20

sequence and series

2015A

7. **Answer (B):** The difference between consecutive terms is 3, and the difference between the first and last terms is $73 - 13 = 60 = 20 \cdot 3$. Therefore the number of terms is $20 + 1 = 21$.

Note: The kth term in the sequence is $3k + 10$.

2000

6. **Answer (C):** The sequence of units digits is

$$1, 1, 2, 3, 5, 8, 3, 1, 4, 5, 9, 4, 3, 7, 0, 7, 7, 4, 1, 5, 6, \ldots$$

The digit 6 is the last of the ten digits to appear.

2003B

8. (B) Let the sequence be denoted $a, ar, ar^2, ar^3, \ldots$, with $ar = 2$ and $ar^3 = 6$. Then $r^2 = 3$ and $r = \sqrt{3}$ or $r = -\sqrt{3}$. Therefore $a = \frac{2\sqrt{3}}{3}$ or $a = -\frac{2\sqrt{3}}{3}$.

2010A

8. **Answer (D):** Tony worked for $2 \cdot 50 = 100$ hours. His average earnings per hour during this period is $\frac{\$630}{100} = \$6.30$. Hence his average age during this period was $\frac{\$6.30}{\$0.50} = 12.6$, and so at the end of the six month period he was 13.

2009A

9. **Answer (B):** Let the ratio be r. Then $ar^2 = 2009 = 41 \cdot 7^2$. Because r must be an integer greater than 1, the only possible value of r is 7, and $a = 41$.

2016A

2004B

10. **(D)** If there are n rows in the display, the bottom row contains $2n - 1$ cans. The total number of cans is therefore the sum of the arithmetic series

$$1 + 3 + 5 + \cdots + (2n - 1),$$

which is

$$\frac{n}{2}[(2n - 1) + 1] = n^2.$$

Thus $n^2 = 100$, so $n = 10$.