

WMC 2018 Upper Primary Solutions

Section A

1. **D** $0,8 - 0,07 = 0,01(80 - 7) = 0,01 \times 73 = 0,73$
2. **C** $13\,000\,000 + 13\,000 = 13\,013\,000$
3. **A** $9 \times \frac{3}{5} = \frac{27}{5} = 5,4$ which is closet to the integer 5
4. **E** 287 is not divisible by any even number since it is odd, so it is not divisible by 4 and 6. The last digit of 287 is not 0 or 5 so it is not divisible by 5. The sum of the digits is $2 + 8 + 7 = 17$ which is not a multiple of 3 and so 287 is not divisible by 3. Lastly $287 = 41 \times 7$ meaning 287 is divisible by 7.
5. **C** $\frac{4}{7} + \frac{5}{9} = \frac{9 \times 4}{7 \times 9} + \frac{7 \times 5}{7 \times 9} = \frac{36}{63} + \frac{35}{63} = \frac{36+35}{63} = \frac{71}{63}$.
6. **D** Taking the 4 to the other side gives that $6x = 46 - 4$ and so $6x = 42$ then dividing by 6 gives $\frac{6x}{6} = \frac{42}{6}$, so $x = \frac{42}{6} = 7$
7. **D** $x + 70^\circ = 90^\circ$ and so $x = 90 - 70 = 20$ (degrees).
8. **B** Each coin has a $\frac{1}{2}$ chance of landing on heads. Then the probability of coins landing on heads is $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. Alternatively, the possible outcomes are HH,HT,TH,TT and only one out of the four outcomes is two heads.
9. **E** The length in metres of each step is $\frac{500}{625} = \frac{4}{5}$ and so in 10000 steps, the distance she covers in metres is $10000 \times \frac{4}{5} = 8000$ m = 8 km.
10. **E** $8362 \div 12 = 696$ remainder 10.

Section B

11. **5** Luke has already won $\frac{95}{100} \times 20 = 19$ of his games. Let x be the number of games he must win in a row to reach a 96% win percentage. This translates to the equation $\frac{19+x}{20+x} = 0,96$ and so $19+x = 19,2+0,96x \implies 0,04x = 0,2 \implies x = 5$ (games).
12. **43** Bob solved $\frac{70}{100} \times 30 = 21$ of the algebra problems. He obtained 80% overall so he solved $\frac{80}{100} \times 80 = 64$ questions in total meaning he solved $64 - 21 = 43$ geometry questions.
13. **3** c cannot be 1 since otherwise the RHS is not a three digit number. Now if $c = 2$ then in order for the RHS to be three digit number it must be that $ab \geq 50$. In fact, Since the middle digit of def cannot be 0, we have that $ab \geq 55$. Now trying ab to be 56, 61, 63, 64 and 65 shows that c cannot be 2. Then suppose $c = 3$. Then b can only be 2 or 4 giving f is 6 and 2 respectively. Also d must be 1. Trial and error then gives $54 \times 3 = 162$ and so $c = 3$.

14. **10** $CAR - CAT = 12 - 8 = 4 = R - T$. Then $BAT + (R - T) = 6 + 4 = 10 = BAR$.
15. **22** Area = $\frac{1}{2}$ base \times height = $\frac{1}{2} \times 11 \times 4 = 22$.
16. **8** Consider any positive integer whose last digit is 9. Taking powers and observing only the last digit gives the pattern 9, 1, 9, 1, ... That is the units digit is 9 if the power is odd and 1 if the power is even. Then since both 19 and 99 are odd, the units digit will be the units digit of $9 + 9 = 18$ which is 8.
17. **2880** In July, her salary was $\frac{120}{100} \times 2000 = R2400$. In August, her salary was $\frac{120}{100} \times 2400 = R2880$.
18. **420** The least common multiple of 2, 3, 4, 5, 6, 7 is $7 \times 6 \times 5 \times 2 = 420$.
19. **3030** The divisors of 2018 are 1, 2, 1009, 2018. Thus the sum of its divisors is 3030.
20. **6** The sum of the first four number is $4 \times 5 = 20$, the sum of the last 4 numbers is $4 \times 8 = 32$, and the sum of all the numbers is $7 \times 6\frac{4}{7} = 46$. So the common number in both sets is $20 + 32 - 46 = 6$.

Section C

Question 21

We can first take two sets of three coins each and put them on the scale. If they weigh the same, we know that the fake coin is one of the remaining coins, and on the second use of the scale, we can put the two coins on either side and see which one is lighter and is the fake coin. Now if the two sets of three coins do not weigh the same, we know that the fake coin must be in the lighter set. Then in the second use of the scale, we can put any two of those three coins. If they weigh the same, the other coin must be the fake coin, otherwise the lighter coin is the fake coin.

Question 22

The polygon can be uniquely formed as shown in the diagram. The area is then equal to $80 \times 100 - (10 \times 80 + 50 \times 40) = 5200$

