EXERCISES (SOLUTIONS): DIVISIBILITY

1. Yes; for example 5 is a divisor of 35. No; the divisors of a prime number are two: 1 and itself.
2. A number divisible by 3 and by 7 is divisible by 21 because 3 and 7 are co-prime numbers; for example, 21, 42, etc. Nevertheless, a number divisible by 3 and by 9 can be a number which is not divisible by 27; for example, 9, 18, etc. The greatest multiple of 7 with two digits is 98. The smallest multiple of 9 with two digits is 108.
3. 405, 420, 435, 450, 465, 480 and 495.
4. For example, 13 and 19 (prime numbers). For example, 25 and 36 (prime numbers raised to the square. For example, 15 and 35 (product of two prime numbers).
5. L.C.M.(200,150,132)=6600 and, for example, 6600*2=13200.
6. a) 1480; b) 1482 or 1488; c) 1485
7. We can build and carry out the Eratosthens sieve to find the prime numbers lower than or equal to 64. Once we have found those numbers, we can check if one of them divides 4007. It is enough to do for prime numbers until 64 which is approximately the square root of 4007 (64x64=4096).
8. – prime numbers (except for 2) are odd numbers, so if we add two of them the result is an even number which is not prime.
   - (2n+1)+(2n+3)=4n+4=4(n+1) -> multiple of 4
   - n+(n+1)+(n+2)=3n+3=3(n+3) -> multiple of 3
9. 2520
10. For example, 13 and 25.
11. For example, 30800, 61600 and 15400.
12.
    - 14: 4 divisors: 1,2,7,14.
    - 28: 6 divisors: 1,2,4,7,14,28.
    - 56: 8 divisors: 1,2,4,7,8,14,28,56.
    - 98: 6 divisors: 1,2,7,17,49,98.
    - 108: 12 divisors: 1,2,3,4,6,9,12,18,36,27,54,108.
    - 252: 18 divisors: 1,2,3,4,6,7,9,12,14,18,21,28,36,42,63,84,126,252.
    - 1080: 32 divisors: 1,2,3,4,5,6,8,9,10,12,15,18,20,24,27,30,36,40,45,54,60,72,90,108,120,135,180, 216,270,360,540,1080.
    - 3465: 24 divisors: 1,3,5,7,9,11,15,21,33,35,45,55,63,77,99,105,165,231,315,385,495,693, 1155,3465.
13. 2 and 20. Or 4 and 10.
14. 15 and 390. Or 30 and 195.
15. L.C.M.(40,60)=120 and G.C.D.(40,60)=20. We can solving it by definition or by decomposing the numbers in prime factors. The G.C.D. can be also computed by means of the Euclides' algorithm.
16. Divisors of 156: 1,2,3,4,6,12,13,26,39,52,78 and 156.
17. They will meet again at 7 o'clock. They will have done 8 trips in total.
18. 29 trees.
19. 10 pipes.
20. 6 glasses and 5 mugs. 12 glasses and 10 mugs.
21. 12 children in each hut.

22. 240 floor tiles.
23. 10 boxes of green floor tiles and 7 boxes of blue floor tiles.
24. 5 boxes of tomatoes and 7 boxes of peppers with 25 cans in each box.
25. The height of the stakes is 1750 mm, that is, 1.75 metres height. 85 boards in total.
26. Square with a side of 30 cm.
27. 15 squares with a side of 4 cm.
28. Either 2519 people or 5039 people.
29. They can be 720 or 780 eggs.
30. 29 boxes, with 20 units per box.
31. Four possibilities: 21 black and 630 milk. Or 42 and 315. Or 63 and 210. Or 105 and 126.
32. 73 bunches with 10 flowers per bunch.
33. 4 pencil boxes and 3 marker boxes.
34. 6 napkins.
35. They can have a side measure of 1 dm, 3 dm, 5 dm or 15 dm.
36. It can be a height of 120 mm, 240 mm, 360 mm, ...