Appendix A

Answers

1. 0580_m24_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	8.24 cao	**2**	**M1** for $3\times1.04+4\times1.28$
(b)(i)	32	**2**	**M1** for $\frac{8}{11+8+6}[\times100]$ oe
(b)(ii)	360	**2**	**M1** for $\frac{1500}{11+8+6}\times k$ where $k = 1$, 11, 8 or 6
(b)(iii)	270	**1**	**FT** 0.75 × *their* 360
(b)(iv)	1.25 cao	**2**	**M1** for $x\times\left(1-\frac{8}{100}\right)=1.15$ oe or better
(c)	140 nfww	**3**	**M2** for $\frac{620 \text{ to } 640}{5-0.5}$ or $\frac{620+10}{4 \text{ to } 5}$ oe or **M1** for 620 +10 oe or 620 – 10 oe or 5 + 0.5 oe or 5 – 0.5 oe seen

2. 0580_m24_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	5	3	**M2** for $\frac{(12800-8000)\times 100}{8000\times 12}$ or **M1** for $[12800-8000=]\frac{8000\times 12\times r}{100}$ or 400 seen If 0 scored, **SC1** for answer 13.3 or 13.33…
(a)(ii)	4[.0] or 3.99…	3	**M2** for $\sqrt[12]{\frac{12800}{8000}}$ or **M1** for $12800=8000\times k^{12}$ for any k

Question	Answer	Marks	Partial Marks
(b)	9 nfww	3	**M2** for $260\,000\times\left(1+\frac{1.8}{100}\right)^{8}$ oe evaluated to 4 sf or better or $260\,000\times\left(1+\frac{1.8}{100}\right)^{9}$ oe evaluated to 2 sf or better or **M1** for $[300\,000=]\ 260\,000\times\left(1+\frac{1.8}{100}\right)^{n}$ oe soi (Accept any inequality sign in [300 000 =])

3. 0580_s24_ms_41 Q: 1

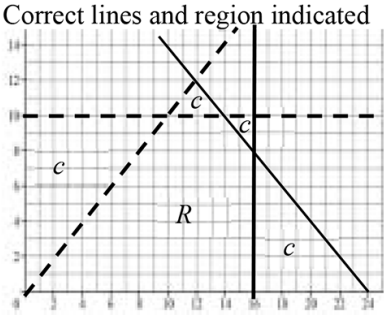
Question	Answer	Marks	Partial Marks
(a)(i)	4.55 or 4.545…	**1**	
(a)(ii)	50 : 263 : 400 cao	**2**	**M1** for a correct simplification from 250 000 : 1 315 000 : 2 000 000
(a)(iii)	83 cao	**3**	**M2** for $\frac{43\frac{1}{3}}{100}\times(100-60-10)$ oe or **M1** for 100 – 60 – 10 seen
(a)(iv)	10 200 000 cao	**3**	**B2** for 10 185 185 to 10 185 200 or **M1** for 5 500 000 ÷ 27 [× 50]
(a)(v)	3.19×10^7 or $3.190\ldots \times 10^7$	**3**	**B2** for 31903920 or **M1** for 60.7 × 60 × 24 × 365 If B0 scored **SC1** for correctly converting *their* number seen to standard form to 3sf or better
(b)	2095 nfww	**3**	**M2** for 6445 – C where $4300 \leqslant C < 4400$ oe or A – 4350 where $6440 < A \leqslant 6450$ oe or **M1** for 6440 +5 or 6440 –5 or 4400 + 50 or 4400 – 50 seen oe

4. 0580_s24_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	10 : 3 final answer	2	**M1** for 1500 : 450 oe in ratio form If 0 scored **SC1** for answer 3 : 10
(b)	360 240 400	3	**B2** for answer 0.36 0.24 0.4 or for answer two of 360 240 400 or **M1** for $\frac{1000}{9+6+10}[\times k]$ where $k = 1, 9, 6$ or 10 If 0 scored, **SC1** for answer with 3 values in ratio 9 : 6 : 10 in that order
(c)	3.68 cao	2	**M1** for $\left(1+\frac{15}{100}\right)\times 3.2$ oe or **B1** for answer 0.48
(d)	18 804[.0...]	2	**1** for $16620\times\left(1+\frac{2.5}{100}\right)^5$ oe
(e)	3.95	3	**M2** for 22.5 – (18.5 to 18.6) or (22 to 23) −18.55 or **M1** for 23 – 0.5 oe seen or 23 + 0.5 oe seen or 18.5– 0.05 oe seen or 18.5 + 0.05 oe seen

5. 0580_s24_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)	$y < 10$ $y < x$ oe $x + y \leqslant 24$ oe	3	**B1** for each If 0 scored, **SC1** for $y \leqslant 10$ and $y \leqslant x$ and $x + y < 24$

Question	Answer	Marks	Partial Marks
(b)	Correct lines and region indicated  	**6**	**B1** for each correct line and **B2** for R in correct region for all 4 correct lines or **B1** for R in any one of the regions marked *c* or **B1** for R that satisfies 3 of the correct inequalities
(c)	228 nfww	**2**	**M1** for $8x + 12y$ for any (x, y) in *their* R, x, y both integer or $x = 15$, $y = 9$

6. 0580_s24_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	3050	2	**M1** for $50 \times 40 + 70 \times 15$ or better
(a)(ii)	91.1 or 91.14 to 91.15	1	**FT** $\frac{2780}{their\,3050} \times 100$
(a)(iii)	125 nfww	2	**M1** for [...] × $\frac{100-4}{100}$ =120 oe
(a)(iv)(a)	132	2	**B1** for increase of 6 in adult or junior or **M1** for 56 : 76 or for multiples of 33 seen 33, 66, 99, 132, … or $50 + x : 70 + x = 14 : 19$ oe or $(70 - 50) \times \frac{19+14}{19-14}$ oe or $50 + x = (120 + 2x) \times \frac{14}{19+14}$ oe
(a)(iv)(b)	10	2	**FT** $\frac{their\,\mathbf{(a)}-120}{120} \times 100$ dep on *their* **(a)** > 120 **M1** for $\frac{their\,\mathbf{(a)}-120}{120}[\times 100]$ or $\frac{their\,\mathbf{(a)}}{120} \times 100\,[-100]$
(b)(i)	2280 or 2281 to 2282 nfww	2	**M1** for $2500 \times \left(1 - \frac{3}{100}\right)^3$ oe
(b)(ii)	8	2	**M1** for $2500 \times \left(1 - \frac{3}{100}\right)^n$ or 0.97^n evaluated with $n > 3$

7. 0580_s24_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)(i)	40	**2**	**M1** for $\frac{50}{75}$ [× 60] oe
(a)(ii)	36 nfww	**3**	**M2** for $\frac{47-0.5}{75\text{ to }80}$ [× 60] or $\frac{46\text{ to }47}{75+2.5}$ [× 60] or **M1** for 47+0.5 or 47 – 0.5 or 75 + 2.5 or 75– 2.5

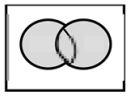
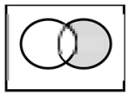
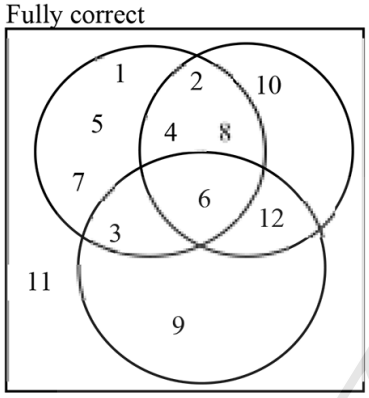
Question	Answer	Marks	Partial Marks
(b)	107 or 107.2...	**6**	**M5** for [speed =] $\frac{240}{\left(2\times\frac{260}{7}+60\right)}$ × 60 oe OR **B5** for [total time =] 134 or 134.2 to 134.3 or 2.24 or 2.238... or **B4** for (t =) 37.1 or 37.14... OR **M2** for $\frac{t}{60}\times 100+\frac{t+60}{60}\times 110=240$ oe or **M1** for $\frac{t}{60}\times 100$ or $\frac{t+60}{60}\times 110$ oe **M1** for correct equation of form $at = b$ from *their* equation containing two terms in t and involving the speeds. **M1** for $\frac{240}{2\times \textit{their}\, t+60}$ [× 60]

8. 0580_m23_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{750}{8+7}\times 8$ [= 400]	M1	
(a)(ii)(a)	37.5	1	
(a)(ii)(b)	275	3	**M2** for $250+\frac{250\times 2\times 5}{100}$ oe or **M1** for $\frac{250\times 2\times 5}{100}$ oe
(a)(iii)	407[.00] cao nfww	3	**B2** for 406.5 to 406.7 or **M1** for $350\times\left(1+\frac{0.25}{100}\right)^{60}$ oe isw If 0 scored **SC1** for answer 354 or answer 406
(b)	24	2	**M1** for [C : D =] 6 : 10 oe and [C : E =] 6 : 9 oe or for $\frac{6}{6+10+9}$[×100] oe

Question	Answer	Marks	Partial Marks
(c)	56 000 nfww	3	**M2** for $60564\div\left(1+\frac{3}{100}\right)\div\left(1+\frac{5}{100}\right)$ oe or **M1** for $[x\times]\left(1+\frac{3}{100}\right)\times\left(1+\frac{5}{100}\right)$ or for $60564\div\left(1+\frac{3}{100}\right)$ oe or $60564\div\left(1+\frac{5}{100}\right)$ If 0 scored, **SC1** for answer 65499 to 65500
(d)	2.5[0] or 2.499...	3	**M2** for $\sqrt[8]{\frac{609.20}{500}}$ oe or **M1** for $500\times(...)^8=609.2[0]$ oe

9. 0580_s23_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	*r, l, t, e, a*	**1**	
(a)(ii)	2	**1**	
(b)		**1**	
		**1**	
(c)(i)	Fully correct 	**3**	**B2** for 7, 6, or 5 sections correct or **B1** for 4, 3 or 2 sections correct
(c)(ii)	5	**1FT**	strict FT from their diagram

10. 0580_s23_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	249.98 to 250[.0…]	**3**	**M2** for 830 – 500 × 1.16 or **M1** for 500 × 1.16 OR **M1** for 830 ÷ 1.16 **M1** for (*their* 715.5… – 500) × 1.16

Question	Answer	Marks	Partial Marks
(b)(i)	33.5 or 33.51…	**2**	**M1** for $\frac{12400}{37000}$ [×100] oe If 0 scored, **SC1** for answer 66.5 or 66.48 to 66.49
(b)(ii)	38 184 cao	**2**	**M1** for 37 000 × $\left(1+\frac{3.2}{100}\right)$ oe or **B1** for 1184
(c)(i)	441 or 440.6 or 440.64 to 440.65	**3**	**B2** for answer 3941 or 3940.6 or 3940.64 to 3940.65 or **M2** for 3500 × $\left(1+\frac{2.4}{100}\right)^5$ − 3500 or **M1** for 3500 × $\left(1+\frac{2.4}{100}\right)^5$ oe isw
(c)(ii)	16	**3**	**B2** for 15[.0] nfww to 15.1 or **M2** for 3500 × $\left(1+\frac{2.4}{100}\right)^{15}$ oe seen or 3500 × $\left(1+\frac{2.4}{100}\right)^{16}$ oe seen or **M1** for (3500 or *their* 3941) × $\left(1+\frac{2.4}{100}\right)^n$ associated with 5000 oe

Question	Answer	Marks	Partial Marks
(a)(i)	22.5	**2**	**M1** for $\frac{9}{14+17+9}$ [×100]
(a)(ii)	238	**2**	**FT** *their* 14 + 17 + 9 = *N* seen in **(a)(i)** **M1** for $\frac{560}{\textit{their}\ (14+17+9)} \times k$, where k = 1, 9, 14 or 17
(a)(iii)	METHOD 1 1.25 × 195 oe	**M2**	**M1** for $\frac{25}{100} \times 195$
	243[.75] and No oe	**A1**	Strict **FT** yes if *their* **(a)(ii)** > 243.75 If M0 scored, then **SC1** for 243.75 and a correct conclusion.
	METHOD 2 $\frac{\textit{their}\ 238}{195} - 1 = 0.22\ldots$ oe	**(M2)**	**M1** for $\frac{\textit{their}\ 238}{195} = 1.22\ldots$ oe
	22[%] (or better) and No oe	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives answer > 25 If M0 scored, then **SC1** for 22.05 and a correct conclusion.
	METHOD 3 195 × 0.25 = 48.75 oe **and** *their* 238 – 195 = 43	**(M2)**	**M1** for 0.25 × 195
	43 **and** 48.75 and NO	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives profit > 48.75 If M0 scored, then **SC1** for 43 and 48.75 and a correct conclusion.
	METHOD 4 $\frac{\textit{their}\ 238}{125} \times 100$	**(M2)**	**M1** for $x \times \left(1+\frac{25}{100}\right) = \textit{their}\ 238$
	190.4 and NO	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives answer > 195 If M0 scored then **SC1** for 190.4 and a correct conclusion.
(b)	56.55	**2**	**M1** for $\frac{725 \times 1.3[\times 6]}{100}$ oe

Question	Answer	Marks	Partial Marks
(c)	48.5[0]	**2**	**M1** for $x \times \left(1-\frac{24}{100}\right) = 36.86$ oe

12. 0580_w23_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	227 900 000	**1**	

Question	Answer	Marks	Partial Marks
(a)(ii)	51 200 or 51 190 or 51 194	**2**	**M1** for $\frac{35.8}{100} \times 143\,000$ After 0 scored SC1 for answer figs 512 or figs 5119 or figs 51194
(a)(iii)	2.43 or 2.434…	**1**	
(a)(iv)	3000 or 3004 to 3005	**2**	**M1** for $\frac{4.495\times10^{9}}{1.496\times10^{8}}$ [× 100] oe After 0 scored SC1 for answer figs 3 or figs 3004…. or figs 3005
(a)(v)	1.52 or 1.522…	**2**	**B1** for 1AU = 1.5[0] × 10^8 or 1.497… × 10^8 [km] or $1\text{km} = 6.68\times10^{-9}$ *or* $6.678\ldots\times10^{-9}$ [AU] OR **M1** for $\frac{5.2\times2.279[\times10^{8}]}{7.786[\times10^{8}]}$ oe After 0 scored **SC1** for answer figs 152 or figs 1522……
(a)(vi)	4890 or 4885…	**2**	**M1** for $d \times \left(1+\frac{39.2}{100}\right) = 6800$ oe
(b)(i)	2.9979 × 10^5 × 60^2 × 24 × 365.25	**M1**	After **M0** **SC1** for 2.9979 × 10^5 × 31557600 oe
	= 9.4606… × 10^{12}	**A1**	
(b)(ii)	2.54 or 2.536 to 2.537	**2**	**M1** for $\frac{2.4\times10^{19}}{9.461\times10^{12}}$ oe

13. 0580_w23_ms_42 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	6925.5[0] cao	**2**	**M1** for $7695 \times \frac{100-10}{100}$ oe or **B1** for answer 769.5
(a)(ii)	8550	**2**	**M1** for $X \times \frac{100-10}{100} = 7695$ oe

Question	Answer	Marks	Partial Marks
(b)	660	**3**	**B2** for 60 or **M2** for $600 + \frac{600 \times 2 \times 5}{100}$ oe or **M1** for $\frac{600 \times 2[\times 5]}{100}$ oe
(c)	1.55 or 1.549 to 1.550	**3**	**M2** for $\sqrt[12]{\frac{601.35}{500}}$ or **M1** for $500 \times (...)^{12} = 601.35$
(d)(i)	26.3 or 26.25 to 26.26	**2**	**M1** for $[k]\left(\frac{100-3}{100}\right)^{10}$ oe
(d)(ii)	23	**3**	**M2** for a correct trial evaluated with n =22 or n = 23 or **M1** for $[k]\ (0.97)^n < 0.5[k]$ oe soi or for $[k](0.97)^n = 0.5[k]$ oe soi, implied by one correct trial $n > 10$ or for $[k](0.97)^{23}$ oe seen If 0 scored **SC1** for answer 22

14. 0580_w23_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	18593 cao	2	**M1** for $7437.05 \times 250 \div 100$ oe
(b)	804.53 cao	2	**M1** for $5400 \div 671.20$ [$\times 100$] oe
(c)(i)	2000	2	**M1** for $3500 \div (4 + 3)$ [$\times k$] oe
(c)(ii)	1354.13 …	3	**M2** for (3500 – *their* **(c)(i)**) $\times \frac{77.05}{85.35}$ oe or **M1** for (3500 – *their* **(c)(i)**) ÷ figs 85.35 oe or for $\frac{77.05}{85.35}$ oe or for (3500 – *their* **(c)(i)**) × figs 77.05
(c)(iii)	2 [h] 52 [min] nfww	3	**M2** for $\frac{2100 \text{ to } 2200}{740+10}$ or $\frac{2200-50}{740 \text{ to } 760}$ or **M1** for 2200 + 50 or 2200 – 50 or 740 + 10 or 740 – 10

15. 0580_m22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	184	2	**M1** for $\frac{852-300}{300}$[$\times 100$] oe or for $\frac{852}{300} \times 100$[$-100$] oe
(b)	497	2	**M1** for $\frac{852}{5+7} \times k$ oe where $k = 1$, 5 or 7
(c)(i)	Forty thousand six hundred	1	
(c)(ii)	4.06×10^4	1	
(d)	435	3	**M2** for $3000 \times \left(1 - \frac{48}{100} - \frac{3}{8}\right)$ oe or **B2** for 2565, or 1440 **and** 1125 or 1875 **and** 1440 or 1560 **and** 1125 or **M1** for $1 - \frac{48}{100} - \frac{3}{8}$ or $3000 \times \left(\frac{48}{100} + \frac{3}{8}\right)$ oe or **B1** for 1440 or 1125 or 1560 or 1875 If 0 scored **SC1** for answer 975
(e)	35.7	3	**M2** for $\frac{100+15}{100} \times \frac{100+18}{100}$ [-1] oe or better or **M1** for $k \times \frac{100+15}{100} \times \frac{100+18}{100}$ oe

16. 0580_s22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	42	2	**M1** for $12 \div 2$ or better
(b)(i)	5.72	2	**M1** for $\frac{100-12}{100} \times 6.50$ oe or **B1** for 0.88 oe
(b)(ii)	12.5[0]	2	**M1** for $\frac{100-12}{100} \times x = 11$ or better oe

Question	Answer	Marks	Partial Marks
(c)	4	2	**M1** for $\frac{100+2.5}{100} \times [...] = \frac{100+6.6}{100}$ oe
(d)(i)	72.3 or 72.31...	2	**M1** for $80 \times \left(\frac{100-2}{100}\right)^5$ oe
(d)(ii)	4 nfww	3	**B2** for answer 9 nfww or **M2** for correct trials with values giving either side of 67 or **M1** for $80 \times \left(\frac{100-2}{100}\right)^n = 67$ or *their*$(i) \times \left(\frac{100-2}{100}\right)^k = 67$ or an evaluated trial with $n \geqslant 6$ or $k \geqslant 1$

17. 0580_s22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	150	**2**	**B1** for answer $150k$ or **M1** for prime factors of 30 or 75 seen or a list of multiples of both 30 and 75 with at least 3 of each or for $\frac{30\times 75}{15}$ oe or for answer $2 \times 3 \times 5^2$
(b)	152 190 266	**3**	Accept in any order **B2** for two correct answers or **M1** for $\frac{608}{4+5+7}\times k$ oe where k =1, 4, 5, 7
(c)	2.61×10^{-2} 2.61×10^{-2} or $2.608\ldots \times 10^{-2}$	**2**	**B1** for figs 2608 or 261 seen If 0 scored, **SC1** for answer $2.6[0] \times 10^{-2}$ without more accurate value in standard form seen
(d)	$\frac{27}{99}$ oe fraction	**1**	
(e)	2.8	**1**	
	g/cm^3 or $g\ cm^{-3}$	**1**	

18. 0580_s22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	10 07	**1**	
(b)	123	**2**	**M1** for 10 30 – 8 27 soi or 10 30 – 8 52 + 25 soi or 25 + 50 + 48
(c)	$25.2, 25\frac{1}{5}$	**2**	**M1** for figs 29.4 ÷ 70 [× 60] oe
(d)	\$142.1[0] cao	**4**	**M2** for [adults =] 56 ÷ 8 × 5 and [child =] 56 ÷ 8 × 3 or better or **M1** for 56 ÷ (5 + 3) × k where k = 1, 3 or 5 **M1** for *their* 35 × 2.80 + *their* 21 × 2.80 × $\frac{3}{4}$ oe

19. 0580_w22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)(i)	2990 cao	1	
(a)(ii)	1.0 cao	1	
(a)(iii)	2100 cao	1	
(b)	97	1	
(c)	$\frac{1}{64}$ final answer	1	
(d)	$7.01[0] \times 10^{-3}$	1	
(e)	1.65×10^{x}	2	**M1** for final answer figs 165 or for $15\times10^{x-1}$ seen or for 0.15×10^{x} seen

Question	Answer	Marks	Partial Marks
(f)	37.7... – 3.7... [= 34] oe	M1	
	$\frac{34}{90}$ oe fraction	B1	

20. 0580_w22_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	550 nfww	3	**M2** for $\frac{500\times2\times5}{100}+500$ oe or **M1** for $\frac{500\times2\times5}{100}$ oe
(a)(ii)	546.65	2	**M1** for $500\times\left(1+\frac{1.8}{100}\right)^{5}$ oe
(a)(iii)	8 nfww	3	**B2** for final answer 13 OR **M2** for trials correctly comparing both investments to 7 and 8 more years or **M1** for at least two trials correctly comparing both investments

Question	Answer	Marks	Partial Marks
(b)	1476 cao	3	**B2** for 1480 or 1476.2 ... OR **M1** for $2500\times\left(1-\frac{10}{100}\right)^{5}$ oe **B1** for their more accurate answer seen correctly rounded to the nearest dollar.
(c)	3.2[0] or 3.200 to 3.201	3	**M2** for $(...) = \sqrt[22]{2}$ oe isw or **M1** for $[N] \times (...)^{22} = 2[N]$

21. 0580_w22_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{14}{18}$ oe	1	
(a)(ii)	17.5	4	**M3** for $\frac{1}{2}(10+24)18+22\times24-134=40v$ oe or **M2** for $\frac{1}{2}(10+24)18+22\times24$ oe or **B2** for [distance covered by bus =] 700 or **M1** for correct method for any partial area for the car or for $40v$
(b)	92.8 or $92\frac{4}{5}$	3	**M1** for $\frac{figs162[4]}{their10\,min30\,sec}$ oe **M1** for correct conversion to km/h, e.g. $\times\frac{60}{1000}$

22. 0580_w22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	60.9 or 60.86 to 60.87	1	
(a)(ii)	375	2	**M1** for $\frac{250}{12}$ [× 18] oe
(a)(iii)	30 nfww	3	**M1** for figs2200 ÷ 800 [× 12]oe **M1** for 1500 ÷ 600 [× 12] oe
(b)(i)	1.92	2	**M1** for $k \times \left(1+\frac{25}{100}\right) = 2.4[0]$ oe or better
(b)(ii)	43.75 or $43\frac{3}{4}$	3	**M2** for $\left(\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)[-1]\right)[\times 100]$ oe or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)\times 100\,[-100]$ or for $\frac{2.40\times\left(1+\frac{15}{100}\right)}{\textit{their}\textbf{(b)(i)}}\times 100$ [– 100] oe or **M1** for $2.40\times\left(1+\frac{15}{100}\right)$ or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)$ oe
(c)	18 nfww	3	**M2** for $\frac{200 \text{ to } 210}{11.5-0.25}$ or $\frac{200+5}{11 \text{ to } 11.5}$ oe or **M1** for 200 + 5, 200 – 5, 11.5 + 0.25 or 11.5 – 0.25

23. 0580_m21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	245	1	
(b)	8	2	**M1** for 40 + 26.5x = 252 oe or **B1** for 212 seen
(c)	6	2	**M1** for (224 – 2 × 48) ÷ 32 oe or 2 × 48 + 32 (x – 2) = 224 soi
(d)	35 : 36 : 32 final answer	2	**B1** for *their* (a) : 252 : 224 or equivalent ratio

24. 0580_m21_ms_42 Q: 10

	Answer	Mark	Partial Marks
(a)	1600	3	**B2** for answer figs 16 or **M2** for 90.72 ÷ (figs45 × figs3 × figs42) or **M1** for volume = figs 45 × figs 3 × figs 42 isw
(b)	62.8 or 62.83 to 62.84	3	**M2** for $\frac{\pi \times 10^2 \times 30}{15000} \times 100$ or **M1** for $\pi \times 10^2 \times 30$
(c)	12.9[0]	3	**B2** for 86 OR **M2** for $\frac{98.9}{1+\frac{15}{100}} \times 0.15$ oe or $98.9 - \frac{98.9}{1+\frac{15}{100}}$ oe or **M1** for $\left(1+\frac{15}{100}\right)a = 98.9$ oe isw
(d)	50	2	**M1** for 3540 ÷ 70.8

25. 0580_s21_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	28	2	**M1** for $32 \times 0.50 + 30 \times 0.40$
(a)(ii)	98 – 100 × 0.5 48 ÷ 0.4 = 120 [minutes] = 2 [hrs]	M3	**M1** for $100 \times 0.50 + x \times 0.40 = 98$ **M1** for $50 + 0.4x = 98$ or $0.4x = 48$ **M1** for $x = \frac{48}{0.4}$ x = 120 [min] = 2 [hr] OR **M1** for $100 \times 0.5 [= 50]$ **M1** for $98 - 50 [= 48]$ **M1** for $48 \div 0.4 = 120$ [min] = 2 [hr]
(b)	2925 1170 4095	3	**B2** for one correct answer or **M1** for 8190 ÷ (5 + 2 + 7)
(c)	58	2	**M1** for $\left(1+\frac{45}{100}\right)k = 84.1$ oe

26. 0580_s21_ms_41 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	438 cao	2	**M1** for $\frac{500}{1.142}$
(a)(ii)	14.95	2	**M1** for [329 –] 275 × 1.142 oe
(b)	14	2	**M1** for $5.25\times\frac{8}{3}$ oe
(c)	1.7[0] or 1.699…	3	**M2** for $\sqrt[5]{\frac{6669}{6130}}$ or **M1** for $6669 = 6130\ (k)^5$

27. 0580_s21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	11.61 final answer	2	**M1** for $13.5[0]\times\left(1-\frac{14}{100}\right)$ oe or **B1** for 1.89
(a)(ii)	197.37 final answer	2	**FT** 17 × *their* (a)(i) exact or correct to nearest cent **M1** for 42.5 ÷ 2.5
(b)(i)	53.3 or 53.33…	1	
(b)(ii)	7.5	2	**M1** for 22.5 ÷ (2 + 8 + 5) oe soi
(c)	20.55×2.45 oe	M2	**M1** for 20.5 + 0.05 oe seen or 2.4 + 0.05 oe seen If 0 scored, **SC1** here for 20.45 × 2.35 oe
	3 nfww	A2	**M1** for *their* area ÷ 10 ÷ 2.5 oe

28. 0580_s21_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	120	**2**	**M1** for $6 \div (21 - 19)$ oe soi or for $\frac{2x}{40} = 6$
(a)(ii)(a)	34	**2**	**M1** for $40 - \frac{15}{100} \times 40$ oe or better or **B1** for 6
(a)(ii)(b)	35	**2**	**M1** for $\left(1 - \frac{15}{100}\right) \times p = 29.75$ or better
(b)(i)	44 274 cao	**3**	**B2** for 44273 to 44274 or 44270 or **M1** for $40100 \times \left(1 + \frac{2}{100}\right)^5$ oe
(b)(ii)	2019 nfww	**3**	**M2** for one correct trial of $n = 8$ or $n = 9$ either to find a salary or, if working with 1.02^n and 47 500 ÷ 40 100 [= 1.1845], to find a value of 1.02^n or **B2** for final answer 9 or 4 nfww or **M1** for *their* 44 274 $\times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or 40 100 $\times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or for at least one trial giving a value greater than *their* 44 274
(c)	2.9 [increase]	**2**	**M1** for $\left(1 + \frac{5}{100}\right) \times \left(1 - \frac{2}{100}\right)$ oe implied by 1.029 or 102.9[%]

29. 0580_m20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	295	2	**M1** for [87 +] 4×52 oe
(a)(ii)	29.5 or 29.49…	1	**FT** $\frac{87}{their\textbf{(a)(i)}} \times 100$
(b)	11	2	**M1** for 18×4 [± 61] oe
(c)	4160 cao nfww	2	**M1** for $64 \div 0.0154$ or **B1** for rounding *their* answer to nearest 10
(d)	2.4[0] nfww	2	**M1** for $\left(1+\frac{12.5}{100}\right)x = 2.7[0]$ oe
(e)	53 : 36	3	**M2** for 265 : 180 oe or for answer 36 : 53 or 53 min: 36 min or **M1** for 4h 25 [mins] or 265 [mins] seen
(f)	6[.00] or 5.999…	3	**M2** for $\sqrt[5]{\frac{736}{550}}$ or **M1** for $736 = 550 \times (x)^5$

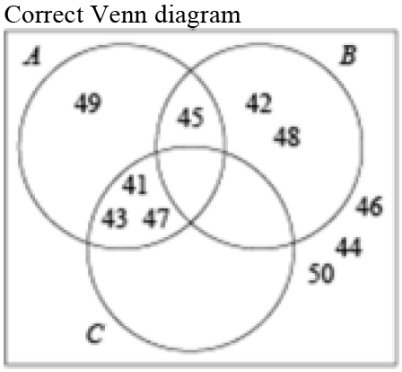
30. 0580_p20_ms_40 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	48	2	**M1** for $\frac{72}{3}$
(a)(ii)	32.4[0]	1	
(a)(iii)	$\frac{13}{30}$	2	**M1** for $\frac{72 - their\textbf{ (ii)} - 8.4}{72}$ oe
(a)(iv)	24	3	**M2** for $\frac{19.2}{0.8}$ oe or **M1** for recognising 19.2 is 80%
(b)	660	3	**M2** for $\frac{550 \times 2 \times 10}{100} + 550$ oe or **M1** for $\frac{550 \times 2 \times 10}{100}$ oe
(c)	663.9[0]	2	**M1** for 550×1.019^{10} oe
(d)	1.5[0]	3	**M2** for $\sqrt[10]{\frac{638.3[0]}{550}}$ oe or **M1** for $550 \times m^{10} = 638.3[0]$

31. 0580_s20_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	7680	2	**M1** for $0.24 \times 32\,000$ oe
(a)(ii)	34 240	2	**M1** for $32\,000 \times \frac{100+7}{100}$ oe
(b)	5306.04	2	**M1** for $5000 \times \left(1+\frac{2}{100}\right)^3$ oe
(c)	26.7 or 26.66... to 26.67	4	**B3** for 96 or $\frac{96}{360}$ oe OR **M3** for $(1-\frac{1}{5}) \times (1-\frac{2}{3}) \times 100$ oe or **M2** for $(1-\frac{1}{5})$ and $(1-\frac{2}{3})$ oe OR **M1** for $360 \div 5$ [$\times 4$] oe **M1** for *their* $288 \div 3$ [$\times 2$]
(d)	33 500	2	**M1** for $36\,515 \div \frac{100+9}{100}$ oe
(e)	6525	4	**M3** for $\left(\frac{65}{45}-\frac{63}{45}\right)[A]=290$ oe or **M2** for $\left(\frac{13}{9}-\frac{7}{5}\right)[A]=290$ oe or **M1** for correct attempt to convert to a common ratio value for Arjun or for $\frac{13}{9}-\frac{7}{5}$ oe

32. 0580_s20_ms_41 Q: 5

	Answer	Mark	Partial Marks
(a)	Correct Venn diagram 	3	**B2** for 8 or 9 numbers correct or **B1** for 6 or 7 numbers correct
(b)(i)	41, 43, 47	1	**FT** *their* Venn diagram
(b)(ii)	44, 46, 49, 50	1	**FT** *their* Venn diagram
(c)	0	1	**FT** *their* Venn diagram

33. 0580_s20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	14, 10	2	**M1** for $24 \div (7 + 5)$
(a)(ii)	$\frac{3}{350}$	2	**B1** for correct fraction not in lowest terms
(a)(iii)	120	1	
(b)(i)	10.2[0]	2	**M1** for $\frac{15}{100} \times 12$ oe or better
(b)(ii)	45	2	**M1** for $\frac{38.25}{1 - \frac{15}{100}}$ oe
(c)(i)	85	2	**M1** for $\frac{500 \times 1.7 \times 10}{100}$ oe
(c)(ii)	203 or 202.5 to 202.6	2	**M1** for $200 \times \left(1 + \frac{0.0035}{100}\right)^{365}$
(c)(iii)	1.9	3	**M2** for $\sqrt[6]{\frac{559.78}{500}}$ or **M1** for $500\left(1 + \frac{r}{100}\right)^6 = 559.78$

34. 0580_s20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)	1260	2	**M1** for $15 \times 54 + 25 \times 18$
(b)	38 800	2	**M1** for $37054 \div \left(1 - \frac{4.5}{100}\right)$ oe
(c)(i)	15 : 12 : 28	2	**M1** for correct attempt to find a common multiple for the women oe
(c)(ii)	216	3	**M2** for $224 \div$ *their* $28 \times$ *their* $(15 + 12)$ or **M1** for $224 \div$ *their* 28
(d)	55.25	2	**M1** for $8 + 0.5$ or $6 + 0.5$ seen
(e)	156 or 156.3…	2	**M1** for $\left(1 + \frac{1.5}{100}\right)^{30}$

35. 0580_w20_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	1 : 5 : 12	2	**M1** for 2 : 10 : 24 or 7 : 35 : 84 or $\frac{1}{18} : \frac{5}{18} : \frac{12}{18}$
(b)(i)	266 and 95	3	**B2** for 266 or 95 or 266 and 95 reversed or **M1** for $\frac{114}{6}$
(b)(ii)	15	2	**M1** for $\frac{114 - 96.9}{114}$ [$\times 100$] oe or $\frac{96.9}{114} \times 100$
(c)(i)	2h 50min	1	
(c)(ii)	636	2	**M1** for 1802 ÷ *their* 2h 50min

36. 0580_w20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	9080 cao	**3**	**B2** for 9078 to 9081… or **M1** for 813 × *their* 11h 10min
(b)(i)	654 or 653.5…	**2**	**M1** for 10260 ÷ 15 h 42 min oe
(b)(ii)(a)	21.8 or 21.82 to 21.83	**1**	
(b)(ii)(b)	4.58 or 4.59 cao	**2**	**M1** for 470 ÷ (10260 ÷ 100) oe or 100 ÷ *their* **(b)(ii)(a)**
(c)	12.97	**1**	

37. 0580_w20_ms_42 Q: 3

	Answer	Mark	Partial Marks
(a)(i)	2210 or 2208 or 2208.2, or 2208.16…	**2**	**M1** for $2000 \times \left(1+\frac{2}{100}\right)^5$ oe
(a)(ii)	10.4 or 10.5 or 10.40 to 10.41	**2**	**M1** for $\frac{\textit{their}\,\textbf{(a)(i)} - 2000}{2000}$ [×100] or $\frac{\textit{their}\,\textbf{(a)(i)}}{2000} \times 100$ or $\left(1+\frac{2}{100}\right)^5 - 1$ or $\left(1+\frac{2}{100}\right)^5 \times 100$ oe
(a)(iii)	12	**3**	**B2** for 11.3 or 11.26 to 11.27 **OR** **M2** for [2000 ×] $\left(1+\frac{2}{100}\right)^{11}$ oe or [2000 ×] $\left(1+\frac{2}{100}\right)^{12}$ oe seen or **M1** for [2000 ×] $\left(1+\frac{2}{100}\right)^{n}$ oe, $n > 5$ oe or for $2000 \times \left(1+\frac{2}{100}\right)^{n} = \text{or} > \text{or} \geqslant 2500$ oe

	Answer	Mark	Partial Marks
(b)	490 cao	3	**M2** for $p\times\left(1-\frac{4}{100}\right)^{16}=255$ oe soi by 490.0... or **M1** for $p\times\left(1-\frac{4}{100}\right)^{n}=255$ oe, $n>1$ oe

38. 0580_w20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	$5.101[00\ldots]\times10^{8}$ final answer	1	
(a)(ii)	361 150 800 oe	2	**FT** *their* **(a)(i)** **M1** for $\frac{70.8}{100}\times 510\,100\,000$ or for $\frac{70.8}{100}\times$ *their* **a(i)**
(b)(i)	6070 oe	1	
(b)(ii)	32 000 oe	2	**B1** for figs 32
(b)(iii)	6.68 or 6.677 …	2	**M1** for $\frac{6.41\times10^{5}}{9.6[0]\times10^{6}}$ [$\times$ 100] oe
(b)(iv)	1250 or 1248 to 1249 oe	2	**B1** for figs 125 or figs1248 to figs 1249
(c)(i)	25.1 or 25.08…	2	**M1** for $\frac{7.53[\times10^{9}]-6.02[\times10^{9}]}{6.02[\times10^{9}]}$ oe or $\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}\times100$
(c)(ii)	1.33 or 1.325…	3	**M2** for $\sqrt[17]{\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}}$ or $\sqrt[17]{1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}}$ or **M1** for $6.02[\times10^{9}]\times p^{17}=7.53[\times10^{9}]$ or $p^{17}=1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}$

39. 0580_m19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	473	2	**M1** for $645 \div (11 + 4)$
(b)	212.5	2	**M1** for 50×4.25
(c)	31.5 or 31.45 to 31.46	3	**M2** for $54 \div 1\frac{43}{60}$ oe or **M1** for time =1h 43min or 103 [mins] or $54 \div$ *their* time
(d)	875	1	
(e)	10.4 or 10.38 to 10.39	1	
(f)(i)	30 [×] 70 and 2100	1	
(f)(ii)	both numbers rounded up oe	1	

40. 0580_s19_ms_41 Q: 8

	Answer	Mark	Partial Marks
(a)	6 nfww	3	**M2** for $\frac{2.65 - 2.50}{2.50}$[×100] or for $\frac{2.65}{2.50} \times 100$ or **M1** for $\frac{2.65}{2.50}$
(b)	552.5[0]	3	**B2** for 52.5[0] or **M2** for $500 \times \frac{1.5}{100} \times 7 + 500$ oe or **M1** for $500 \times \frac{1.5}{100}$ [×7] oe
(c)	37.4 or 37.36…	2	**M1** for $\left(1 + \frac{1.6}{100}\right)^{20}$ oe soi 1.37…
(d)	4[.00...]	3	**M2** for $\sqrt[22]{\frac{2607}{6400}}$ or **M1** for $6400 \times x^{22} = 2607$ oe or better

41. 0580_s19_ms_41 Q: 11

	Answer	Mark	Partial Marks
	[Total time =]16 h 6 min or 16.1 h	2	**B1** for 22 h 6 min or 22.1h or 966 mins If 0 scored, **SC1** for 9 h 41 min
	[Distance to airport in New York =] 16.5	2	**M1** for 18×55
	[Arc length =] 6200 or 6199 to 6200. …	3	**M2** for $\frac{55.5}{360} \times 2 \times \pi \times 6400$ or **M1** for $\frac{55.5}{360}$ or $2 \times \pi \times 2400$
	[Distance Geneva to Chamonix =] 104	2	**M1** for 65×1.6 or 65×96 oe
	392 to 393	2	**M1** for $\frac{6316 \text{ to } 6322.4}{\textit{their}16.1}$ Must be correct value in numerator

42. 0580_s19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	16.5 or 16.49...	3	**M2** for $\frac{1.13 - 0.97}{0.97}[\times 100]$ oe or $\frac{1.13}{0.97} \times 100$ oe or **M1** for $\frac{1.13}{0.97}$ oe
(b)(i)	35	2	**M1** for $60 \div (5 + 7)$
(b)(ii)	140	1	
(c)	$1.26 final answer	3	**B2** for 1.259... or 1.26 but not as final answer or **M1** for $2.25 \div 0.9416$ If 0 scored, **SC1** for 1.13×0.9416
(d)	15[.0…]	3	**M2** for $\sqrt[21]{\frac{58000}{1763000}}$ oe or **M1** for $58000 = 1763000\ (k)^{21}$
(e)	1239.75	2	**B1** for 43 + 0.5 or 28 + 0.5 oe seen

43. 0580_s19_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	6h 27 mins	2	**B1** for answer .....h 27 mins
(a)(ii)	150 km/h	3	**M2** for $\frac{90}{36} \times 60$ or **M1** for $\frac{90}{\textit{their}\ \text{time}}$ or **B1** for 36 [mins] seen
(a)(iii)	780	4	**M3** for $\left(90 \times \frac{35}{3600}\right) \times 1000 - 95$ oe or **M2** for $\left(90 \times \frac{35}{3600}\right) \times 1000$ oe or **B1** for figs 875 or **M1** for $90 \times \frac{35}{3600}$ seen or for $90 \times \frac{1000}{3600}$ oe If 0 scored, **SC1** for *their* distance (> 95) – 95
(b)(i)	7 : 5	1	
(b)(ii)	66.7 or 66.66 to 66.67	3	**M2** for $\frac{140-84}{84}$ [× 100] oe or for $\frac{140}{84} \times 100$ oe or **M1** for $\frac{140}{84}$ oe
(b)(iii)	24 576	5	**M4** for complete method, $40 \times 60 + 0.7 \times 220 \times 84 + 0.3 \times 220 \times 140$ oe OR **B1** for 40 [children] **M1** for $0.7 \times 220 \times 84$ oe **M1** for $0.3 \times 220 \times 140$ oe **B1** for 2400 or 12936 or 9240 nfww

	Answer	Mark	Partial Marks
(c)	3.5×10^5 nfww	3	**M2** for $3.08 \times 10^5 \div \left(\frac{100-12}{100}\right)$ oe or **M1** for 3.08 [$\times 10^5$] associated with (100–12)%

44. 0580_w19_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	[Ali] 2700 [Mo] 2100	3	**B2** for one correct or for correct values reversed or **M1** for 600 ÷ (9 – 7) or for any equation that would lead to an answer of 300, 2700 or 2100, or 4800 (for the total)

	Answer	Mark	Partial Marks
(b)	11	3	**M2** for $\frac{220-195.8}{220}[\times 100]$ or for $[100 -]\frac{195.8}{220}\times 100$ or **M1** for 220 – 195.8 or for $\frac{195.8}{220}$ or a correct implicit equation for percentage reduction or for $\frac{195.8-220}{220}$
(c)	84	3	**M2** for $\frac{63}{1-\frac{25}{100}}$ oe or **M1** for associating 63 with (100 – 25)% or a correct implicit equation for the original price.

45. 0580_w19_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	662.45	2	**M1** for $600\times\left(1+\frac{2}{100}\right)^5$ oe
(b)(i)	800	2	**M1** for $x\left(1+\frac{5}{100}\right)^2=882$ oe or **SC1** for answer 82
(b)(ii)	5 nfww	2	**M1** for trial with $882\times\left(1+\frac{5}{100}\right)^n$ with $n>1$

46. 0580_w19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	5 : 6	**1**	
(a)(ii)	2.0736[0] × 10^5 final answer	**3**	**B2** for 207360 oe or **M1** for 16 × 18 × 720
(b)(i)	26780	**2**	**M1** for 18540 ÷ 9 soi
(b)(ii)	1.36	**2**	**M1** for 0.85 × 1.6 oe or **B1** for 0.51 or 51
(c)	66.7 or 66.66 to 66.67	**5**	**M4** for $\frac{(2.3-1.5\times0.92)}{1.5\times0.92}[\times100]$ oe or $\frac{2.3\times100}{1.5\times0.92}$ oe **OR** **Working in euros** **B2** for [€]1.38 or **M1** for 1.5[0] × 0.92 **M2dep on B2 or M1** for $\frac{2.3-their\ 1.38}{their\ 1.38}[\times100]$ oe or $\frac{2.3-their\ 1.38}{their\ 1.38}\times100$ oe or **M1** for 2.3 – *their* 1.38 or $\frac{2.3}{their\ 1.38}$ **OR** **Working in dollars** **B2** for [$]2.50 or **M1** for or 2.3[0] ÷ 0.92 **M2dep on B2 or M1** for $\frac{their\ 2.5-1.5}{1.5}[\times100]$ oe or $\frac{their\ 2.5}{1.5}\times100$ or **M1** for *their* 2.5 – 1.5 or $\frac{their\ 2.5}{1.5}$

	Answer	Mark	Partial Marks
(d)	219 000 or 218814[.3….] rounded to 4 sf or more	**3**	**B2** for 414000 or 414414[.3….] rounded to 4 sf or more or **M2** for $195600\times\left(1+\frac{8.7}{100}\right)^9$ [– 195600] or **M1** for $195600\times\left(1+\frac{8.7}{100}\right)^k$ or better ($k>1$ and an integer)

47. 0580_w19_ms_42 Q: 9

	Answer	Mark	Partial Marks
(a)	171 or 171.0…	**3**	**M2** for $\frac{7.6}{160} \times 60 \times 60$ oe or **M1** for $\frac{7.6}{160}$ or $\frac{7.6}{2\frac{2}{3}}$ or $\frac{7.6}{2\,\text{min}\,40\,\text{sec}}$ If 0 scored, **SC1** for answer 189 or 188.6 to 188.7
(b)(i)	77 [min] 20 [s]	**4**	**M3** for $\frac{32}{12} \times 29$ oe or **B2** for 4640 or 1.29 or 1.288 to 1.289, $\frac{58}{45}$ oe or 32 laps or 29 laps or **M2** for $2^5 \times 5 \times 29$ oe or **M1** for 2 m 40 sec ÷ (2 m 40 sec – 2 m 25 sec) soi for 2 m 25 sec ÷ (2 m 40 sec – 2 m 25 sec) soi or for an attempt to find LCM or 23 200 seen or correctly find prime factors of 145 or 160 or for $\frac{7.6}{145}$ or $\frac{7.6}{2\frac{5}{12}}$ or $\frac{7.6}{2\,\text{min}\,25\,\text{sec}}$ oe, provided SC1 not earned in part (a)
(b)(ii)	220.4	**2**	**M1** for *their* (b)(i) ÷ 2min 40 sec [× 7.6] oe or *their* (a) × *their* (b)(i) ÷ 60 oe

48. 0580_w19_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	1254	2	**M1** for $342 \div 3$
(a)(ii)	27.3 or 27.27…	1	
(b)	867	2	**M1** for $1020 \times \frac{15}{100}$ oe or $1020 \times \left(1 - \frac{15}{100}\right)$ oe
(c)	4.5[0]	3	**M2** for $\frac{79.5[0]}{100+6}[\times 6]$ oe or $\frac{79.5[0]}{100+6} \times 100$ oe or **M1** for 79.5[0] associated with 106[%]
(d)	22.6 or 22.58… nfww	4	**M1** for $\frac{45}{20}$ or better and **M2** for $\frac{60+45}{\textit{their}\ 2\text{h}\ 24\text{min} + \textit{their}\ \frac{45}{20}}$ or **M1** for $\textit{their}\ \frac{45}{20} + \textit{their}$ 2h 24min
(e)	91.6[0] to 91.61	3	**M2** for $480 \times \left(1 + \frac{2.1}{100}\right)^4 - 430$ oe OR **M1** for $480 \times \left(1 + \frac{2.1}{100}\right)^4$ oe **A1** for 522, 521.6[0] to 521.61
(f)	112.8125	2	**B1** for 2.5 or 9.5 seen

49. 0580_m18_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	23.27 final answer	2	**M1** for 9×2.97 soi
(a)(ii)	2.75 final answer	3	**M2** for $2.97 \div \frac{108}{100}$ oe or **M1** for 108[%] associated with 2.97 oe
(b)	12.4[0] or 12.41 to 12.42	2	**M1** for $35 \div 0.0153$ oe If 0 scored, **SC1** for answer 0.19
(c)	70 nfww	3	**M2** for $(600 + 2.5) \div (9 - 0.5)$ or **B1** for one of $600 + 2.5$ or $9 - 0.5$ seen

50. 0580_s18_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)	$\frac{9}{9+7+4}\times 680$	1	
(b)	238 136	3	**B2** for 238 or 136 or **M1** for $\frac{7}{9+7+4}\times 680$ oe or $\frac{4}{9+7+4}\times 680$ oe seen
(c)	272	2	**M1** for $306 \div 1.125$
(d)	1.37	3	**M2** for $(17.56-5\times 2.69)\div 3$ or **M1** for $17.56-5\times 2.69$ or **B1** for 13.45 [cost of apples]
(e)	40.8[0]	3	**3FT** for 0.3 × *their* 136 from part **(b)** or **M2** for *their* $136(\frac{1}{2}+\frac{1}{5})$ or better or **M1** for *their* $136\times\frac{1}{2}$ or *their* $136\times\frac{1}{5}$ or **B1** for 68 or 27.2 or $\frac{3}{10}$ or 0.3 seen

51. 0580_s18_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	6.06 or 6.060 to 6.061	3	**M2** for $\frac{82500-77500}{82500}$[×100] oe or **M1** for $\frac{77500}{82500}$[×100] soi
(b)	13 674 cao	3	**M1** for $12000\left(1+\frac{2.2}{100}\right)^6$ **A1** for 13673.7...

	Answer	Mark	Partial Marks
(a)(i)	85	**1**	
(a)(ii)	455	**2**	**M1** for $260 \div 20 \times 35$ oe
(a)(iii)	61	**3**	**B2** for 61.5… seen or **M1** for $2000 \div 650$ soi or for $\frac{x}{2000} = \frac{20}{650}$ oe or other attempt at scaling up with 650 or for $650 \div 20$ oe
(b)(i)	40	**3**	**M2** for $\frac{1.89 - 1.35}{1.35}$ [$\times 100$] oe or $\frac{1.89}{1.35} \times 100$ oe or **M1** for oe $\frac{1.89}{1.35}$[$\times 100$] soi
(b)(ii)	1.75 nfww	**3**	**M2** for $1.89 \div \left(\frac{100+8}{100}\right)$ or better or **M1** for 1.89 associated with 108 [%]
(c)	10.1 or 10.06…	**3**	**M2** for $\sqrt[3]{\frac{20.8}{15.6}}$ oe or **M1** for $15.6 \times k^3 = 20.8$ oe
(d)(i)	14:15	**3**	**B2** for correct unsimplified 3 term ratio A: B: C or correct unsimplified two term ratio A : C or **M1** for attempt to find common multiple of 4 and 10 or other common value for B or for $7 \times \frac{4}{10}$ oe or $3 \times \frac{10}{4}$ oe

	Answer	Mark	Partial Marks
(d)(ii)	147	**3**	**M2** for $\frac{45}{15}(14 + 20$ [+15]$)$ oe or $45 \div 3 \times 4 + (45 \div 3 \times 4) \div 10 \times 7$ [+ 45] or **M1** for $45 \div 3$ oe or $45 \div$ *their* **(d)(i)** value for C shown

53. 0580_s18_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	13.5	3	**M2** for $\frac{45.4[0]-40}{40}$ [$\times 100$] or $\frac{45.4[0]}{40} \times 100$ or **M1** for $\frac{45.4[0]}{40}$ [$\times 100$]
(a)(ii)	35.5[0]	3	**M2** for $42.6[0] \div \left(1+\frac{20}{100}\right)$ or better or **M1** for recognising 42.6[0] as 120[%]
(b)	150 cao	2	**M1** for $\frac{500\times 2\times 15}{100}$ oe
(c)(i)	7800 cao	3	**B2** for 7790 or 7785 to 7786 or **M1** for $21000\times\left(1-\frac{18}{100}\right)^5$ oe isw If 0 or 1 scored, **SC1** for *their* 7785… seen and rounded correctly to nearest 100
(c)(ii)	9[.00…]	3	**M2** for $\sqrt[12]{\frac{42190}{15000}}$ or better or **M1** for $15000\left(1+\frac{x}{100}\right)^{12}=[42190]$

54. 0580_w18_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	1200	2	**M1** for $1962 \div 1.635$
(a)(ii)	1667.7[0] final answer	2	**M1** for $1962 \times (1 - \frac{15}{100})$ oe or **B1** for 294.3[0] If 0 scored, **SC1** for answer 1020
(a)(iii)	275	2	**M1** for $220 \div$ *their* $(5-1)$ soi
b(i)	165	3	**M2** for $\frac{9752-3680}{3680}$[$\times 100$] oe or $\frac{9752}{3680}\times 100$ oe or **M1** for $\frac{9752}{3680}$ or $9752-3680$
b(ii)	51200	3	**M2** for $\frac{74240}{100+45}$[$\times 100$] oe or **M1** for 74 240 associated with 145[%] oe

55. 0580_w18_ms_43 Q: 2

	Answer	Mark	Partial Marks
(a)(i)	$\frac{240}{(23+25)} \times 23$	**M1**	
(a)(ii)	11 : 10	**2**	**M1** for 110 : 100 or better or **SC1** for 10 : 11, following boys 100, girls 110

	Answer	Mark	Partial Marks
(a)(iii)	276	**2**	**M1** for $240 \times \left(1+\frac{15}{100}\right)$ oe or **B1** for 36 seen
(a)(iv)	150	**3**	**M2** for $\frac{240}{100+60}$ [× 100] oe or **M1** for evidence of 160[%] associated 240
(b)	464 000	**3**	**M1** for $256\,000 \times \left(1+\frac{2}{100}\right)^{30}$ oe **A1** for 463 700 to 463 710 **B1** for *their* more accurate answer seen and rounded to nearest 1000
(c)	4.5[0]	**3**	**M2** for $[x =] \sqrt[32]{4.09}$ oe or **M1** for $(x)^{32} = 4.09$ oe If 0 scored, **SC2** for answer 3.6 or 3.59 or 3.588… or **SC1** for $\sqrt[32]{3.09}$ or 1.0358 to 1.036 seen

56. 0580_m17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)	22.9 or 22.85 to 22.86	**2**	**M1** for $\frac{8}{10+17+8}$ [× 100] oe
(b)	$5635\times\frac{17}{10+17+8}$ or better [= 2737]	**2**	**M1** for $\frac{5635}{(10+17+8)}$
(c)	5000	**3**	**M2** for $5635=k\left(1+\frac{2.42}{100}\right)^5$ oe or **B1** for $\left(1+\frac{2.42}{100}\right)$
(d)	9950	**2**	**M1** for 2 × 2500 or 3 × 1650
(e)	1.98 final answer	**2**	**B1** for 1.976 or 1.98 not final answer or **M1** for 130 × 0.0152

57. 0580_s17_ms_41 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	275.31	**2**	**M1** for 90 × 23.15 + 1885 × 13.5 oe
(a)(ii)	3202	**3**	**M2** for $\frac{198.16-90\times0.245}{0.055}$ oe **M1** for 90 × 0.245 or 90 × 24.5 oe
(b)	17.[0] or 17.00 to 17.01	**2**	**M1** for $13.5\times\left(1+\frac{8}{100}\right)^3$
(c)(i)	40	**3**	**M2** for $\frac{7.7-5.5}{5.5}$ [×100] oe or $\frac{7.7}{5.5}\times100$ or **M1** for $\frac{7.7}{5.5}$ oe
(c)(ii)	11.9 or 11.86 to 11.87	**3**	**M2** for $\sqrt[3]{\frac{7.7}{5.5}}$ oe or **M1** for $5.5\times x^3=7.7$ oe
(d)	150 [million] oe	**2**	**M1** for 390 [million] ÷ (5 + 2 + 6)
(e)	250 nfww	**3**	**M2** for 258.25 ÷ ((100 + 3.3) ÷ 100) or **M1** for 258.25 associated with 103.3[%]

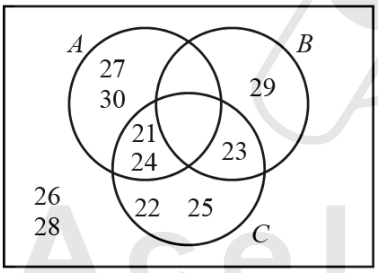
58. 0580_s17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	600 ÷ (11+ 9) × 11 [=330] with no errors seen	**M1**	Could be in separate steps
(a)(ii)	270	**1**	
(b)(i)	372 cao nfww	**3**	**B2** for answer 371.7… or **M1** for $330 \times \left(1+\frac{1.5}{100}\right)^{8}$ oe not spoiled After zero scored, **SC1** for answer 42 or 41.7…
(b)(ii)	12.6 or 12.7 or 12.63 to 12.73	**2**	**M1** for $\frac{\textit{their}\,\textbf{(b)(i)}-330}{330}$ or $\frac{\textit{their}\,\textbf{(b)(i)}}{330}\times 100$ soi by 112.7 or 113 After zero scored, **SC1** for answer 12%
(c)(i)	$\frac{99}{280}$ cao final answer	**1**	
(c)(ii)	27.5[0]	**3**	**M2** for $24.75 \div \frac{100-10}{100}$ oe or **M1** for recognising 24.75 as 90[%] oe
(d)(i)	32 cao	**2**	**M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)$ [x]oe or for 0.15 × 0.8 [x] oe
(d)(ii)	13 cao	**2**	**M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)\times x = 40.84 - 32$ oe seen or for *their* **(d)(i)** + $\left(1-\left(\frac{\textit{their}\,\textbf{(d)(i)}}{100}\right)\right)x = 40.84$ oe

59. 0580_s17_ms_43 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	9550	**1**	
(a)(ii)	23 158 750	**2FT**	**FT** *their* **(a)(i)** × 2425 correctly evaluated **M1** for *their* lower bound × 2425
(a)(iii)	23 160 000	**1FT**	**FT** *their* **(a)(ii)** rounded to 4 sf
(a)(iv)	2.316×10^7	**1FT**	**FT** *their* **(a)(iii)** or *their* **(a)(ii)** rounded to 3sf or more and in standard form
(b)	520 nfww	**3**	**M2** for $546 \times \frac{100}{(100+5)}$ oe or **M1** for 105[%] associated with 546 oe
(c)	3380 or 3376 to 3377	**2**	**M1** for $3\,000 \times \left(1+\frac{3}{100}\right)^4$ oe

60. 0580_s17_ms_43 Q: 10

	ANSWER	MARK	PARTIAL MARKS
(a)		**4**	All 8 regions correct **M3** for 6 or 7 regions correct **M2** for 4 or 5 regions correct **M1** for 3 regions correct
(b)(i)	$\notin$	**1**	
(b)(ii)	$\varnothing$	**1**	
(c)	21, 23, 24, 29	**2FT**	Correct or **FT** **SC1** for 1 omission or 4 correct and 1 extra
(d)(i)	5	**1FT**	Correct or **FT** if less than 10
(d)(ii)	9	**1FT**	Correct or **FT** if less than 10
(e)	$\subset$ or $\subseteq$	**1**	

61. 0580_w17_ms_41 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)	2915	**2**	**M1** for 10 494 ÷ (13 + 5) oe
(b)	1056	**2**	**M1** for 384 ÷ (10 – 6) oe
(c)(i)	52.2 or 52.17…	**2**	**M1** for 20 ÷ 23 or 20 × 60 or 23 ÷ 60 isw If zero scored, **SC1** for answer 52.6 (from use of 0.38)
(c)(ii)	63[.0] or 63.03 to 63.05…	**5**	**M4** for $\frac{\textit{their}\ 52.17... - 32}{32} \times 100$ oe or **M3** for $\frac{\textit{their}\ 52.17... - 32}{32}$ oe or $\frac{\textit{their}\ 52.17...}{32} \times 100$ oe OR **B2** for $\frac{5}{8}$ [hours] oe or 37.5 [minutes] or **M1** for 20 ÷ 32 or better and **M2** for $\frac{\textit{their}\ 37.5 - 23}{23} \times 100$ oe or **M1** for $\frac{\textit{their}\ 37.5 - 23}{23}$ or $\frac{\textit{their}\ 37.5}{23} \times 100$
(d)	0.06 final answer nfww	**3**	**M1** for 11.99 ÷ 0.9276 or 12.99 × 0.9276 **A1** for 12.93 or 12.925 to 12.926
(e)	9750	**3**	**M2** for $7605 \div \left(1 - \frac{22}{100}\right)$ oe or **M1** for (100 – 22)[%] correctly associated with 7605 seen

62. 0580_w17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	4 : 5	**1**	
(a)(ii)	4 : 5	**1**	
(a)(iii)	3 : 4	**2**	**B1** for 12 : 16 or answer 4 : 3
(b)(i)	26.8 or 26.79…	**3**	**M2** for $\frac{15600-11420}{15600}[\times 100]$ or $\frac{11420}{15600}\times 100$ or **M1** for $\frac{11420}{15600}$
(b)(ii)	16000 nfww	**3**	**M2** for $15600\times\frac{100}{100-2.5}$ oe or **M1** for 15600 associated with 97.5[%] seen
(c)	1.6 or $\frac{8}{5}$	**2**	**M1** for $\frac{200\times x\times 15}{100}=48$ oe or **M1** for figs 16
(d)	2.5 or $\frac{5}{2}$ cao nfww	**3**	**B2** for 2.49[9…] or 102.4[99…] or 1.024[99…] or 2.50 or 102.5 or 1.025 or **M2** for $\sqrt[10]{\frac{256}{200}}$ oe or **M1** for $256=200(x)^{10}$ seen