1	125	B1	

2	$(27 =) 3^3$	M1	
	$((3^2)^7 =) 3^{2\times7}$ or $((3^2)^7 =) 3^{14}$	M1	
	3^{17}	A1ft	ft 3^a and 3^b then answer 3^{a+b} with M1M0 or M0M1 scored
	Additional Guidance		
	Answer 3^{17} with no incorrect working		M1M1A1
	3^{17} in working with 17 on the answer line or both 3^{17} and 17 on the answer line		M1M1A1
	$3^3 \times 3^9 = 3^{12}$		M1M0A1ft
	Evaluation of powers of 3 as values only		M0M0A0
	Answer 17 with no valid working		M0M0A0

3	8	B1	
	$\frac{1}{0.4}$ or $\frac{10}{4}$ or 2.5 or $\frac{1}{\frac{2}{5}}$ or $\frac{5}{2}$ or $2\frac{1}{2}$	M1	8×0.4 or 3.2 implies B1M1 16 : 5 or equivalent ratio implies B1M1
	3.2 : 1 or $\frac{16}{5}$: 1 or $3\frac{1}{5}$: 1	A1ft	ft B0M1
	Additional Guidance		
	$8^3 = 512$ or $8 \times 8 \times 8 = 512$ alone is not sufficient for B1		
	ft answers must have n exact or correctly rounded to at least 2 sf eg $\sqrt{512} = 22.62$ (incorrect and truncated) 2.5 9.05 : 1		B0 M1 A1ft
	ft answer exact surd value eg $\sqrt{512} = 16\sqrt{2}$ 2.5 9.05 : 1 or $\frac{32}{5}\sqrt{2}$: 1		B0 M1 A1ft

Q	Answer	Mark	Comments
4	256	B1	

Q	Answer	Mark	Comments
5(a)	243	B2	B1 3^{12-7} or 3^5 oe single index or $3 \times 3 \times 3 \times 3 \times 3$ oe multiplication string or 531 441 seen as 3^{12} or as a numerator or 2187 seen as 3^7 or as a denominator or 3^n correctly evaluated, where n is an integer $\geqslant 4$
	Additional Guidance		
	Condone 3^5 and 243 on the answer line, in either order		B2
	3^5 only on the answer line		B1
	Do not allow a misread		
	12 – 7 is insufficient for B1 unless 3^{12-7} or 3^5 is also seen		
	Do not award B1 for a correct evaluation of 3^n not ascribed to a particular value of n eg a list 3, 9, 27, 81 … does not score the mark unless 81 is identified as 3^4		

Q	Answer	Mark	Comments
5(b)	2^{13}	B2	B1 2^{3+6+4} or $(8=)\ 2\times2\times2$ or 2^3 or $(2^6\times2^4=)\ 2^{6+4}$ or $(2^6\times2^4=)\ 2^{10}$ or $2^9\ (\times2^4)$ or $2^7\ (\times2^6)$ or 8192

Additional Guidance	
8192 and 2^{13} on answer line, in either order	B2
8192 only on the answer line	B1
Correctly combined powers can be implied eg $8=2^4$ with answer 2^{14} implies $2^6\times2^4=2^{10}$	B1
Evaluations other than 8192 do not score eg 8×1024 without seeing 8×2^{10} eg $8\times64\times16$	B0 B0
Do not award B1 for 8192 if it is in a list of powers of 2 unless it is indicated or it is the highest power evaluated	
Changing terms to numbers with a base of 8 scores zero unless converted to a number with a base of 2	

Q	Answer	Mark	Comments
6(a)	3200	B1	

Q	Answer	Mark	Comments
6(b)	12	B1	

Q	Answer	Mark	Comments
7 (a)	64 or +64	B1	

Q	Answer	Mark	Comments
7 (b)	1000	B1	

Q	Answer	Mark	Comments
8	**Alternative method 1 – evaluation and division**		
	$(5^2 =)$ 25 or $(3 \times 5^2 =)$ 75 or 600 ÷ 3 or 200 or 600 ÷ 5^2 or 24	M1	oe oe eg $3 \times 200 = 600$ oe eg $25 \times 24 = 600$
	600 ÷ 3 ÷ 5^2 or 8	M1dep	oe eg $8 \times 75 = 600$
	3 with M1 awarded and not from incorrect working	A1	
	Alternative method 2 – product of prime factors		
	600 written as a product of factors where at least one factor is prime	M1	eg 2 and 300 or 5 and 120 or 2 and 2 and 150 may be seen on a factor tree or in repeated division allow one strand to be incorrect if a previous value completes the product eg 20 × 30 followed by 2 × 10 × 5 × 8 implies 2 × 10 × 30 for M1
	2 and 2 and 2 and 3 and 5 and 5	M1dep	may be seen on a factor tree or in repeated division
	3 with M1 awarded and not from incorrect working	A1	
	Additional Guidance		
	$8 \times 3 \times 25 = 600$ and answer 3		M1M1A1
	2^3 on answer line with M2 awarded		M1M1A0
	Answer 3 on answer line with no working		M0M0A0
	Do not allow 600 ÷ 3 × 5^2 for M2 in alt 1 unless recovered, but do allow $\frac{600}{3\times5^2}$ or 600 ÷ (3×5^2)		

Q	Answer	Mark	Comments
9	25	B1	

Q	Answer	Mark	Comments
10(a)	Correct evaluation of the cube root of an integer [40, 50] or correct evaluation of the cube of a decimal or fraction (3, 3.5]	M1	eg $\sqrt[3]{40} = 3.4$ or $40 \rightarrow 3.4$ eg $3.5^3 = 42.8$ or $3.5 \rightarrow 42.8$
	42	A1	SC1 answer given as $\sqrt[3]{42}$
	Additional Guidance		
	Up to M1 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts		
	Condone eg $40 = 3.4$ or $\sqrt{40} = 3.4$ to mean $\sqrt[3]{40} = 3.4$		
	Answer only 42		M1A1
	Must select 42 as final answer for M1A1 ie 42 as the last in a list with a blank answer line is not enough for A1 unless 42 selected		
	If $\sqrt[3]{42}$ or 3.5^3 is evaluated then it must be correct to award the A1 for 42		
	NB 42 only from incorrect method eg listing multiples of 3 or $42 \div 3$ seen or 42 is divisible by 3 as the working		M0A0

Acceptable values for cube roots of integers in range

40	3.4(19…) or 3.42(0)
41	3.4(48…) or 3.45
42	3.4(76…) or 3.48 or 3.5
43	3.5(03…)
44	3.5(30…)
45	3.5(56…) or 3.557 or 3.56 or 3.6
46	3.5(83…) or 3.6
47	3.6(08…) or 3.609 or 3.61
48	3.6(34…)
49	3.6(59…) or 3.66 or 3.7
50	3.6(84…) or 3.7

Examples of cubes of numbers in range with their acceptable values

3.1	29(.791) or 29.8 or 30
3.2	32(.768) or 32.77 or 32.8 or 33
3.3	35(.937) or 35.94 or 36
3.4	39(.304)
3.5 or $3.4\dot{9}$	42(.875) or 42.88 or 42.9 or 43

Q	Answer	Mark	Comments
10(b)	Valid response that indicates there is one (negative) answer missing	B1	eg –10 (is also an answer) or there is a negative value as well or square roots have two answers or answer is 10 and –10
	Additional Guidance		
	–10 × –10 (= 100)		B1
	Another number can square to make 100 (implies exactly two)		B1
	She has forgotten the other value (implies exactly two)		B1
	There is another value it could be (implies exactly two)		B1
	It could be a different number (implies exactly two)		B1
	It could be negative (bod means 10 could be –10)		B1
	-10^2 (= 100) (condone missing brackets around –10)		B1
	$\pm \sqrt{100}$		B1
	Indication that there might be **more** than two possible values for x eg There are other possible numbers eg There could be other values eg Other numbers square to make 100 eg She hasn't included negatives		 B0 B0 B0 B0
	Repeating the question eg There is more than 1 possible value eg 10 is not the only possible value eg More than 1 number works		 B0 B0 B0
	A partially correct statement eg x could be negative or decimal eg –10 × –10 = –100 eg $x^2 = -10$		 B0 B0 B0

Q	Answer	Mark	Comments
11(a)	74.0656 or 74.1 or 74.07 or 74.066	B2	B1 61.4656 or 61.5 or 61.47 or 61.466 or $\frac{38\,416}{625}$ or 12.6 or $\frac{63}{5}$ or $\frac{46\,291}{625}$
	Additional Guidance		
	Truncated answer only eg 74 or 74.0 or 74.06 or 74.065		B0
	An incorrect answer cannot imply B1 – a value for B1 must be seen		
	Ignore subsequently incorrect rounding or any truncation once a correct B2 response seen eg 74.0656 seen, answer 74 eg 74.07 seen, answer 74.0		 B2 B2

Q	Answer	Mark	Comments
12 (a)	125 or 216	B1	only one value needed
	Additional Guidance		
	Ignore any values out of range		
	125 and 216 given		B1
	Condone 5 and 125 on answer line		B1
	Condone 6^3 and 216 on answer line		B1
	Condone 5 or 5^3 on answer line with 125 seen in working		B1
	6 or 6^3 on answer line with no correct evaluation seen		B0
	More than one answer including an incorrect answer in range		B0

Q	Answer	Mark	Comments
13(a)	9	B1	

Q	Answer	Mark	Comments
13(b)	12	B1	accept ±12

Q	Answer	Mark	Comments
13(c)	16	B1	

Q	Answer	Mark	Comments
14	368	B2	B1 25 or 343