

Q	Answer	Mark	Comments
1	segment	B1	region A
	sector	B1	region B

Q	Answer	Mark	Comments
2	88(%) or 0.88	M1	oe eg 1 – 0.12
	$2200000 \div 88 (\times 100)$ or $25000 (\times 100)$	M1dep	oe eg $2.2 \times 10^6 \div (100 - 12) (\times 100)$ or $2200000 \times [1.136, 1.14]$ or 2500000
	2.5×10^6	A1	oe standard form eg 2.500000×10^6 SC1 2.2×10^6 oe standard form seen SC1 any value seen converted to standard form
Additional Guidance			
M1 or SC1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts			
M1 may be seen in a trial or incorrect working eg 3000000×0.88 or 88% of 2200000			M1
$2200000 \div 88\%$ not recovered			M1M0
$2200000 \times 1.12 = 2464000$ $2.464 \times 10^6 = 2.5 \times 10^6$			SC1

Q	Answer	Mark	Comments
3(a)	The number of blueberries in the tub	B1	

Q	Answer	Mark	Comments						
3(b)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>2</td><td>6</td><td>8</td></tr> <tr> <td>120</td><td>40</td><td>30</td></tr> </table> B2	2	6	8	120	40	30		B1 40 or 8 in the correct position or $(k =) 120 \times 2$ or $(k =) 240$ seen
2	6	8							
120	40	30							
Additional Guidance									
$(k =) 240$ or $(k =) 120 \times 2$ may be seen anywhere on the page									
240 may be seen embedded in the formula eg $120 = \frac{240}{2}$			B1						

Q	Answer	Mark	Comments
4(a)	The same number of 7s as even numbers	M1	any order may be in a list or on the spinner must be at least one 7
	5, 5, 6, 7, 7, 8	A1	any order may be in a list or on the spinner may be implied
	$\frac{2}{6}$	A1ft	oe fraction, decimal or percentage ft M1A0 with completed spinner or list of six numbers
Additional Guidance			
Ignore simplification or conversion attempt after correct answer seen			
Accept 0.33(...) or 33.(...)% for $\frac{2}{6}$			
A list/spinner with blanks and/or using other numbers may still score M1 eg 5, 5, 7, 10 or 5, 6, 7, 7, 8, 9		M1	
$\frac{2}{6}$ with no incorrect working eg 5, 6, 7, 8 on spinner with 2 blanks answer $\frac{2}{6}$ (M1A1 is implied)		M1A1A1	
5, 5, 6, 6, 7, 7 with answer $\frac{2}{6}$		M1A0A1ft	
5, 5, 5, 5, 6, 7 with answer $\frac{4}{6}$		M1A0A1ft	
5, 6, 6, 7, 7, 9 with answer $\frac{2}{6}$		M1A0A0ft	
5, 5, 5, 5, 5, 6 with answer $\frac{5}{6}$		M0A0A0ft	

Q	Answer	Mark	Comments
4(b)	Valid reason	B1	eg sum of probabilities is not 1
	Additional Guidance		
	Ignore irrelevant statements alongside a correct statement eg the sum of the probabilities is not 1 and the probabilities are not percentages	B1	
	Do not ignore incorrect statements alongside a correct statement eg the sum of the probabilities is 0.11 not 1	B0	
	They add up to 1.1	B1	
	They add up to 110%	B1	
	It is 0.1 too much	B1	
	One of the probabilities is 0.1 too much	B1	
	It should be something like 0.1, 0.2, 0.3, 0.4	B1	
	B should be 0.4	B1	
	They don't add up correctly	B0	
	They add up to 0.11	B0	
	It's not a fair spinner	B0	

Q	Answer	Mark	Comments
5(a)	$C (0, 6)$	B1	if answer space is blank, accept $(0, 6)$ written at C on the diagram
	$D (3, 0)$	B1	if answer space is blank, accept $(3, 0)$ written at D on the diagram
Additional Guidance			
For each part mark the answer space unless blank			
Allow x and y written above the coordinates but do not allow eg $(0x, 6y)$			

Q	Answer	Mark	Comments
5(b)	5	B1	
	3	B1	
Additional Guidance			
Mark the answer lines only			
Do not allow eg $(0, 5)$			

Q	Answer	Mark	Comments
6	6.4×10^{-14}	B1	oe standard form eg 6.40×10^{-14}

Q	Answer	Mark	Comments
7	$\frac{52}{200}$ or $\frac{26}{100}$ or $\frac{13}{50}$	B1	oe fraction, decimal or percentage eg 0.26 or 26%
	Valid reason involving the number of trials	B1	eg it is from using the largest number of flips
	Additional Guidance		
	1st B1 Ignore simplification or conversion attempt after correct answer seen eg $\frac{52}{200} = 0.28$		1st B1
	52 out of 200 or 52 : 200		1st B0
	Probability from incorrect working eg $\frac{10 + 30 + 40 + 50}{50 + 100 + 150 + 200} = \frac{130}{500}$		1st B0
	Ignore irrelevant statements alongside a correct statement eg Using most flips and they could have done more		2nd B1
	Do not ignore incorrect statements alongside a correct statement eg Uses all the flips but they could have used 100 flips		2nd B0
	It uses all the flips		2nd B1
	More spins		2nd B1
	200 is the largest amount of data		2nd B1
	200 is the highest number		2nd B1
	200 is the total number of flips		2nd B0
	200 flips gives 52 heads		2nd B0
	200 is the final result		2nd B0
	That is the highest number in the table		2nd B0
	The highest results are more accurate		2nd B0
	100 flips is easier to work out		2nd B0
	He could use any of the results		2nd B0
	B0B1 is possible eg Answer 27% Reason Use the one from most spins		B0B1

Q	Answer	Mark	Comments
8	A change in distance for an integer time interval or a change in distance for a non-integer time interval with the corresponding time interval	M1	integer time intervals are [88, 92] [70, 74] [52, 56] [34, 38] [16, 20] may be seen on graph
	$\frac{\text{their change in distance}}{\text{corresponding time interval}}$	M1dep	oe eg $\frac{[88, 92]}{5}$ must see their change in distance and the corresponding time interval division by 1 may be implied
	18	A1	SC1 24
	Additional Guidance		
	M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	90 × 5		M1M0
	(1 second) Answer [16, 20] is awarded at least M2		
	18 from incorrect working cannot score A1		
	18 followed by further work eg $18 \div 5 = 3.6$		M1M0

Q	Answer	Mark	Comments
9	Only intersection shaded	B1	mark intention

Q	Answer	Mark	Comments
10	Alternative method 1: works year by year		
	90 000 × 1.03 or 92 700 or 90 000 × 1.08 or 97 200	M1	oe eg $90\ 000 + 90\ 000 \times 0.03$
	90 000 × 1.03 × 1.08 or 100 116	M1dep	oe eg $92\ 700 \times 1.08$
	100 116 and Yes	A1	oe eg $100\ 116 > 100\ 000$ SC1 99 900 seen
	Alternative method 2: uses multipliers		
	1.03 × 1.08 or 1.112(4)	M1	oe
	$\frac{100\ 000}{90\ 000}$ or 1.111(...) or $\frac{100\ 000}{1.03 \times 1.08}$ or [89 895, 89 900]	M1	oe $\frac{100\ 000}{1.03 \times 1.08}$ or [89 895, 89 900] is M2
	1.112(4) and 1.111(...) and Yes or [89 895, 89 900] and Yes	A1	oe eg 1.112(4) and 1.111(...) so it is more SC1 99 900 seen
	Additional Guidance		
	M1 or SC1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	A correct value is sufficient for showing working eg1 Alt 1 100 116		M2A0
	eg2 Alt 1 100 116 and Yes		M2A1
	Alt 1 $90\ 000 \times 103\%$ not recovered		M0
	Alt 2 Yes cannot be implied only by an inequality		
	SC1 is from increasing 90 000 by 11%		

Q	Answer	Mark	Comments
	$15 \times 20000 \div 100 \div 1000$	M2	oe full method eg $300000 \div 100 \div 1000$ or 0.2×15 or 0.00015×20000 M1 one correct step eg 15×20000 or 300000 or $20000 \div 100$ or 200 or $20000 \div 1000$ or 20 or $15 \div 100$ or 0.15 or $15 \div 1000$ or 0.015 or 100×1000 or 100000
11	3	A1	
Additional Guidance			
M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts			
M2 will usually be seen in stages eg $20000 \div 100 = 200$ $200 \times 15 = 3000$ $3000 \div 1000$			M2
M1 may be seen embedded in more than one step (extra steps could be incorrect) eg $15 \times 20000 \div 100$ or 3000 or $15 \times 20000 \div 1000$ or 300 or $20000 \div 100 \div 1000$ or 0.2 or $15 \div 100 \div 1000$ or 0.00015			M1
Ignore their units for method marks			

Q	Answer	Mark	Comments
12	SSS	B1	

Q	Answer	Mark	Comments
13	15×7.2 or 108 and 18×7.6 or 136.8 and 7×8 or 56	M1	oe implied by 300.8 allow one product or f_x value to be incorrect
	$(108 + 136.8 + 56) \div 40$ or $300.8 \div 40$ or $\frac{188}{25}$	M1dep	oe do not allow if any exact f_x or Σf_x value is approximated
	7.52	A1	accept 7.5 if 7.52 in working lines with no incorrect method
Additional Guidance			
M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts			
$15 \times 7.2 \quad 18 \times 7.6 \quad 7 \times 8$ $(108 + 137 + 56) \div 40$ (f_x value 137 is approximated)			M1 M0
$108 + 136.8 + 56 = 300.8$ $300 \div 40$ (Σf_x value 300 is approximated)			M1 M0
M1dep Missing brackets must be recovered eg $108 + 136.8 + 56 \div 40$ not recovered			M1M0
7.52 in working with answer $7.4 \leq d < 7.8$			M2A0

Q	Answer	Mark	Comments
14(a)	$15 = 3^2 + c$ or $(c =) 6$	M1	oe
	$7^2 +$ their 6	M1dep	oe
	55	A1	

Q	Answer	Mark	Comments
14(b)	It is impossible to tell	B1	

Q	Answer	Mark	Comments
15	Alternative method 1: works out concrete poured in 30 minutes $10.9 \times 30 \times 60 \div 1000$ or 19.6(2) or $10.9 \times 30 \times 60$ or 19 620 and 20×1000 or 20 000		
		M3	oe full method eg $10.9 \times 1800 \div 1000$ or $30 \times 654 \div 1000$ or $19620 \div 1000$ M2 two correct steps eg $10.9 \times 30 \times 60$ or 19 620 or $10.9 \times 30 \div 1000$ or 0.327 or $10.9 \times 60 \div 1000$ or 0.654 or $30 \times 60 \div 1000$ or 1.8 M1 one correct step eg 10.9×30 or 327 or 10.9×60 or 654 or $10.9 \div 1000$ or 0.0109 or 30×60 or 1800 or $30 \div 1000$ or 0.03 or $60 \div 1000$ or 0.06 or 20×1000 or 20 000
	19.6(2) and No or 19 620 and 20 000 and No	A1	oe eg 19.62 so it isn't

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15 cont	Alternative method 2: works out time for 20 tonnes at given rate		
	$20 \times 1000 \div 10.9 \div 60$ or [30.5, 30.6] or $20 \times 1000 \div 10.9$ or [1834, 1835] and 30×60 or 1800	M3	oe full method eg $20000 \div 10.9 \div 60$ or $20 \times [91.7, 91.74312] \div 60$ or [1834, 1835] $\div 60$ M2 two correct steps eg $20 \times 1000 \div 10.9$ or [1834, 1835] or $20 \times 1000 \div 60$ or 333.(...) or $20 \div 10.9 \div 60$ or [0.0305, 0.031] or $1000 \div 10.9 \div 60$ or [1.52, 1.53] M1 one correct step eg 20×1000 or 20000 or $20 \div 10.9$ or [1.83, 1.835] or $20 \div 60$ or 0.33(...) or $1000 \div 10.9$ or [91.7, 91.74312] or $1000 \div 60$ or [16.6, 16.7] or 10.9×60 or 654 or 30×60 or 1800
	[30.5, 30.6] and No or [1834, 1835] and 1800 and No	A1	oe eg 30.6 so it isn't
	Additional Guidance		
	Up to M2 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	M3 or M2 will usually be seen in stages eg Alt 1 $10.9 \times 30 = 327$ $327 \times 60 = 19620$ $19620 \div 1000$		
	M2 or M1 may be seen embedded in more than one step (extra steps could be incorrect)		
	No may be indicated by selecting the box or a statement in the working lines		
	No cannot be implied only by an inequality		
	A correct value is sufficient for showing working eg Alt 1 19.62 and No		
	Ignore their units throughout		
	Other approaches are possible eg works out rate in kg per s for 20 tonnes in 30 minutes and compares to 10.9		

Q	Answer	Mark	Comments
16	Fully correct box plot with shortest at 2.4 cm LQ at 4 cm median at 6 cm UQ at 7 cm longest at 9 cm	B3	mark intention B2 box plot with four correct plots and one incorrect/omitted plot or box plot with five correct plots and at most one extra plot B1 at least three correct plots
Additional Guidance			
A box plot must be a rectangle with 'whiskers'			
Accept 'whiskers' ending in points rather than vertical lines			
For B2 condone the median given as a point in the rectangle			

Q	Answer	Mark	Comments
17	$\frac{1}{4}x + 15 + \frac{2}{3}x - 44 = 180$	M1	oe equation
	$\frac{1}{4}x + \frac{2}{3}x = 180 - 15 + 44$ or $3x + 180 + 8x - 528 = 2160$	M1dep	oe equation with terms collected eg $\frac{11}{12}x = 209$ or oe equation with fractions eliminated eg $11x = 2508$
	$(x =) 209 \div \frac{11}{12}$ or $(x =) 228$	M1dep	oe calculation that leads to $(x =) 228$ eg $(x =) 2508 \div 11$ implied by 72 and 108
	72 : 108	A1	oe ratio eg 2 : 3 or 1 : 1.5 or $\frac{2}{3} : 1$
Additional Guidance			
Ignore simplification attempt after correct ratio seen eg 72 : 108 in working with answer 36 : 52		M3A1	
Accept [0.66, 0.67] for $\frac{2}{3}$			
Accept [0.91, 0.92] for $\frac{11}{12}$			
Accept [1.09, 1.1] for $\frac{12}{11}$			

Q	Answer	Mark	Comments
Alternative method 1: only uses trigonometry			
	$\cos 52 = \frac{x}{23.7}$	M1	oe eg $\sin(90 - 52) = \frac{x}{23.7}$ or $\frac{x}{\sin 38} = \frac{23.7}{\sin 90}$ accept [0.61, 0.62] for $\cos 52$ or $\sin 38$
	$23.7 \times \cos 52$	M1dep	oe eg $23.7 \times \sin 38 \div \sin 90$ accept [0.61, 0.62] for $\cos 52$ or $\sin 38$
[14.59, 14.6]		A1	SC1 [18.4, 18.723]
Alternative method 2: uses trigonometry and Pythagoras			
18 23.7 ² and $(23.7 \times \sin 52)^2$ or [561.6, 561.7] and [338, 351]		M1	oe accept [0.78, 0.79] for $\sin 52$ accept [18.4, 18.723] for $23.7 \times \sin 52$
	$\sqrt{23.7^2 - (23.7 \times \sin 52)^2}$ or $\sqrt{[210.6, 223.7]}$	M1dep	oe accept [0.78, 0.79] for $\sin 52$ accept [18.4, 18.723] for $23.7 \times \sin 52$
	[14.59, 14.6]	A1	SC1 [18.4, 18.723]
Additional Guidance			
	SC1 is from a diagonal making an angle of 38° with x		

Q	Answer	Mark	Comments
	One of $12x^2 + 8x$ $-12x^2 + 10x$ $-18x - 42$	M1	may be seen in a grid
	Two of $12x^2 + 8x$ $-12x^2 + 10x$ $-18x - 42$	M1dep	may be seen in a grid
19(a)	$12x^2 + 8x$ and $-12x^2 + 10x$ and $-18x - 42$ and -42	A1	must see 6 correct terms and a final simplification to -42
Additional Guidance			
For terms seen in a grid accept eg $8x$ for $+8x$			
Accept multiplication signs between coefficients and algebra eg $12 \times x^2 + 8 \times x$			1st M1
Accept eg $+ -12x^2$ for $-12x^2$			
Do not accept unprocessed brackets eg do not accept $-(18x + 42)$			
Crossed out terms are likely to be their working rather than deleted work			

Q	Answer	Mark	Comments
19(b)	$(4x + 5)(2x - 7)$	B2	oe factorisation eg $(-2x + 7)(-4x - 5)$ B1 $(ax + b)(cx + d)$ where $ac = 8$ and $bd = -35$ or $(ax + b)(cx + d)$ where $ac = 8$ and $ad + bc = -18$ allow multiplication signs for B2 or B1
	Additional Guidance		
	B1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	$(8x - 7)(x + 5)$ $(ac = 8$ and $bd = -35)$	B1	
	$(2x - 3)(4x - 3)$ $(ac = 8$ and $ad + bc = -18)$	B1	
	For B1 allow use of fractions or decimals eg $(4x + 10)(2x - 3.5)$	B1	
	For B1 allow eg $8(x + 1.25)(x - 3.5)$	B1	
	Condone missing final bracket for B2 or B1 Ignore any attempt to 'solve' eg $(4x + 5)(2x - 7)$ in working lines with -1.25 and 3.5 on answer lines	B2	

Q	Answer	Mark	Comments	
20	$x^2 - 9x + 3x - 27$ or $x^2 - 6x - 27$	M1	oe implied by eg $\frac{1}{2}x^2 - \frac{9}{2}x + \frac{3}{2}x - \frac{27}{2}$ may be seen in a grid	
	their $(x^2 - 9x + 3x - 27) = 12 - 2x^2$	M1dep	oe equation with brackets expanded eg their $\left(\frac{1}{2}x^2 - \frac{9}{2}x + \frac{3}{2}x - \frac{27}{2}\right) = 6 - x^2$	
	3 $x^2 - 6x - 39 (= 0)$ or 3 $x^2 - 6x = 39$	M1dep	oe $ax^2 + bx + c (= 0)$ or $px^2 + qx = r$ eg $x^2 - 2x - 13 (= 0)$ or $\frac{3}{2}x^2 - 3x - \frac{39}{2} (= 0)$ implied by eg $\frac{2 \pm \sqrt{56}}{2}$	
	$d = k$ $e = 14k^2$ $f = k$ where k is a non-zero constant	A1	eg $d = 1$ $e = 14$ $f = 1$ or $d = 2$ $e = 56$ $f = 2$ or $d = 6$ $e = 504$ $f = 6$	
Additional Guidance				
Take the values on the answer lines as the final answer		eg $\frac{2 \pm \sqrt{56}}{2}$ in working with $d = 2$ $e = \sqrt{56}$ $f = 2$ on answer lines		M3A0
1 $\pm \sqrt{14}$ in working with $d = 1$ $e = 14$ $f =$ (blank)				M3A0
For terms seen in a grid accept eg $3x$ for $+3x$				
For up to M2 accept algebraic fractions but do not allow 3rd M1 unless recovered		eg $\frac{x^2 - 9x + 3x - 27}{x + 3} = \frac{12 - 2x^2}{x + 3}$		M1M1

Q	Answer	Mark	Comments
21	Alternative method 1: uses total and proportion in S with W		
	$4480 \times \frac{9}{7}$ or 5760	M1	oe total in S with W eg 640×9
	$1 - \frac{1}{4} - \frac{3}{10}$ or $\frac{9}{20}$	M1	oe proportion in S with W eg 0.45 or 45%
	their 5760 \div their $\frac{9}{20}$	M1dep	oe full method dep on M2
	12800	A1	
	Alternative method 2: uses total in S with W and total in N with E		
	$4480 \times \frac{9}{7}$ or 5760	M1	oe total in S with W eg 640×9
	$4480 \times \frac{11}{7}$ or 7040	M1	oe total in N with E eg 640×11
	their 5760 + their 7040	M1dep	oe full method eg 640×20 dep on M2
	12800	A1	
	Alternative method 3: sets up an equation		
	$4480 \times \frac{9}{7}$ or 5760	M1	oe total in S with W eg 640×9
	$\frac{1}{4}x + \frac{3}{10}x + \text{their 5760} = x$	M1dep	oe equation in any variable eg $10x + 12x + 230400 = 40x$
	their 5760 \div $\left(1 - \frac{1}{4} - \frac{3}{10}\right)$	M1dep	oe full method eg $230400 \div 18$
	12800	A1	

Question 21 continues on the next page

21 cont	Alternative method 4: works out proportion in W or proportion in S		
	$1 - \frac{1}{4} - \frac{3}{10}$ or $\frac{9}{20}$	M1	oe proportion in S with W eg 0.45 or 45%
	$\frac{7}{9} \times \text{their } \frac{9}{20}$ or $\frac{7}{20}$ or $\frac{2}{9} \times \text{their } \frac{9}{20}$ or $\frac{2}{20}$	M1dep	oe proportion in W eg 0.35 or 35% eg $\frac{7}{7+2} \times \text{their } \frac{9}{20}$ or oe proportion in S eg 0.1 or 10% eg $\frac{2}{7+2} \times \text{their } \frac{9}{20}$
	$4480 \div \text{their } \frac{7}{20}$ or $4480 \times \frac{2}{7} \div \text{their } \frac{2}{20}$	M1dep	oe full method eg 640×20
	12800	A1	
	Additional Guidance		
Up to M2 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts			
Proportions can be percentages but in calculations values must be used eg Alt 1 $5760 \div 45\%$ is awarded M2 but cannot be awarded the 3rd M1 unless $\frac{9}{20}$ or 0.45 is subsequently used correctly			

Q	Answer	Mark	Comments
22	4.791	B3	B2 [4.789, 4.7913] B1 4 or 4.75
Additional Guidance			
Ignore values written as fractions			
Ignore the suffixes			

Q	Answer	Mark	Comments
23	<p>One correct expression eg $(\vec{DE}) = 6\mathbf{a} + \mathbf{b} + 2\mathbf{a} - 5\mathbf{b}$ or $(\vec{DF}) = 6\mathbf{a} + \mathbf{b} + 4\mathbf{a} - 6\mathbf{b}$ or $(\vec{EF}) = -2\mathbf{a} + 5\mathbf{b} + 4\mathbf{a} - 6\mathbf{b}$</p>	M1	<p>oe eg $(\vec{ED}) = -6\mathbf{a} - \mathbf{b} - 2\mathbf{a} + 5\mathbf{b}$ or $(\vec{FD}) = -6\mathbf{a} - \mathbf{b} - 4\mathbf{a} + 6\mathbf{b}$ or $(\vec{FE}) = 2\mathbf{a} - 5\mathbf{b} - 4\mathbf{a} + 6\mathbf{b}$ accept unprocessed brackets eg $(\vec{EF}) = -(2\mathbf{a} - 5\mathbf{b}) + 4\mathbf{a} - 6\mathbf{b}$</p>
	<p>Two correct expressions from \vec{DE} \vec{DF} \vec{EF}</p>		<p>oe eg \vec{DE} and \vec{FD} accept unprocessed brackets</p>
	<p>Two fully simplified expressions from $(\vec{DE}) = 8\mathbf{a} - 4\mathbf{b}$ $(\vec{DF}) = 10\mathbf{a} - 5\mathbf{b}$ $(\vec{EF}) = 2\mathbf{a} - \mathbf{b}$</p>	A1	<p>oe eg $(\vec{DE}) = 8\mathbf{a} - 4\mathbf{b}$ and $(\vec{FD}) = -10\mathbf{a} + 5\mathbf{b}$</p>
	<p>Two fully simplified expressions from $(\vec{DE}) = 8\mathbf{a} - 4\mathbf{b}$ $(\vec{DF}) = 10\mathbf{a} - 5\mathbf{b}$ $(\vec{EF}) = 2\mathbf{a} - \mathbf{b}$ and valid indication that the vectors are parallel</p>	A1	<p>eg $(\vec{DE}) = 8\mathbf{a} - 4\mathbf{b}$ and $(\vec{FE}) = -2\mathbf{a} + \mathbf{b}$ and $8\mathbf{a} - 4\mathbf{b} = -4(-2\mathbf{a} + \mathbf{b})$ or $(\vec{DF}) = 10\mathbf{a} - 5\mathbf{b}$ and $(\vec{EF}) = 2\mathbf{a} - \mathbf{b}$ and $\vec{DF} = 5\vec{EF}$</p>
	Additional Guidance		
	Condone absence of vector notation		
	Condone eg \vec{DCE} or D to E for \vec{DE}		
	If the only two correct expressions are eg \vec{DE} and \vec{ED} the maximum possible mark is M1		
	Only combining the three given vectors	Zero	
	$\vec{DF} = \vec{DE} + \vec{EF}$ is not a valid indication		
	Stating eg \vec{DF} is a (scalar) multiple of \vec{EF} is not enough for the final A1		

Q	Answer	Mark	Comments
24(a)	$(k =) 21 \times 6$ or $(k =) 126$	M1	oe may be implied eg $y = \frac{126}{x}$
	10.5 or $\frac{21}{2}$	A1	oe value eg $\frac{126}{12}$ ignore units
	Additional Guidance		
Ignore simplification or conversion attempt after correct answer seen			
10.5 only seen embedded eg $10.5 \times 12 = 126$			M1A0

Q	Answer	Mark	Comments
24(b)	$21 = A \times \frac{1}{3}$ or $(A =) 21 \times 3$ or $(A =) 63$	M1	oe eg $21 = A \times \left(\frac{1}{3}\right)^{\frac{1}{6} \times 6}$ implied by $(y =) 7$
	$(y =) 7$ and middle box ticked	A1ft	ft decision using their 10.5 in (a) must have $(y =) 7$
	Additional Guidance		
A correct value is sufficient for showing working			
Decision may be indicated by selecting a box or a statement in the working lines			
Decision cannot be implied only by an inequality			