

Question 1

The value of $1987 - 1988 + 1989 - 1990 + 1991 - 1992 + \dots - 2016 + 2017$ is:

- A. -15 B. -14 C. 2002 D. 2003 E. 2017

Question 2

A container in the shape of a cube has edge length 20 cm and contains some water. A solid gold cube, with edge length 15 cm, sinks to the bottom of this container, causing the water level to rise just to the top of the solid cube. Which of the following is closest to the original depth of the water?

- A. 5.31 cm B. 6.56 cm C. 7.50 cm D. 8.25 cm E. 11.50 cm

Question 3

I have some strange dice: the faces show the numbers 1 to 6 as usual, except that the odd numbers are negative (i.e., -1, -3, -5 in place of 1, 3, 5). If I throw two such dice, which total cannot be achieved?

- A. 3 B. 4 C. 7 D. 8 E. 10

Question 4

Sixty-four white $1 \times 1 \times 1$ cubes are used to form a $4 \times 4 \times 4$ cube, which is then painted red on each of its six faces. This large cube is then broken back up into its 64 unit cubes. Each unit cube is given a score as using the table below. What would the total score for the 64 cubes be?

Number of red faces:	3	2	1	0
Score:	5	1	0	-5

- A. -24 B. -16 C. 0 D. 16 E. 24

Question 5

A number is 'Beprisque' if it is the only natural number between a prime number and a perfect square (e.g. 10 is Beprisque but 12 is not). The number of two-digit Beprisque numbers (including 10) is:

- A. 2 B. 3 C. 4 D. 5 E. 6

Question 6

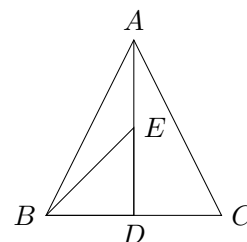
A bag contains twenty lollies: four orange flavoured, six lime flavoured and ten strawberry flavoured. Lollies are removed randomly from the bag and eaten. What is the minimum number of lollies that must be removed to be certain that at least two lollies of each flavour have been eaten?

- A. 6 B. 18 C. 12 D. 10 E. 8

Question 7

ABC is an equilateral triangle as shown, with sides of length 14 cm. If D is the midpoint of BC and E is the midpoint of AD , the length of BE to one decimal place must be:

- A. 12.1 cm B. 9.3 cm C. 6.1 cm D. 7.6 cm E. 15.7 cm



Question 8

Gina took seven tests. The average of the first four tests was 71%. The average of test 4 through to test 7 was 84%. The fourth test score was 74%. What is the average of the seven tests (to one decimal place)?

- A. 78.0% B. 74.3% C. 99.1% D. 67.4% E. 77.1%

Question 9

In the equation $2x + 8 = x^2 - p = 5x + 11$, what is the value of p ?

- A. -6 B. -1 C. 5 D. 6 E. -5

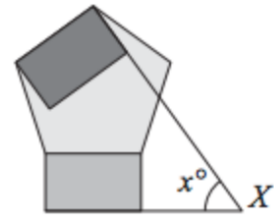
Question 10

Brachycephalus frogs have three toes on each foot and two fingers on each 'hand', whereas the common frog has five toes on each foot and four fingers on each 'hand'. All frogs have two 'hands' and two feet. Some Brachycephalus and common frogs are in a bucket. Each frog has all its fingers and toes. Between them they have 122 toes and 92 fingers. How many frogs are in the bucket?

- A. 15 B. 17 C. 19 D. 21 E. 23

Question 11

The diagram shows two rectangles and a regular pentagon. One side of each rectangle has been extended to meet at X . What is the value of x in degrees?



- A. 52 B. 54 C. 56 D. 58 E. 60

Question 12

In an attempt to copy down a linear sequence of six positive integers, I wrote down five numbers:

10 24 31 36 45

After checking with the original numbers, I found that not only did I miss one of the numbers entirely, I miscopied one of the others. Which of the above numbers was not copied correctly?

- A. 10 B. 24 C. 31 D. 36 E. 45

Question 13

The largest four-digit number whose digits add to sixteen is 9700. The fifth largest four-digit number whose digits have a sum of sixteen is:

- A. 9601 B. 9502 C. 9520 D. 9430 E. 9511

Question 14

If $x\#y = xy - x$, what is $3\#(5\#2)$ equal to?

- A. 21 B. 8 C. 12 D. 16 E. 10

Question 15

You have two large bags of marbles. In one bag the ratio of green marbles to pink marbles is $2 : 3$. In the other bag the ratio of green marbles to pink marbles is $3 : 5$. Both bags contain marbles. If you have 24 green marbles, the smallest number of pink marbles you could have is:

- A. 36 B. 37 C. 38 D. 39 E. 40

Question 16

The number of dots on opposite faces of a regular die add to seven. Four regular dice are arranged as shown. Which of the following could be the sum of the number of dots hidden between the dice?



- A. 22 B. 26 C. 19 D. 21 E. 23

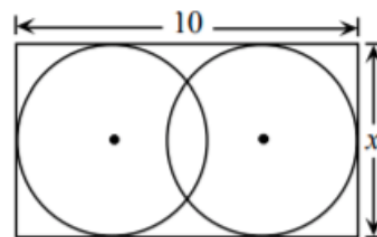
Question 17

The product of 20^{17} and 17^{20} is calculated and written out fully. The number of zeros at the end of this number would be:

- A. 17 B. 20 C. 34 D. 37 E. 40

Question 18

Two circles with equal radii are enclosed by a rectangle, as shown. The distance between their centres is $\frac{3}{7}$ of x . The value of x is



- A. $\frac{140}{13}$ B. 14 C. $\frac{67}{7}$ D. $\frac{70}{17}$ E. 7

Question 19

A straight one-way city street has six consecutive traffic lights. Every light remains green for 1.25 minutes, yellow for 5 seconds, and red for 1.25 minutes. The lights are synchronised so that each light turns red ten seconds after the preceding one turns red. What is the longest interval of time, in seconds, during which all six lights are green?

- A. 10 B. 25 C. 30 D. 35 E. 75

Question 20

There are three men in a leaking boat. The first man can bail out ten litres of water in a minute, the second man at triple this rate, and this third man at half the second man's rate. Water is leaking into the boat at seventy litres a minute. If the boat can hold 200 litres of water before it sinks, how many seconds will it take from the time the leak started until it sinks?

- A. 480 B. 780 C. 800 D. 833 E. 900

Question 21

Three rugs have a combined area of 400m^2 . By overlapping the rugs to cover a floor area of 280m^2 , the area covered by exactly two layers of rug is 48m^2 . What area of floor is covered by three layers of rug?

- A. 24m^2 B. 36m^2 C. 48m^2 D. 72m^2 E. 84m^2

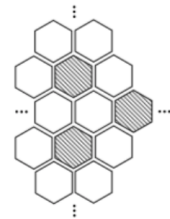
Question 22

P , Q , R , S , and T are five different integers between two and nineteen inclusive. P is a two-digit prime number whose digits also add up to a prime number. Q is a multiple of five. R is an odd number, but not a prime number. S is the square of a prime number. T is a prime number that is also the mean of P and Q . Which number is the largest?

- A. P B. Q C. R D. S E. T

Question 23

A square floor is tiled, as partially shown, with a large number of regular hexagonal tiles. The tiles are coloured blue or white. Each blue tile is surrounded by six white tiles and each white tile is surrounded by three white and three blue tiles. Ignoring part tiles, the ratio of the number of blue tiles to the number of white tiles is closest to:



- A. 1 : 6 B. 2 : 3 C. 3 : 10 D. 1 : 4 E. 1 : 2

Question 24

The angles of a quadrilateral are in the ratio 3 : 4 : 5 : 6. What is the difference between the largest angle and the smallest angle?

- A. 30° B. 40° C. 50° D. 60° E. 70°

Question 25

The combined age of Aroha and Benji is 39. The combined age of Benji and Chen is 40. The combined age of Chen and Danica is 38. The combined age of Danica and Emily is 44. The total of all five ages is 105. Which of the five is the youngest?

- A. Danica B. Chen C. Emily D. Aroha E. Benji

Question 26

A sheet of graph paper is placed with its x -axis pointing due East and its y -axis pointing due North. A sluggish snail starts at point $(0, 0)$ and slowly, but smoothly, slithers one unit North, two units East, three units South, four units West, five units North, six units East, seven units South, eight units West, nine units North and (lastly!) ten units East. At which point does the snail finally arrive?

- A. $(5, 6)$ B. $(6, -5)$ C. $(6, 5)$ D. $(-4, 5)$ E. $(-1, -2)$

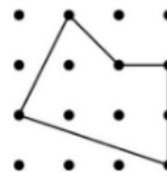
Question 27

Granny says “I am 84 years old - not counting my Sundays”. How old is she really?

- A. 90 B. 91 C. 92 D. 96 E. 98

Question 28

A single polygon is made by joining dots in the 4×4 grid with straight lines, which meet only at dots at their end points. No dot is at more than one corner. The diagram shows a five-sided polygon formed in this way. What is the greatest possible number of sides of polygon formed by joining the dots using these same rules?



- A. 12 B. 13 C. 14 D. 15 E. 16

Question 29

The expression $2017^{2017} - 1$ is calculated and written out in full. The last digit would be:

- A. 0 B. 2 C. 4 D. 6 E. 8

Question 30

Two brothers and three sisters form a single line for a photograph. The two boys refuse to stand next to each other. How many different line-ups are possible?

- A. 72 B. 36 C. 60 D. 120 E. 24