

10/1 Put a circle round the correct answer:

Multiply the second and third prime number together and divide by the fifth triangle number.

- a) 1      b) 2      c) 3      d) 4      e) 5

10/2 Leo is making a game for his maths teacher. He codes words using:

A = 1 and B = 2 and so on. He writes this on the white board:

13, 1, 20, 8, 5, 24

Decode to find the word he was giving his teacher.

10/3 Recently, Eliud Kipchoge ran the marathon (42 km) in one hour and fifty-nine minutes and forty seconds. What was his speed in metres per second?

10/4 Find a sequence of 5 consecutive numbers that add to 100.

10/5 Sina writes:  $AA - BB = BB$ . She knows that  $22 - 11 = 11$  works, how many other answers are there?

10/6 Which of the following is an impossible triangle:

- a) 2, 2, 2      b) 2, 2, 4      c) 2, 4, 4      d) 4, 4, 4

10/7 What is the total of the border numbers?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

10/8 Masie makes a regular hexagon with matchsticks and then makes enough hexagons to go around the original hexagon to make a tessellation. How many matches will Masie use?



10/9 The Goldbach Conjecture states that every even integer greater than two can be the sum of two prime numbers. Find all the pairs of primes that add to 30.

10/10 A rectangle has sides of  $x + 2$  and  $x + 3$ , find  $x$  if the area of the rectangle is 132.

10/11 What geometric figure do these three coordinates describe?

(0,0), (3,0) and (0,4)

10/12 19 is described as a Happy Number because starting with

$19 \rightarrow 1^2 + 9^2 = 82$   
 $82 \rightarrow 8^2 + 2^2 = 68$   
 $68 \rightarrow 6^2 + 8^2 = 100$   
 $100 \rightarrow 1^2 = 1$  so 1 is happy.

Find the number closest to and lower than 19, which is also happy.



10/13 Assuming each letter represents a unique digit, solve this cryptarithm,

M	A	T	H	S
S	T	A	T	S
M	A	T	H	E
				X

Where  $M = 1$  and  $T = 5$

Mathex =

10/14 A circle has 6 points equally spaced around the circumference. If each point is joined to every other point, how many crossings will there be?

10/15 My dog Nikki has a large number of tennis balls. She is a clever dog, and she places them in piles of 1, then 4, then 10, then 20 and so on. If she has 6 piles, how many tennis balls does she have?



10/16 This code will make a regular hexagon Repeat 6[forward 50 right 60]

What code will make a regular dodecagon?

10/17 A cube of side 4cm is made up of smaller cubes,  $1\text{cm}^3$ . If the cube is taken apart and another cube with an eighth of the volume is made, what are the dimensions of the rectangle made with the left overs, such that the cuboid has minimum surface area.

---

10/18 There are 204 squares of any size on a chessboard. How many rectangles (excluding squares) of any size are there on a chessboard?

10/19 In mathematics, a Mersenne Prime is a prime number that is one less than a power of two. That is, it is a prime number of the form  $M_n = 2^n - 1$ .

Write the first 5 Mersenne Primes.

10/20 Jo has 15 matchsticks. She uses all 15 matchsticks each time she makes a different triangle. What is the difference in area between the largest and the smallest triangles that she makes?