Number Theory

1	**3**	44	2	**M1** 97 or 53 seen
2	**2**	$\sqrt{3}+\sqrt{6}$, π	**2**	–1 for each error or omission
3	**2**	**(a)** 211 cao **(b)** 216 cao	**1** **1**	
4	**11**	11, 13, 17, 19, 23	**3**	**B2** 3 or 4 correct or **B1** 2 correct If **B0** then **M1** for $x > 10.5$ and **M1** for $x < 26.5$ or **M1** for 10.5 and 26.5 seen
5	**11 (a)**	77	**2**	**M1** for 11,13,17,19 clearly identified, ignore numbers less than 8 with no other numbers greater than or equal to 8 besides possibly an extra 17
	(b)	either 18 or 19 or both	**2FT**	**M1** for 11,13,17 clearly identified, ignore numbers less than 8 with no other numbers greater than or equal to 8 besides possibly an extra 17 or for *their* (a) − 58
6	**5 (a)**	9 and 16	**1**	
	(b)	11	**1**	
7	**1**	17	**1**	
8	**5 (a)**	12, 15	**1**	
	(b)	11, 13	**1**	
9	**15 (a)**	$2 \times 3 \times 3 \times 5$	**2**	**B1** for 2, 3, [3] and 5 identified as only prime factors or **M1** for partial prime factorisation $6 \times 3 \times 5$ or $2 \times 9 \times 5$ or $3 \times 3 \times 10$ or $2 \times 3 \times 15$
	(b)	630	**2**	**M1** for $2 \times 3^2 \times 5 \times 7$ oe or for listing multiples of 90 and 105 at least up to 630
10	**17 (a)**	$2 \times 3 \times 5$	**2**	**B1** for 2, 3, 5 as prime factors
	(b)	90	**2**	**B1** for $90k$ or for listing multiples of each up to 90 or $2 \times 3^2 \times 5$

11	**7**	18	**2**	**M1** for $36 = 2 \times 2 \times 3 \times 3$ soi or $90 = 2 \times 3 \times 3 \times 5$ soi or listing the correct factors of 36 and 90 showing a minimum of 2, 3, 6, 9 and 18
12	**2**	96	**2**	**B1** for $96k$ or $2^5 \times 3$ or for listing multiples of each up to 96
13	**13 (a)**	$2^5 \times 3^2 \times 7$ oe final answer	**3**	**B2** for product of two of 2^5, 3^2, 7 or **B1** for 2, 3 and 7 seen or **M1** for 2×1008 or 3×672 or 7×288 soi
	(b)	2.016×10^3	**1**	
14	**6**	144	**2**	**M1** for finding a correct product of prime factors or correctly listing a minimum of 3 multiples of 36 **and** 48 or for answer $2^4 \times 3^2$ oe or $144k$
15	**10**	14	**2**	**M1** for $56 = 2 \times 2 \times 2 \times 7$ soi or $70 = 2 \times 5 \times 7$ soi or 2×7 as final answer
16	2	$7 - (5 - 3) + 4$	**1**	