Playing with Numbers: Exercise 16.2

Q.1 If 21y5 is a multiple of 9, where y is a digit, what is the value of y?
Sol: **Given:** 21y5 is a multiple of 9.
Since, according to rule of divisibility of 9, sum of all the digits should be multiple of 9.
So, 2 + 1 + y + 5 = 8 + y
It means that 8 + y is a factor of 9. This will be possible when 8 + y should be 0, 9, 18, 27 ….and so on. But y is a single digit number, so this sum can be only 9.
So, 8 + y = 9
y = 9-8
y = 1
Thus, digit y should be digit 1.

Q.2 If 31z5 is a multiple of 9, where z is a digit, what is the value of z? You will find that there are two answers for the last problem. Why is this so?
Sol: **Given:** 31z5 is a multiple of 9.
Since, according to rule of divisibility of 9, sum of all the digits should be multiple of 9.
So, 3 + 1 + z + 5 = 9 + z
It means that 9 + z multiple of 9. This will be possible when 9 + z should be 0, 9, 18, 27….and so on. But z is a single digit number, so this sum can be 9 or 18.
Thus, digit z should be two possible digits 0 or 9.

Q.3 If 24x is a multiple of 3, where x is a digit, what is the value of x?
(Since 24x is a multiple of 3, its sum of digits 6+x is a multiple of 3; so 6+x is one of these numbers: 0, 3, 6, 9, 12, 15, 18, … . But since x is a digit, it can only be that 6+x = 6 or 9 or 12 or 15. Therefore, x = 0 or 3 or 6 or 9. Thus, x can have any of four different values.)
Sol: **Given:** 24x is a multiple of 3.
Since, according to rule of divisibility of 3, sum of all the digits should be multiple of 9.
So, 2 + 4 + x = 6 + x
It means that 6 + x multiple of 3. This will be possible when 6 + x should be 0, 3, 6, 9, 12, 15, 18….and so on. But x is a single digit number, so this sum can be 6 or 9 or 12 or 15.
Thus, digit x should be four possible digit 0 or 3 or 6 or 9.

Q.4 If 31z5 is a multiple of 3, where z is a digit, what might be the values of z?
Sol: **Given:** 31z5 is a multiple of 3.
Since, according to rule of divisibility of 3, sum of all the digits should be multiple of 9.
So, 3 + 1 + z + 5 = 9 + z
It means that 9 + z multiple of 3. This will be possible when 9 + z should be 0, 3, 6, 9, 12, 15, 18….and so on. But z is a single digit number, so this sum can be 9 or 12 or 15 or 18.
Thus, digit z should be four possible digit 0, 3, 6 or 9.