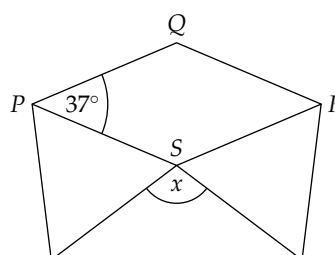




14. The diagram shows a rhombus, $PQRS$, joined to two equilateral triangles.
One of the smaller angles of the rhombus is 37° .

What is the size of the angle marked x ?

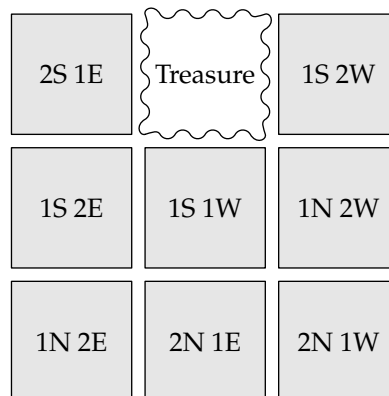
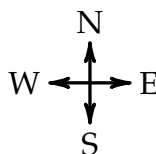
- A 91° B 93° C 95° D 97°
E 99°



15. Matthew has to travel through every square on the map once to claim the Treasure.

Each square has an instruction: "2S 1E" means "go from that square to the square 2 squares to the South and 1 square to the East".

Following these directions, what is the direction on Matthew's starting square?



- A 1S 2E B 1N 2W C 1S 2W D 2N 1W E 1S 1W

16. I have 21 white, 35 yellow and 28 red tulips.

What is the greatest number of bunches I can make, if all the bunches are exactly the same and there are no tulips left over?

- A 7 B 12 C 14 D 21 E 28

17. Beattie is making beetroot brownies in two baking tins. One tin is rectangular and measures 15 cm by 24 cm. The other is a 20 cm by 20 cm square. The mixture in the rectangular tin is 2 cm deep. Each tin has the same amount of brownie mixture.



How deep is the mixture in the square tin?

- A 1.5 cm B 1.8 cm C 2.1 cm D 2.2 cm E 4.0 cm

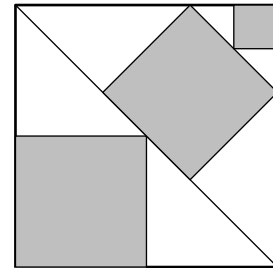
18. Panath and Ranesh share a tube of 32 sweets in the ratio of their ages. The sum of their ages is a multiple of 5 and is less than 50.

If Panath gets 20 sweets, what is the difference in their ages?

- A 5 B 10 C 15 D 20 E 25

19. What fraction of the largest square is shaded by the three smaller squares?

- A $\frac{1}{3}$ B $\frac{4}{9}$ C $\frac{1}{2}$ D $\frac{5}{9}$ E $\frac{7}{12}$



20. What are the last three digits of the answer to the calculation below?

$$123 \times 124 \times 125 \times 126 \times 127$$

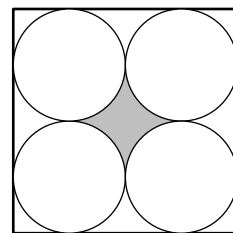
- A 000 B 222 C 444 D 666 E 888

21. The average of John and Leo's ages is Kelly's age. The average of Kelly and Mila's ages is Leo's age. Of the four children, John is the youngest and Mila the oldest. The average of John and Mila's ages is 11.

What is the total of the ages of Kelly and Leo?

- A 14 B 16 C 18 D 20 E 22

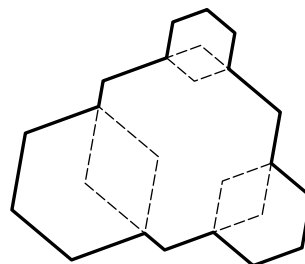
22. Each of the circles in this diagram has a radius of 3 cm and an area of approximately 28.26 cm^2 .
The circles fit together, touching the edges of the square.



What is the approximate area of the shaded region?

- A between 3 cm^2 and 5 cm^2
- B between 5 cm^2 and 7 cm^2
- C between 7 cm^2 and 9 cm^2
- D between 9 cm^2 and 11 cm^2
- E between 11 cm^2 and 13 cm^2

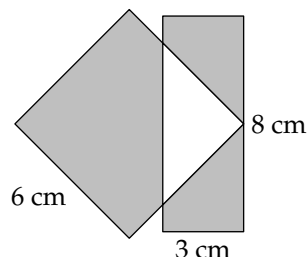
23. The diagram shows four regular hexagons.
The perimeter of the largest hexagon is 60 cm.
The total perimeter of the three smaller hexagons is 96 cm.



What is the length of the perimeter of the combined shape (drawn with a thicker line)?

- A 90 cm
- B 92 cm
- C 96 cm
- D 108 cm
- E 120 cm

24. In the diagram a square with sides of length 6 cm overlaps a rectangle with sides of length 3 cm and 8 cm.
Each diagonal of the square is parallel to a side of the rectangle.



What is the total shaded area?

- A 42 cm^2
- B 45 cm^2
- C 48 cm^2
- D 51 cm^2
- E 54 cm^2

25. I have a cuboid box with edges of 5 cm, 5 cm and 6 cm.
I also have 148 centimetre cubes and one 'double cube' (a cuboid made from two centimetre cubes stuck together face to face).

When I fit all these into the cuboid box, how many different possible positions are there for the 'double cube'?

- A 356
- B 365
- C 536
- D 563
- E 635