

WMC 2019 Middle Primary Final Round Solutions

Section A

1. **21**

This can be done by long division.

2. **420**

In the numerator $1 \times 2 \times \cdots \times 19$ cancels out and we have $20 \times 21 = 420$ remaining.

3. **40m**

The width of the rectangle is $91 \div 13 = 7$. So the perimeter of the rectangle is $2 \times (7 + 13) = 2 \times 20 = 40$.

4. **20 bicycles and 40 tricycles**

Let a and b be the number of bicycles and tricycles in the store respectively. Since there is a total of 60 vehicles we have that $a + b = 60 \iff b = 60 - a$. The number of wheels is $2a + 3b$ since each of the a bicycles have two wheels and the b tricycles each have 3 wheels. This gives that $2a + 3b = 140$. Now since $b = 60 - a$ we have that $2a + 3(60 - a) = 140 \implies a = 40$. Then $b = 60 - 40 = 20$.

5. **6**

The pages that were removed are 25, 26, 27, 28, 29, 30 so 6 pages were removed.

6. **R270**

A 20 percent increase would mean the book costs $\frac{120}{100} \times 300 = R360$. Now if this price decreases by 75 percent it would cost $\frac{75}{100} \times 360 = R270$.

7. **1400**

$10000000 \times 140 = 1400000000mm$. Now to convert from millimetres to kilometres we divide by $10 \times 100 \times 1000 = 1000000$. So the length in kilometres is $1400000000 \div 1000000 = 1400km$

8. **27**

The trick here is to write $999 \times 777 = 1000 \times 777 - 777 = 777000 - 777 = 776223$. So the sum of the digits is $7 + 7 + 6 + 2 + 2 + 3 = 27$.

9. **Saturday**

The Wednesdays must be on the 2nd, the 16th and the 30th. So the 12th will be on a Saturday.

10. **34**

There are 10 two-digit numbers that begin with a 5. There are 9 two-digit numbers that end with a 5. But since we count 55 twice, there are $19 - 1 = 18$ two-digit numbers that contain a 5. Similarly there are 18 two-digit numbers that contain a 6. Now the numbers 56 and 65 contain both, so there are $18 + 18 - 2 = 34$ numbers that contain a 5 or a 6.

Section B

11. Suppose the first die gives the number a and the second die gives the number b . There are $6 \times 6 = 36$ different observations for a and b . Now they add up to 6 when we observe $(1, 5)$, $(2, 4)$, $(3, 3)$, $(4, 2)$ or $(5, 1)$ which makes 5 pairs. So the probability that the numbers add up to 6 is $\frac{5}{36}$.
12. In an hour the eldest sister can paint a third of the wall, the middle sister can paint a quarter of the wall and the youngest sister can paint a sixth of the wall. So together they can paint

$$\frac{1}{3} + \frac{1}{4} + \frac{1}{6} = \frac{4 + 3 + 2}{12} = \frac{9}{12} = \frac{3}{4}$$

of the wall in an hour meaning that they can paint a quarter of the wall in $60 \div 3 = 20$ minutes. So to paint the whole wall they would need $20 \times 4 = 80$ minutes = 1 hour and 20 minutes.