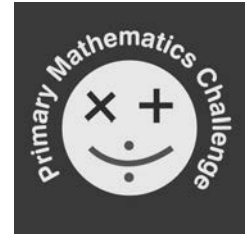


Primary Mathematics Challenge Bonus Paper



5 February 2020

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.

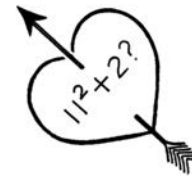
Each correct answer gains one mark.

Practice Questions

P1 *Roses are red, violets are blue.*

Won't you please tell me what's $11^2 + 2$?

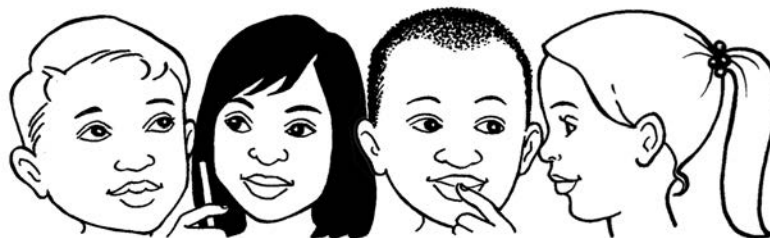
A 1 B 12 C 123 D 1234 E 12345



P2 Susie has saved 2020 5p coins.

How much money is this?

A £1.01 B £10.10 C £101 D £1010 E £10 100



MATHEMATICAL ASSOCIATION



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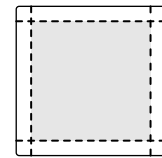
Printed on recycled paper 

1. A flight from Singapore to Manchester takes 15 hours. The time in Singapore is 7 hours ahead of Manchester. My flight leaves Singapore at 3 p.m. Singapore time. What time should my flight land in Manchester?



- A 3 a.m. B 6 a.m. C 10 p.m. D 11 p.m. E 1 a.m.

2. My dad hates crusts. Mum cuts off the crusts of his 10×10 cm piece of toast every day. She cuts 1 cm from each edge and throws these pieces away. What percentage of the toast is thrown away?



- A 12% B 19% C 24% D 32% E 36%

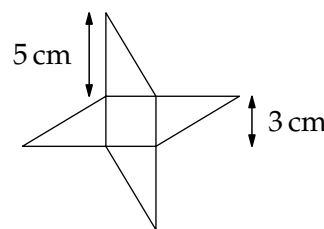
3. Seagram knows that $1111 \times 2222 = 2468642$. Which of the following answers should he decide is 3333×4444 ?

- A 14811850 B 14811851 C 14811852
D 14811853 E 14811854

4. Astrod adds up all the positive odd numbers under 100 and gets a total of 2500. Steven then adds up all the positive even numbers up to and including 100. What total should he get?

- A 2500 B 2502 C 2540 D 2550 E 2600

5. In the diagram, four right-angled triangles have been joined to the sides of a square to form a star shape. The length of each side of the square is 3 cm and the perpendicular height of each triangle is 5 cm. What is the area of the star shape?



- A 15 cm^2 B 25 cm^2 C 30 cm^2 D 34 cm^2 E 39 cm^2

6. Today my maths teacher bought 80 socks all exactly the same. He wears a pair of socks each day. Each of his socks wears out after 100 days of wear. After approximately how many years will he have to replace them all?



- A 2 B 4 C 6
D 8 E more than 10

7. In a class of 28 pupils, 8 pupils say they like cabbage and 10 say they like sprouts. 13 say they don't like either.

How many like both cabbage and sprouts?

- A 3 B 5 C 7 D 9 E 11

8. Dougie has six dogs to walk.

If he walks two at a time, how many different pairs of dogs can he take out?



- A 6 B 9 C 12 D 15 E 30

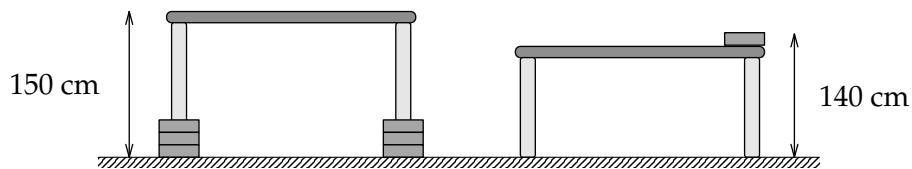
9. A city has a bicycle hire scheme where it is possible to hire a bicycle for short journeys.

Last year I hired a bicycle 60 times and rode for 13 hours altogether.

For how long on average did I hire the bicycle on each ride?

- A 13 minutes B 23 minutes C 39 minutes
D 47 minutes E 73 minutes

10.



In the left-hand diagram above, a table stands on piles of three bricks. The height of the top of the table is 150 cm above the ground.

In the right-hand diagram, the same table stands on the floor, but with one brick on top of it.

The distance from the top of the brick to the floor is 140 cm.

What is the actual height of the table?

- A 120 cm B 125 cm C 128 cm D 130 cm E 135 cm

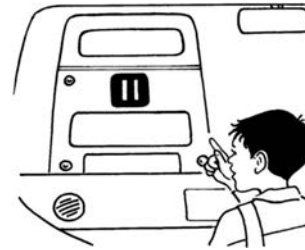
11. I think of a number, add 5, multiply that number by 2, and then reverse the digits in my answer.

I now have the number that I started with.

What is my number?

- A 15 B 26 C 37 D 48 E 59

12. Toby is playing a game trying to spot as many fire engines, buses and motorcycles as he can. He scores 9 points for a fire engine, 5 points for a bus and 2 points for a motorcycle. He sees the same number of motorcycles as fire engines and scores a total of 63 points.



How many buses does he see?

- A 3 B 4 C 5 D 6 E 7

13. Katherine chose three prime numbers. Their mean is 8. The difference between the two smaller prime numbers was also a prime number.

What was the largest prime number that Katherine chose?

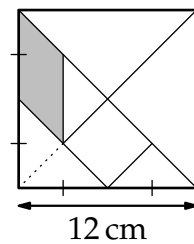
- A 5 B 7 C 13 D 17 E 19

14. Farmer Patch is planting cabbages. He wants to plant them in a square shape, so that there is the same number of cabbages in each row and column. However, he is becoming cross, because when he tries to do this, he either has 6 cabbages left over or he needs 11 more cabbages!

How many cabbages does he have?

- A 31 B 38 C 42 D 55 E 70

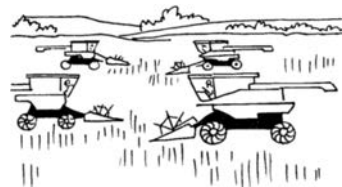
15. Seven tangram pieces are placed together to form a square of side 12 cm, as shown.



What is the area, in square centimetres, of the shaded parallelogram?

- A 12 B 18 C 24 D 27 E 36

16. It takes 4 machines 6 days to harvest a crop. How long would it take 3 machines?



- A 6 days B 8 days C 9 days
D 12 days E 24 days

17. The radius of a coin is 3 cm. When 4000 of these coins are placed side by side in a straight line, how long would this line be?

- A 240 cm B 12 m C 240 m D 1.2 km E 2.4 km

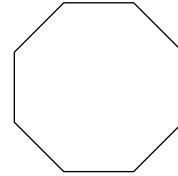
18. Using only the digits 1, 2, 3, 4, 5, 6 and 7, no more than once each, you can make many different numbers: 43 716 or 7 325 641, for example.

What is the largest of these numbers in which all of the numbers formed by pairs of consecutive digits (digits which are side-by-side) are multiples of 3?

- A 75 421 B 637 542 C 721 543 D 751 263 E 7 563 421

19. I cut across a regular octagon with one straight cut.

Which of these pairs of shapes could I **not** make?



- A 1 triangle and 1 hexagon
 B 2 pentagons
 C 1 quadrilateral and 1 hexagon
 D 2 hexagons
 E 1 pentagon and 1 hexagon

20. Cassie wants to colour the edges of a cube either red or blue. She also wants every face of the cube to have at least one red edge.

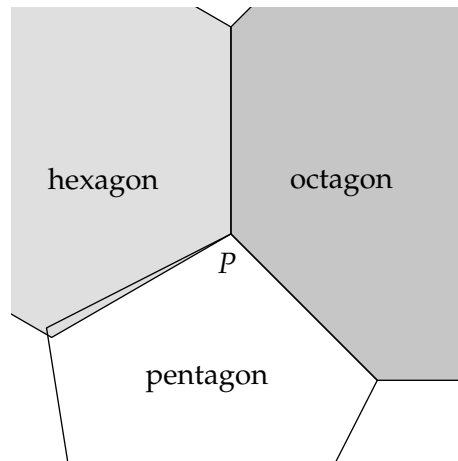
What is the smallest number of red edges that she could have?

- A 2 B 3 C 4 D 5 E 6

21. Icosa has a regular pentagon, a regular hexagon and a regular octagon made of card. All of them have the same side-length.

She places the hexagon edge-to-edge with the octagon and then the pentagon edge-to-edge with the octagon, so that all three meet at the point P .

What is the angle formed by the overlap of the pentagon with the hexagon?

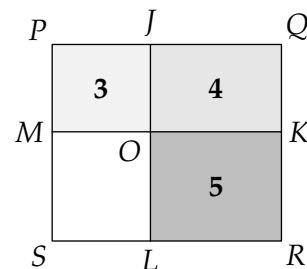


- A 2° B 2.5° C 3°
 D 3.5° E 4°

22. In the diagram the rectangle $PJOM$ has area 3 cm^2 . The rectangle $JQKO$ has area 4 cm^2 . The rectangle $OKRL$ has area 5 cm^2 .

What is the area of the whole rectangle $PQRS$ in square centimetres?

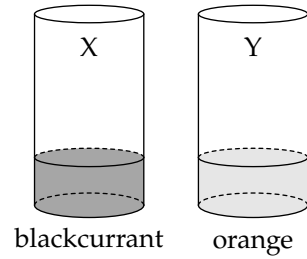
- A 15 B 15.3 C 15.75
 D 16 E 18



23. I am trying to make *blackorange squash*.
I have two identical jars, X and Y.

X is a quarter full of blackcurrant squash.
Y is a quarter full of orange squash.

I pour half of X into Y and stir well.
I then pour half of what is now in Y into X.



What is the proportion of blackcurrant juice to orange juice in X now?

- A 1 : 1 B 1 : 2 C 3 : 1 D 3 : 2 E 5 : 3
-

24. A hollow box in the shape of a cube, but without a lid, contains 125 identical small wooden cubes which fill the box exactly.

How many of the small cubes do **not** touch the sides or the bottom of the box?

- A 27 B 36 C 40 D 49 E 89
-

25. Edward has an A4 piece of paper, which is 210 mm wide and 297 mm long.
After making one cut, he has two pieces: a square and another rectangle.
He repeats the process with the new rectangle and continues until the very last two pieces are both squares.

What is the length of a side of each of these final squares?

- A 1 mm B 2 mm C 3 mm D 4 mm E 5 mm
-