

Question #1

[3] Simplify the following: $18 + 72 \div (15 - 4 \times 3)^2$. Show work.

Question #2

[4] In the calculations below, each letter represents a single digit. Determine the digit that each letter represents. Answer only.

a)
$$\begin{array}{r} 214 \\ + \quad A5 \\ \hline 289 \end{array}$$

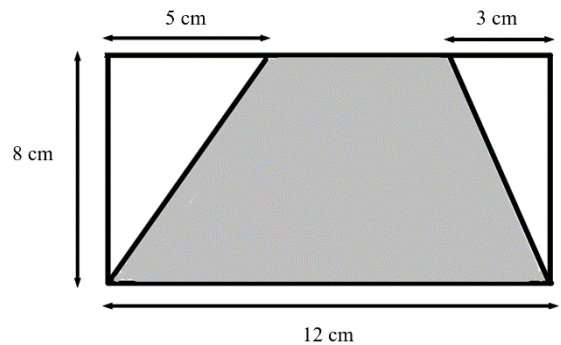
b)
$$\begin{array}{r} 49 \\ \times \quad 7 \\ \hline 3B3 \end{array}$$

c)
$$\begin{array}{r} 53 \\ - \quad C8 \\ \hline 35 \end{array}$$

d)
$$\begin{array}{r} 38 \\ 5 \overline{)19D} \end{array}$$

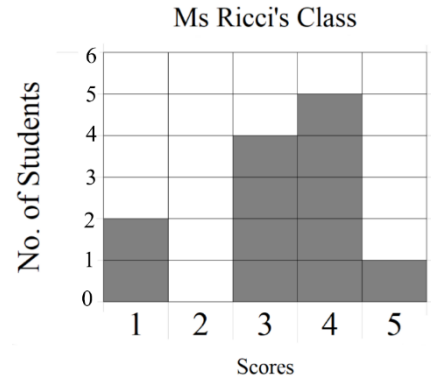
Question #3

[3] In the diagram to the right, a trapezoid is constructed inside a rectangle. Find the area of the trapezoid (it is shaded grey). Show work.



Question #4

[5] Ms Ricci has twelve students in her class and they each wrote a test that was scored out of 5. To the right is a bar graph showing the results for the class. For the scores of all students in her class, determine each of the following:



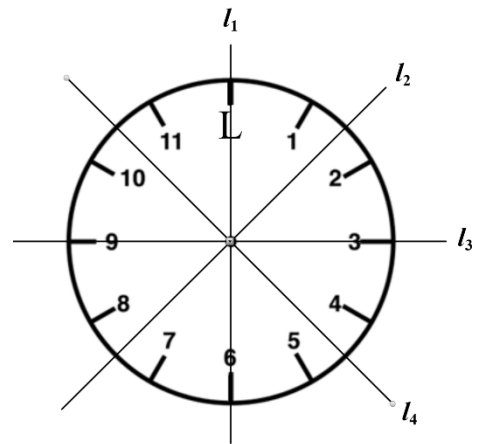
- the mode (answer only).
- the median (show work).
- the mean (show work).

Question #5

[3] Three bags contain jelly beans as follows: Bag #1 contains **36** jelly beans; Bag #2, **32** jelly beans; and Bag #3, **25** jelly beans. Fifty percent of the jelly beans in Bag #1 are yellow, 25% of the jelly beans in Bag #2 are yellow, and 20% of the jelly beans in Bag #3 are yellow. All three bags of jelly beans are dumped into one bowl. What percentage of the jelly beans in the bowl are yellow? Answer to the nearest percent. Show work.

Question #6

[5] To the right is a clock face except that the letter L is in place of the number 12. The lines labelled l_1 , l_2 , l_3 and l_4 meet at the centre of the clock forming eight 45° angles.



Suppose the clock undergoes the following transformation: rotated 90° clockwise about its centre. The two boxes below show the position of letter L and how it appears.

Position: Appearance:

For each of the following transformations, draw two boxes and in one box identify the position of letter L and in the other box show how it appears. **Note: the lines do not move.**

- From its original position, the clock is reflected in line l_3 . Answers only.
- From its original position, the clock is rotated 270° clockwise about its centre and then reflected in line l_1 . Answers only.
- From its original position, the clock is rotated 150° clockwise about its centre, reflected in line l_2 and then rotated 30° counter-clockwise about its centre. Answers only.

Question #7

[2] The following sequence of letters repeats indefinitely:

A B C D E F A B C D E F A B C D E F ...

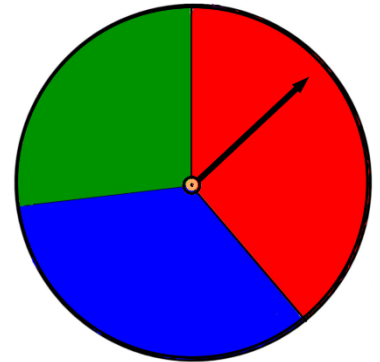
What letter will be in the 100th position? Show work.

Question #8

[3] A floor measures 5m by 4m. It is to be covered by rectangular tiles that measure 80cm by 50cm that are placed with no gaps or overlaps. How many tiles will it take to cover the entire floor? Show work.

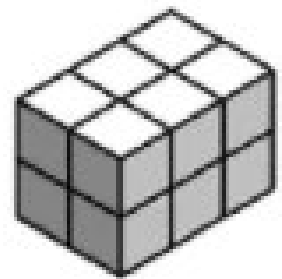
Question #9

[2] Consider the spinner shown to the right. When the arrow is spun, the probability that it will land on red is $\frac{2}{5}$ and the probability that it will land on blue is $\frac{1}{3}$. What is the probability that it will land on green? Show work.



Question #10

[4] Twelve identical cubes each have a surface area of 96 cm². They are joined together to make a rectangular prism that is 2 cubes wide, 3 cubes long and 2 cubes high. Determine the volume of the rectangular prism. Show work.



Question #11

[3] The number N is formed by taking the product of the first eight prime numbers. Is the number N evenly divisible by 1530? Show work.

Question #12

[5] A computer has been programmed to follow these rules:

- A number is inputted into the computer program.
- If the inputted number is odd, it is multiplied by 3 and 1 is added to the result, this new number is then put back into the computer program.

- If the inputted number is even, it is divided by 2, this new number is then put back into the computer program.

Each time, the computer keeps track of all inputted numbers in order.

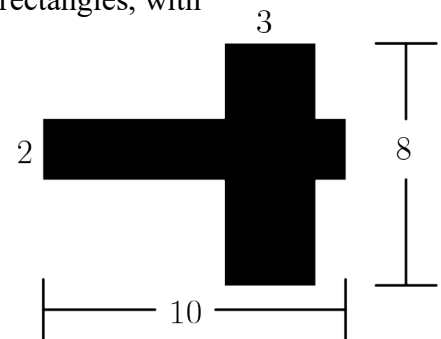
Here is an example. If the inputted number is **9**, the program generates the following sequence: 9, 28, 14, 7, 22, and so on.

- Give the first five numbers in the sequence if the inputted number is **30**. Answer only.
- The number **42** is inputted, what is the 100th number in the sequence of numbers, including 42 as the first number in the sequence. Show work.
- Suppose the third number in a sequence is **25**, what are all possible values for the first number in the sequence? Show work.

Question #13

[4] The black shape drawn to the right consists of two overlapping rectangles, with lengths as indicated.

- Find the perimeter of the black shape. Show work.
- Find the area of the black shape. Show work.



Question #14

[4] There are 20 balls in a jar and they are numbered from 1 to 20. Agnus reaches into the jar, randomly selects a ball, removes it and sets it to one side. Bart then reaches into the jar, randomly selects a ball, removes it and sets it to one side. What is the probability that the sum of the numbers on the two removed balls is an even number? Write your answer as a fraction in lowest terms. Show work.

Question #15

[4] Gianna sets her watch to the correct time at 10:00 am. At the actual time of 11:00 am she notices that her watch reads 10:50 am. Assuming that her watch loses time at a constant rate, what will be the actual time when her watch first reads 4:00 pm? Show work.