Question	Answer	Mark	Comments
1	720	B2	B1 at least 3 multiples of 120 (> 120) and at least 3 multiples of 144 (> 144) eg 240 360 480 and 288 432 576 or (120 =) $2 \times 2 \times 2 \times 3 \times 5$ or (144 =) $2 \times 2 \times 2 \times 2 \times 3 \times 3$ or (Answer =) $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$ or (Answer =) $2^4 \times 3^2 \times 5$ or (Answer =) any multiple of 720 (> 720) eg 1440 or 17280

Additional Guidance	
Prime factor responses for B1 may be in index form eg (120 =) $3 \times 5 \times 2^3$	B1
Prime factor responses for B1 may be seen on a factor tree or a Venn diagram or in repeated division eg1 2 2 2 3 5 on a factor tree for 120 eg2 2 2 2 2 3 3 inside one circle on a Venn diagram	B1 B1
For B1 allow some incorrect multiples if 3 correct of each eg1 240 380 480 720 900 (3 correct) and 288 432 576 868 (3 correct) eg2 Answer 1440 but some incorrect multiples seen	B1 B1
Any multiple of 720 (> 720) given in unsimplified form eg1 $2^7 \times 3^3 \times 5$ eg2 $2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 3 \times 3$	B1 B1
B1 can still be awarded even if subsequently works out HCF	
Answer 720 with some incorrect multiples seen	B2
For products of prime factors, ignore inclusion of $\times 1$	

Question	Answer	Mark	Comments
2	200 written as a product of factors where at least one factor is prime	M1	eg 2 and 100 or 2×10^2 or $200 \div 5 = 40$ may be on a factor tree or repeated division allow one strand to be incorrect if a previous value completes the product eg 10×20 followed by $5 \times 2 \times 5 \times 6$ implies $5 \times 2 \times 20$ for M1
	2 and 2 and 2 and 5 and 5	A1	may be on a factor tree or repeated division
	$2^3 \times 5^2$ or $5^2 \times 2^3$	A1	
	Additional Guidance		
	Allow any number of 1s included as factors up to M1A1 only		
	M1 may be awarded for correct work with no or incorrect answer, even if this is seen among multiple attempts		
	$1 \times 2^3 \times 5^2$		M1A1A0
	$2^3.5^2$ or $2^3 \cdot 5^2$ or $2^3 5^2$ or $2^3,5^2$		M1A1A1
	$2 + 2 + 2 + 5 + 5$		M1A1A0
	$2^3 + 5^2$		M1A1A0
	$2 \times 2 \times 2 \times 5 \times 5$ and $2^3 \times 5^2$ on answer line but $2 \times 2 \times 2 \times 5 \times 5 = 2^3 \times 5^2$ on answer line		M1A1A0 M1M1A1
	$2^3 \times 5^2 = 10^5$		M1A1A0
	$2^3 \times 5^2 = 200$		M1A1A1
	8×25 with no prime factorisation		M0A0A0

Q	Answer	Mark	Comments
3 (a)	x might be a whole number	B1	

Q	Answer	Mark	Comments
4	23 or 29	B1	implied by correct answer
	$\frac{23}{125}$ (× 100) or $\frac{29}{125}$ (× 100) or $\frac{\text{their number}}{125}$ (× 100) or their number = $\frac{125x}{100}$	M1	oe their number can be any integer value
	18.4 or 23.2 or correct evaluation of their number as a percentage of 125	A1ft	ft B0M1 oe their number must be an integer [20, 30] or any prime number

Additional Guidance	
18.4 or 23.2	B1M1A1
18.4 and 23.2	B1M1A1
23 or 29 must be clearly indicated as their prime number	
Any integer [20, 30] used can score B0M1A1ft eg 25 ÷ 125 × 100 with answer 20	B0M1A1ft
Any prime number used can score B0M1A1ft eg 7 ÷ 125 × 100 with answer 5.6	B0M1A1ft
24% of 125 is 30 with answer 24	B0M1A1ft
29% of 125 is 36.25 (36.25 is not an integer)	B1M0A0ft
28% of 125 is 35 with answer 28 (35 is an integer out of range)	B0M1A0ft
28% of 125 is 35 scores M1 (35 is an integer)	
25% of 125 is 31.25 scores M0 (31.25 is not an integer)	

Q	Answer	Mark	Comments
5	125 and 17 or 5^3 and 17 or 5 and 5 and 5 and 17	B2	together in any order eg 125 × 17 or 17 × 5^3 or 5, 5, 5, 17 or 2125 ÷ 17 = 125 or 2125 ÷ 125 = 17 B1 at least three of 8, 27, 64, 125, 216, 343, 512, 729, 1000, 1331, 1728, 2197 etc (allow 2^3, 3^3, 4^3 etc) or all four of 11, 13, 17, 19 (ignore any numbers not between 10 and 20) or (cube number > 1) × (prime number between 10 and 20) or 2125 ÷ (cube number > 1) or 2125 ÷ (prime number between 10 and 20)

Additional Guidance	
B1 may be awarded for correct work with no, or incorrect answer, even if this is seen amongst multiple attempts	
B2 responses may be seen on a factor tree	
B1 for three cube numbers given in index form – evaluations can be ignored eg 4^3 5^3 6^3 scores B1 with no evaluations or with incorrect evaluations	
B1 for multiplications or divisions – evaluation can be ignored eg1 2^3 × 13 scores B1 with no evaluation or evaluated incorrectly eg2 2125 ÷ 27 scores B1 with no evaluation or evaluated incorrectly eg3 2125 ÷ 11 scores B1 with no evaluation or evaluated incorrectly	
125 and 17 seen in multiple attempts is B2 if 2125 included eg 125 × 17 = 2125 or 2125 ÷ 17 = 125 or 2125 ÷ 125 = 17 seen amongst multiple attempts	B2
125 and 17 seen in multiple attempts is B1 if 2125 not included eg 125 × 17 seen amongst multiple attempts	B1
11 13 15 17 19 does not score B1 unless 11 13 17 19 selected	
Incomplete list eg 11 13 19 does not score B1	

Q	Answer	Mark	Comments
6(a)	$2^3 \times 3 \times a^2$ or $24a^2$ $(= 4056)$ or $(a^2 =) \frac{4056}{2^3 \times 3}$ or $(a^2 =) 169$ or $\sqrt{169}$	M1	oe eg $8 \times 3 \times a^2$
	13	A1	
	Additional Guidance		
	Condone $a^2 \times 24$ for M1		
	Fully correct prime factor decomposition with values 2, 2, 2, 3, 13, 13 shown without 13 chosen as the final answer		M1A0
	Embedded answer $2^3 \times 3 \times 13^2$		M1A0
	± 13 or -13		M1A0
	$4056 \div 2^3 \times 3$ unless recovered to 169		M0A0

Q	Answer	Mark	Comments
6(b)	$2^4 \times 3^2 \times a^3$ or $144a^3$ or $2^4 \times 3^2 \times$ (their 13)^3 or $13 \times 4056 \times 2 \times 3$ or 52728×6 or 24336×13	M1	oe eg $144 \times$ (their 13)^3 $16 \times 9 \times 2197$
	316 368	A1ft	ft their 13, which must be an integer > 13
	Additional Guidance		
	eg 14 on answer line in part (a) can follow through to $144 \times 14^3 =$ 395 136		M1A1ft

Q	Answer	Mark	Comments
7	All conditions met: • first number is prime • second number is prime • correctly evaluated • even answer • answer in range	B3	if their product is incorrectly evaluated or missing, then 'even answer' and 'answer in range' refer to the correct product for their multiplication B2 4 conditions met B1 3 conditions met
	Additional Guidance		
	$2 \times 29 = 58$ (or $29 \times 2 = 58$) is the only fully correct solution		B3
	Allow 50 to 60 inclusive for 'answer in range'		
	Award the best mark from boxes or in working for up to B2		
	The two prime numbers do not have to be different		

Q	Answer	Mark	Comments
8	At least two of 2^3, 3^2, 7 selected eg $2^3 \times 3^2 \times 7$ or 2 2 2 3 3 7 7 or $2^2 + 3^2 + 7$ or $2^3 \times 3^2$ or $2^3 + 7$ or $3^2 . 7$	M1	allow 2^3 to be $2 \times 2 \times 2$ or 8 allow 3^2 to be 3×3 or 9 allow 7 to be 7^1 selection is implied by inclusion in intersection of overlapping circles M0 inclusion of 5 in selection
	504	A1	
	Additional Guidance		
	$8 \times 9 \times 7$		M1
	8, 9, 49		M1
	$4 + 9 + 7$		M1
	Intersecting circles with eg only 9 and 7 in the intersection		M1
	Allow inclusion of 1 for up to M1 eg $1 \times 2^3 \times 3^2 \times 7$		M1
	$2^3 \times 3^2 \times 5 \times 7$		M0
	Answer 504		M1A1
	M1 seen with answer the LCM		M1A0

Q	Answer	Mark	Comments
9(a)	80	B3	B2 $(200 =) 2^3 \times 5^2$ or $2^4 \times 5$ oe or 16×5 or $200 \times 2 \div 5$ B1 $a = 2$ and $b = 5$ or 2, 2, 2, 5, 5 seen on a factor tree or 25 or 8
	Additional Guidance		
	For B1, 25 or 8 must be chosen from any lists of square or cube numbers		
	$2 \times 2 \times 2 \times 5 \times 5$		B2
	$5^3 \times 2^2$		B0

Q	Answer	Mark	Comments
9(b)	$e = c^2d$	B1	