

2019 RIPMWC Questions

1. A , B , C and D are 4 numbers such that $A - B = 2017$, $C - B = 2018$ and $C - D = 2019$, find

the value of $\frac{A - D}{(A - C)(B - D)}$.

- A. 2018
- B. -2018
- C. 2019
- D. -2019
- E. None of the above

2. How many numbers which are greater than 200 can be formed by using digits from 2019 at most once?

- A. 26
- B. 28
- C. 30
- D. 32
- E. None of the above

3. A bag contains only yellow, green and red marbles. The ratio of the number of yellow marbles to the number of green marbles is 4:7. The ratio of the number of green marbles to the number of red marbles is 2:3. There are 40 yellow marbles in the bag. Find the total number of green and red marbles in the bag.

- A. 175
- B. 180
- C. 185
- D. 200
- E. None of the above

4. Given that $\frac{2\frac{3}{5} - \frac{7}{3}(8.5 - x)}{1 \div \left(3.05 + 4\frac{9}{20}\right)} = 2$, find the value of x .

- A. $6\frac{1}{4}$
- B. $7\frac{1}{4}$
- C. $8\frac{1}{4}$
- D. $8\frac{1}{2}$
- E. None of the above

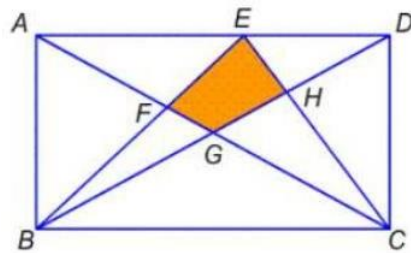
5. Calculate : $\frac{2018^2}{673} - \frac{2017^2}{673} + \frac{2016^2}{673} - \frac{2015^2}{673} + \dots + \frac{2^2}{673} - \frac{1^2}{673}$

- A. 2019
- B. 3027
- C. 3029
- D. 3097
- E. None of the above

6. How many of the first 729 positive integers are perfect squares, cubes or both?

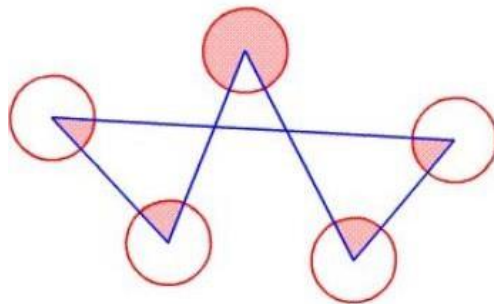
- A. 36
- B. 30
- C. 32
- D. 33
- E. None of the above

7. In the diagram below, $ABCD$ is a rectangle with $BC=7\text{cm}$ and $CD=3\text{cm}$. If the sum of area of triangle ABF and area of triangle CDH is 7 cm^2 . Find the area of quadrilateral $EFGH$ in cm^2



- A. 1.5
- B. 1.75
- C. 2
- D. 2.25
- E. None of the above

8. The diagram shows 5 circles, each with radius 7 cm. By taking $\pi = \frac{22}{7}$, find the total area of the shaded parts.



- A. $230\frac{1}{7}$
- B. 231
- C. $232\frac{2}{7}$
- D. 234
- E. None of the above

9. Two trains are travelling in the same direction along parallel tracks. Train A is 300 metres long and travelling at 75 km/h. Train B is 400 metres in length and 8km ahead of Train A (this distance is measured from the back of Train B to the front of Train A). Twenty minutes later, Train A is 8kmahead of Train B . Assuming that the speed of each train is constant and distance between 2 tracks is very small, find the speed of Train B in km/h.

- A. 20.5
- B. 22.6
- C. 23.5
- D. 24.9
- E. None of the above

10. How many different triangles can be formed by connecting 3 of the 11 points below, where 5 points lie on a line while the other 6 points lie on a different line?



- A. 115
- B. 120
- C. 125
- D. 135
- E. None of the above

11. I $A = 9 + 999 + 99999 + \cdots + \underbrace{999 \cdots 999}_{2017 \text{ "9" }} + \underbrace{999 \cdots 999}_{2019 \text{ "9" }}$, find the sum of the digits of A .

- A. 1006
- B. 1008
- C. 2000
- D. 2002
- E. None of the above

12. Calculate:

$$\left(\frac{1}{31} + \frac{1}{42} + \frac{1}{49} + \frac{1}{51}\right) \times \left(\frac{1}{42} + \frac{1}{49} + \frac{1}{51} + \frac{1}{65}\right) - \left(\frac{1}{31} + \frac{1}{42} + \frac{1}{49} + \frac{1}{51} + \frac{1}{65}\right) \times \left(\frac{1}{42} + \frac{1}{49} + \frac{1}{51}\right)$$

A. $\frac{1}{2007}$

B. $\frac{1}{2011}$

C. $\frac{1}{2015}$

D. $\frac{1}{2019}$

E. None of the above

13. Numbers 1, 2, 3, ..., 8, 9, 10 are placed in a bag and drawn at random with replacement. How many ways can three numbers be drawn whose sum is 13?

A. 58

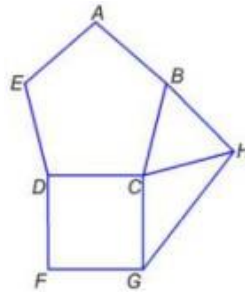
B. 61

C. 63

D. 66

E. None of the above

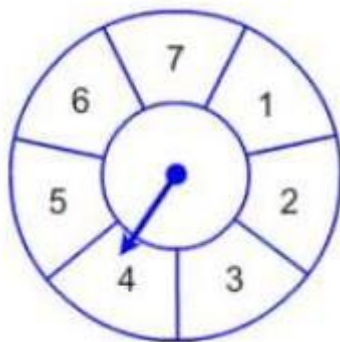
14.



In the above diagram, $ABCDE$ is a regular pentagon (all its sides are equal and all its angles are equal). $CDFG$ is a square and $\triangle BCH$ is equilateral. Find angle CGH .

- A. 33°
- B. 35°
- C. 39°
- D. 40°
- E. None of the above

15. Dave is playing a game called Mod Seven. At the beginning of the game, the arrow points to one of the 7 numbers. On each turn, the arrow is rotated clockwise by the number of spaces indicated by the arrow at the beginning of the turn. For example, if Mod Seven starts with arrow pointing at 4, then on the first turn, the arrow is rotated clockwise 4 spaces so that it now points at 1. The arrow will then move 1 space on the next turn, and so on. If the arrow points at 6 after 2019^{th} turn, at which number did the arrow point after the first turn?



- A. 6
- B. 3
- C. 2
- D. 5
- E. None of the above

16. Mr. Chan has a certain number of pencils to give to pupils in the 3 classes he teaches, X, Y and Z.

If all the pencils are distributed to classes X, Y and Z, each pupil will get 42 pencils.

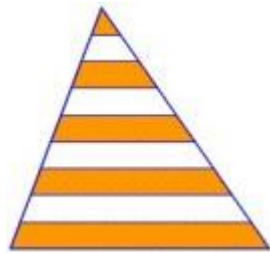
If all the pencils are distributed to classes X only, each pupil will get 105 pencils.

If all the pencils are distributed to classes Y only, each pupil will get 98 pencils.

If all the pencils are distributed to classes Z only, how many pencils will each get?

- A. 225
- B. 235
- C. 245
- D. 255
- E. None of the above

17.



The triangle above is divided into nine stripes of equal width and each strip is parallel to the base of the triangle. If the total area of the unshaded strips is 88 cm^2 , find the total area of the shaded strips in cm^2 .

- A. 100
- B. 105
- C. 108
- D. 110
- E. None of the above

18. A is the largest integer such that $14A$ has exactly 2019 digits. Counting from right to left, what is the 100^{th} digit of A ?

- A. 7
- B. 4
- C. 2
- D. 5
- E. None of the above

19. John writes a number with 729 digits on the blackboard, each digit is either 1 or 2. Esther creates a new number with $2187 (=3 \times 729)$ digits by replacing each 1 with 112 and each 2 with 111. For example, if John's number begins with 2112, then Esther's number would begin with 11112112111. After Esther finishes writing her number, she notices her leftmost 729 digits in her number and John's number are the same. How many times do five 1s occur consecutively in John's number?

- A. 60
- B. 62
- C. 64
- D. 65
- E. None of the above

20. Find the value $\frac{1}{7} + \frac{1}{7^2} + \frac{2}{7^3} + \frac{3}{7^4} + \frac{5}{7^5} + \frac{8}{7^6} + \frac{13}{7^7} + \dots$, where the numerator of each fraction comes from the Fibonacci sequence 1, 1, 2, 3, 5, 8, 13, 21, ... (the first 2 terms are both 1 and from the 3rd term onwards, it is the sum of the 2 terms just before it)

- A. $\frac{6}{49}$
- B. $\frac{9}{49}$
- C. $\frac{11}{43}$
- D. $\frac{7}{41}$
- E. None of the above