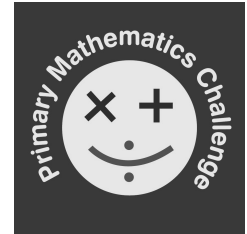


Primary Mathematics Challenge Bonus Paper



3 February 2021

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.

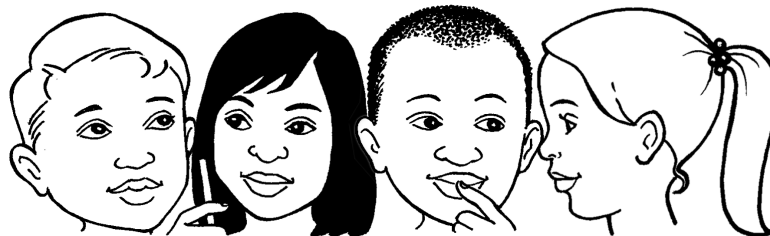
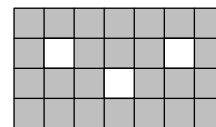
Practice Questions

P1 Which whole number is closest in value to $\frac{20}{21}$?

- A 0 B 1 C 2 D 3 E 4

P2 How many 1×1 squares are shaded in this 7×4 rectangle?

- A 24 B 25 C 26 D 27 E 28



MATHEMATICAL ASSOCIATION



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1. The odometer in Martin's car shows that the car has travelled 45 125 miles. The digit 5 appears twice.



How many more miles must Martin travel before the mileage includes two digits that are the same?

- A 5 B 6 C 7 D 8 E 9

2. The average pay of a restaurant waiter in the UK is £6.81 per hour.



For roughly how many hours will a waiter have work to earn £100?

- A 5 B 8 C 11 D 15 E 18


3. Tick's clock shows a time of 16:27, but Tock's clock shows a time of 16:31. Tock's clock is 3 minutes slow. Then Tick's clock is

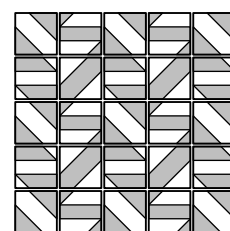
- A 7 minutes slow B 6 minutes slow
 C showing the correct time D 1 minute fast
 E 3 minutes fast

4. A square has a perimeter equal to that of a regular hexagon. The perimeter of the hexagon is 48 cm.

What is the area of the square?

- A 36 cm^2 B 48 cm^2 C 64 cm^2 D 120 cm^2 E 144 cm^2

5. This pattern is made from 25 small tiles like this one: .



How many different kinds of tile are there?

- A 2 B 3 C 4 D 5 E 6

6. Who am I? I am the sum of the squares of two consecutive numbers less than 20 and I look the same upside down!

- A **101** B **161** C **181** D **808** E **818**

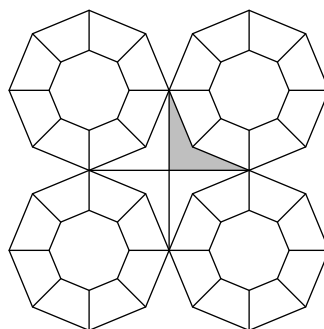
7. What is the remainder when 7 999 999 999 is divided by 8 ?

- A 0 B 1 C 7 D 8 E 9

14. The diagram shows the design of an Islamic tile in the V&A museum.

It is made from regular octagons, trapezia and arrow-shaped quadrilaterals.

What is the size of each of the smallest angles of the quadrilateral that is shaded?



- A 20° B 22.5° C 25° D 27.5° E 30°

15. How many of the five numbers below are multiples of 13?

13 131 1313 13131 131313

- A 1 B 2 C 3 D 4 E 5

16. The grass tennis courts at Wimbledon are immaculate!

A tennis court is a rectangle of dimensions 23.77 m by 10.97 m.

I count 18 single blades of grass in one square centimetre.

Roughly how many blades of grass are there altogether on one court?



- A 5000 B 50 000 C 500 000
D 5 000 000 E 50 000 000

17. If you were to think of two positive whole numbers so that the product of their sum and their difference was 21, what is the largest that one of your numbers could be?

- A 7 B 8 C 9 D 10 E 11

18. Alice made some cupcakes.

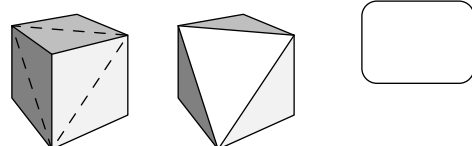
She gave $\frac{1}{3}$ to her best friend, $\frac{1}{5}$ to her mum and $\frac{1}{9}$ to her granny. She kept the rest herself.

Mum got 8 more cupcakes than granny and none were cut.

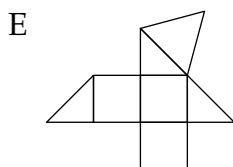
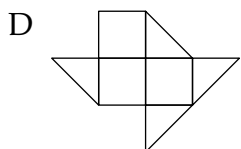
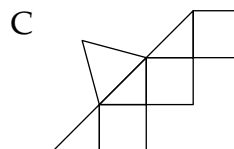
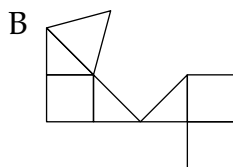
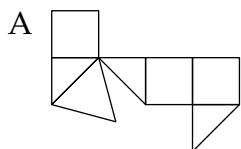
How many did Alice keep for herself?

- A 16 B 20 C 24 D 28 E 32

19. The diagram shows a cube before and after a pyramid was cut off as shown on the right.



Which of the nets below does **not** show a possible net for the remaining solid?



20. The height of a man in a top hat standing on stilts is 320 cm!

The height of the man just wearing his top hat is 225 cm.

The height of the man on stilts without his top hat on is 285 cm.

How tall is the man without stilts or the top hat?

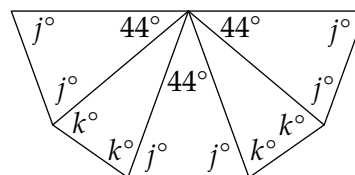
- A 170 cm B 180 cm C 190 cm D 200 cm
E 210 cm



21. This hexagon is split into five isosceles triangles.

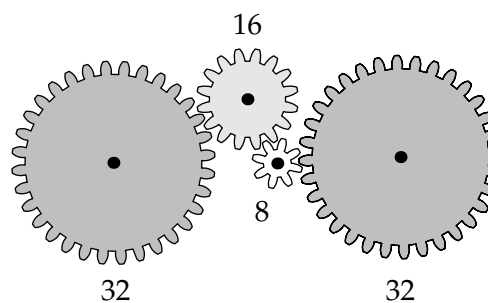
How much larger is angle k° than angle j° ?

- A 2.5° B 5° C 7.5°
D 10° E 15°



22. In this diagram, the number above or below each cogwheel is the number of teeth or *cogs* on that wheel.

When the wheel on the far left turns through 1 complete turn, how much does the wheel on the right turn?



- A a quarter-turn B a half-turn C a complete turn
D 2 complete turns E 4 complete turns



23. Polly makes a parallelogram by cutting off two vertices from an equilateral triangle.

The length of the perimeter of the parallelogram is 20 cm.

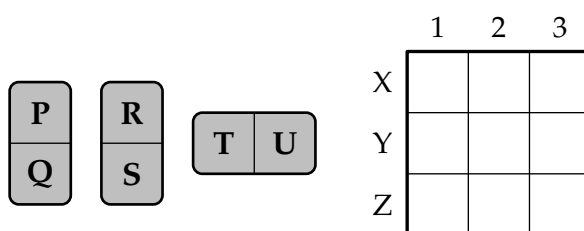
What was the length of the perimeter of the equilateral triangle?

- A 18 cm B 21 cm C 24 cm D 27 cm E 30 cm
-

24. How many positive numbers less than 1 000 000 are multiples of 12 and have only 1 or 2 or both as their digits?

- A 11 B 12 C 13 D 14 E 15
-

25.



The three puzzle pieces above fit into the 3 by 3 grid without rotation or reflection.

- U is not in the same row as P or Q
- T has a blank square immediately above it
- S touches Q diagonally and is not in column 2

Based on the three clues above, in which square does S go?

- A X1 B X3 C Y2 D Z1 E Z3
-