Q1.　　　(a)　　Simplify $t^4 \times t^6$

....

(1)

　　　(b)　　Simplify $(x^4)^3$

....

(1)
(Total 2 marks)

Q2.　　　(a)　　Simplify $4p \times 5q$

....

(1)

　　　(b)　　Simplify $d \times d \times d \times d$

....

(1)

　　　(c)　　Expand $4(3a - 7)$

....

(2)

(d)   Expand and simplify $2(2n + 3) + 3(n + 1)$

....

(2)

(e)   Simplify $t \times t^2$

....

(1)

(f)   Simplify $m^5 \div m^3$

....

(1)
(Total 8 marks)

Q3.   (a)   Simplify $d + d + d + d + d$

....

(1)

(b)   Simplify $y^2 + y^2$

....

(1)

(c)   Expand $4(3a - 7)$

....

(2)

(d)   Simplify $t \times t^2$

....

(1)

(e)   Simplify $m^5 \div m^3$

....

(1)
(Total 6 marks)

Q4.   (a)   Simplify $t^6 \times t^2$

....
(1)

(b)   Simplify $\dfrac{m^8}{m^3}$

....
(1)

(c)   Simplify $(2x)^3$

....
(2)

(d)   Simplify $3a^2h \times 4a^5h^4$

....
(2)
(Total 6 marks)

Q5.   (a)   Simplify $t^6 \times t^2$

....
(1)

(b)   Simplify $\dfrac{m^8}{m^3}$

....

(1)
(Total 2 marks)

M1.

	Answer	Mark	Additional Guidance
(a)	t^{10}	1	**B1** cao
(b)	x^{12}	1	**B1** cao
			Total for Question: 2 marks

M2.

	Working	Answer	Mark	Additional Guidance
(a)		$20pq$	1	**B1** for $20pq$ oe
(b)		d^4	1	**B1** for d^4 cao
(c)	$4 \times 3a - 4 \times 7$	$12a - 28$	2	**M1** for $4 \times 3a$ or 4×7 or $12a$ or 28 **A1** for $12a - 28$ cao
(d)	$4n + 6 + 3n + 3$	$7n + 9$	2	**M1** for $4n + 6$ or $3n + 3$ **A1** for $7n + 9$
(e)		t^3	1	**B1** for t^3 (accept t^{1+2} oe)
(f)		m^2	1	**B1** for m^2 (accept m^{5-3} oe)
				Total for Question: 8 marks

M3.

	Working	**Answer**	**Mark**	**Additional Guidance**
(a)		$5d$	1	**B1** for $5d$ or $5 \times d$
(b)		$2y^2$	1	**B1** for $2y^2$ or $2 \times y^2$
(c)	$4 \times 3a - 4 \times 7$	$12a - 28$	2	**M1** for $4 \times 3a$ or 4×7 or $12a$ or 28 **A1** for $12a - 28$ cao
(d)		t^3	1	**B1** for t^3 (accept t^{1+2} oe)
(e)		m^2	1	**B1** for m^2 (accept m^{5-3} oe)
				Total for Question: 6 marks

M4.

	Working	**Answer**	**Mark**	**Additional Guidance**
(a)	t^{6+2}	t^8	1	**B1** for t^8 or for t^{6+2}
(b)	m^{8-3}	m^5	1	**B1** for m^5 or for m^{8-3}
(c)	$2^3 \times x^3$	$8x^3$	2	**B2** for $8x^3$ cao (**B1** for ax^3, $a \neq 8$ or $2x \times 2x \times 2x$ or $8x^n$ $n \neq 0,3$)
(d)	$3 \times 4 \times a^{2+5} \times h^{1+4}$	$12a^7h^5$	2	**B2** for $12a^7h^5$ (**B1** for $12a^7h^n$, $n \neq 0$, 5 or $12a^mh^5$, $m \neq 0$, 7 or ka^7h^5, or $3 \times 4 \times a^{2+5} \times h^{1+4}$)
				Total for Question: 6 marks

M5.

	Working	**Answer**	**Mark**	**Additional Guidance**
(a)	t^{6+2}	t^8	1	**B1** for t^8 or for t^{6+2}
(b)	m^{8-3}	m^5	1	**B1** for m^5 or for m^{8-3}
				Total for Question: 2 marks

E1.   Both parts of this question were answered well. Candidates achieved the most success in part (a) where t^{24} was the most common incorrect answer. Common incorrect answers in part (b) were x^7 and $3x^{12}$.

E2.   This question was done well by the majority of the candidates. In part (a), most candidates were able to write down the answer 20pq. Common incorrect answers here were 4p5q, 9pq, 20p^2 and 20q^2. In part (b), the vast majority of candidates were able to write down the answer d^4. A very common incorrect answer here was 4d. In part (c), about half the candidates were able to gain both marks. Common incorrect answers here were 12a – 7, 7a – 28 and 12a – 21. In part (d), about three quarters of the candidates were able to score both marks and many that didn't were able to score a mark for either 4n + 6 or 3n + 3. Common incorrect answers here were (4n + 6) + (3n + 1) = 7n + 7 and (4n + 3) + (3n + 3) = 7n + 6 (each gaining 1 mark); and (4n + 3) + (3n + 1) = 7n + 4 (for 0 marks). A surprising number of candidates multiplied the expressions (4n + 3) × (3n + 3) instead of adding them. Parts (e) and (f) were generally done well. Common incorrect answers here were (t × t^2 =) t^2 and (m^5 ÷ m^3 =) $m^{5/3}$ or m^{15}.

E3.   As might be expected, part (a) was answered with the most success. The most common incorrect answer was d5. By comparison, part (b) was answered poorly. Many candidates gave the answer as y^7, 2 y 4 or 4y. Some, though, did not attempt it. Just over one quarter of candidates managed to expand 4(3a – 7) correctly in part (c). Some only multiplied one term inside the bracket by 4, most often resulting in 12a – 7. These candidates gained 1 mark as did the many who showed either 4 × 3a or 4 × 7. There were some who, having got 12a – 28, then decided that this answer could be simplified. More than half of the candidates got either part (d) or part (e) correct but fewer than expected got both parts correct. A common incorrect answer in (d) was t2. This could have arisen because candidates did not understand that t meant t1 or because they did know this but multiplied the indices. Other common incorrect answers

were 2t^2 and 3t. In (e) common incorrect answers were m^8 and $m^{\frac{5}{3}}$.

E4.   **Specification A**

Candidates were equally successful in part (a) and (b) with the vast majority giving the correct answer in each part. In part (c) the most common error was to cube only one part of the product leading to either $8x$ or $2x^3$ Some candidates wrote out $2x \times 2x \times 2x$ and thus gained a mark but went on to simplify incorrectly. Confusion adding rather multiplying to cube 2 led to $6x^3$ In part (d) many candidates confused the operation of the numbers and indices, leading to answers including $7a^7h^5$ from $3 \times 4 = 12$ and 12a10h4 from $2 \times 5 = 10$ and $4 \times 1 = 4$. Some candidates included + signs between their terms, for example $12a^7 + h^4$.

Specification B

Parts (a) and (b) were very successfully answered.

Part (c) produced a wise variety of responses. As well as the correct $8x^3$ there were $8x$, $2x^3$, $6x^3$ as well as the incomplete $2x \times 2x \times 2x$.

Full marks were awarded to $8 \times x^3$

Part (d) also yielded a wide variety of responses apart from the correct $12a^7h^5$. A common error was to regard the power in h as zero and offer the answer $12a^7h^5$. Even more common was to add the coefficients to get $7a^7h^5$.

E5.   **Specification A**

A surprising number of candidates correctly answered both parts of this question. Though t^{12} was common, more gave the correct answer. The success rate was even higher in part (b), showing that work on indices is certainly accessible to Foundation students.

Specification B

In part (a) there was great confusion between indices and multipliers.

Many candidates had coefficients before t eg $2t^6$, $12t$, etc. Often the indices were written

too large, and answers could only be interpreted as $t8$. Others left room for doubt between $t8$ and t^8. The most common incorrect answer was t^{12}.

In part (b) there were similar difficulties and noticeably fewer correct answers than (a). Many tried to divide the powers and then had difficulty with $8 \div 3$. The most common incorrect response was m^{11}. In both parts there were relatively few blank responses and the success rate was 47% for (a) and 32% for (b).