Primary Mathematics Challenge Bonus Paper

3 February 2021



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 machinereadable 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



© The Mathematical Association 259 London Road Leicester LE2 3BE

www.primarymathschallenge.org.uk

Printed on recycled paper

1.	 I. 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 per hour. For roughly how earn £100?	of a restaurant v many hours wi	vaiter in the UK ll a waiter have	is £6.81 work to		
	A 5	B 8	C 11	D 15	E 18	
3.	Tick's clock show Tock's clock is 3 r A 7 minutes sl C showing the E 3 minutes fa	rs a time of 16:27 ninutes slow. Th ow e correct time st	7, but Tock's cloc nen Tick's clock B 6 m D 1 m	ek shows a time is inutes slow inute fast	of 16:31.	
4.	A square has a perimeter of What is the area of	erimeter equal to the hexagon is 4 of the square?	o that of a regula 8 cm.	ar hexagon.		
	A 36 cm ²	B 48 cm ²	C 64 cm ²	D 120 cm ²	E 144 cm ²	
5.	This pattern is ma How many differ A 2 B 3	ade from 25 sma ent kinds of tile 3 C 4	ll tiles like this o are there? D 5	one: . E 6		
6.	Who am I? I am t 20 and I look the	he sum of the so same upside do	quares of two cc wn!	onsecutive numb	pers less than	
	A 101	B I6I	C 181	D 808	E 818	
7.	What is the rema A 0	inder when 799 B 1	9 999 999 is divi C 7	ded by 8 ? D 8	Е 9	

8.	 Adie is addicted to a new quiz game on her phone. She gets one diamond for getting the first question correct, two diamonds for getting the second question correct. In fact, every time she answers a question correctly the number of diamonds she receives doubles! She receives 127 diamonds in total. How many questions did she answer correctly? 					
	A 6	B 7	C 8	D 9	E 10	
9.		$4 \times 8 \times 3 \times$	$11 \times 2 \times N = 32$	$\times 33 \times 34$		
	In the calcula	tion above, wh	at is the value of	N?		
	A 13	B 14	C 15	D 16	E 17	
10.	Patrick remer it you get a ne	nbers his favou egative number	urite number this c, but if you add 5	s way: if you t 501 you get a 4	ake away 500 from 1-digit number.	
	What is the to	otal of the digit	s in Patrick's favo	ourite number	?	
	A 20	B 21	C 22	D 23	E 24	
11.	This plan of divided into the The area of 10^{-1} vegetable path The flowerbe patch is 6 met What is the and A 12 m^2 D 72 m^2	a rectangular three smaller re the flowerbed ch and half the d is 2 metres tres long. rea of the grass B 36 m ² E impo	garden shows the ectangles. is equal to that area of the grass wide and the ve ? 2 C 48 m possible to tell	nat it is t of the egetable	grass grass by vegetable patch def m def m	
12.	In six years' ti How old is Pe	ime Penny will	be three times a	s old as she wa	as four years ago.	
	A 6	В 7	C 8	D 9	E 12	
13.	I have three ja 28 buttons an	ars. In the firs d in the third t	t jar there are 16 here are 37 butto	buttons, in th ns.	ne second there are	
	What is the sn jar will have t	nallest number he same numb	of buttons that m er of buttons?	nust be moved	to ensure that each	
	A 10	B 11	C 12	D 13	E 14	

14.	 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°	$E 30^{\circ}$	
15.	How many of the	e five numbers ł	pelow are multip	les of 13?		
		13 131	1313 13131	131313		
	A 1	B 2	C 3	D 4	E 5	
16.	The grass tennis of A tennis court by 10.97 m. I count 18 single 1 Roughly how ma on one court? A 5000 D 5000 000	courts at Wimb is a rectangle blades of grass : any blades of g B 5 E 5	ledon are immad of dimensions in one square cer rass are there al 50 000 50 000 000	c 500 000		
17.	If you were to this sum and their dif could be?	nk of two positi fference was 21,	ve whole numbe what is the larg	ers so that the pre est that one of y	oduct of their our numbers	
	A 7	B 8	C 9	D 10	E 11	
18.	8. 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 How many did A	cupcakes than lice keep for he	granny and none erself?	e were cut.		
	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° $j^{\circ} 44^{\circ} 44^{\circ} j^{\circ}$

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 D 2 complete turns
- B a half-turnE 4 complete turns





25.

23.	3. 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 len	gth of the perim	eter of the equil	ateral triangle?		
	A 18 cm	B 21 cm	C 24 cm	D 27 cm	E 30 cm	
24.	How many positi only 1 or 2 or both A 11	ve numbers less h as their digits? B 12	c 13	are multiples of D 14	12 and have E 15	



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
------	------	------	------	------