

# EDUQAS GCSE MATHEMATICS

## SUMMER 2022 MARK SCHEME

Component 1: Foundation Tier	Mark	Comment
1. (a)(i) 1200	B1	
1. (a)(ii) 0.6(00)	B1	Ignore trailing zeros; Accept $\frac{6}{10}$ oe
1. (a)(iii) 22	B1	
1. (a)(iv) 13	B1	
1. (b)(i) 44(%)	B1	
1. (b)(ii) 0.87	B1	
1. (c) 7	B1	Accept $\pm 7$ ; allow $-7$ ; Do <b>not</b> accept $7 \times 7 = 49$ or just $7 \times 7$
	(7)	
2. (a) likely and no others options indicated	B1	
2. (b)(i) Arrow marked at 0	B1	Allow clear intention to indicate 0
2. (b)(ii) Arrow marked at $\frac{1}{3}$	B1	Allow clear intention to indicate $\frac{1}{3}$
	(3)	
3. (a) 0.315 indicated	B1	
3. (b) $(48 \div 4 =) 12$	B1	May be embedded
$(45 \div 5) \times 2$	M1	
18	A1	May be embedded; $80 + 12 - 18$ or $80 - 18 + 12$ earns B1 M1 A1
$(80 + 12 - 18 =) 74$	B1	FT 'their derived 12' and 'their derived 18'
	(5)	

4. (a)	<table border="1"> <tr><td>Girl</td><td>Boy</td></tr> <tr><td>P</td><td>T</td></tr> <tr><td>P</td><td>W</td></tr> <tr><td>R</td><td>T</td></tr> <tr><td>R</td><td>W</td></tr> <tr><td>S</td><td>T</td></tr> <tr><td>S</td><td>W</td></tr> <tr><td>Z</td><td>T</td></tr> <tr><td>Z</td><td>W</td></tr> </table>	Girl	Boy	P	T	P	W	R	T	R	W	S	T	S	W	Z	T	Z	W	B2	<p>Rows could be in any order; letters could be lower case</p> <p>B1 for any 4 or 5 of the remaining 6 rows with no incorrect rows; OR for all 6 remaining rows with extra rows;</p> <p>For B2 they must only have the correct 6 expected rows <b>except</b> B2 can also be awarded if all 6 correct expected rows are given and the 2 given rows are repeated <b>AND</b> 8 outcomes indicated in (b) e.g. by a fraction with denominator 8.</p>
Girl	Boy																				
P	T																				
P	W																				
R	T																				
R	W																				
S	T																				
S	W																				
Z	T																				
Z	W																				
4. (b)	$\frac{1}{8}$ oe	B1	<p>FT 'their <math>\frac{1}{8}</math>', provided they have at least 4 correct added rows;</p> <p>Allow e.g. 0.125 or 12.5% <b>but</b> B0 for e.g. 1 in 8 or 1 : 8</p>																		
		(3)																			
5. (a)	(-2, 5)	B1																			
5. (b)	$D$ marked at (-2, -1) and $CD = 5$ (cm)	B2	<p>Tolerance <math>\pm 2</math> mm</p> <p>B1 for <math>D</math> marked at (-2, -1) OR B1STRICT FT for 'their length <math>CD</math>', Allow unambiguous mark at (-2, -1)</p>																		
		(3)																			
6. (a)	2.5 $\times$ 10 + 16 oe, si	M1																			
	41 (minutes)	A1																			
6. (b)	(26 - 16) $\div$ 2.5 oe, si	M1	implied by e.g. '26 - 16 = 10, 2.5 $\times$ 4 = 10' or '2.5 $\times$ 4 = 10, 10 + 16 = 26'; build-up method may be used to find 10																		
	4 (kebabs)	A1	Accept $26 = 2.5 \times 4 + 16$ for A1 provided there is no contradiction of 4																		
		(4)																			

7. (a)	$(300 \div 100) \times 8$ oe	M1	Full method; may be in stages; may be a build-up method e.g. '1% = 3, 2% = 3 + 3, 4% = 6 + 6, 8% = 12 + 12' or '10% = 30, 5% = 15, 1% = 3, 15 + 9'
	(£)24(.00)	A1	Allow £24.00p or 2400p; mark final answer
7. (b)	$(15 \div 3 =) (\text{£})5(.00)$ oe	B1	If units are given they must be correct;
	$8 \div 10 \times 6$ or $800 \div 10 \times 6$ oe	M1	May be a build-up method e.g. $10\% = 0.80$ , $50\% = 4$ , $10\% + 50\% = 0.80 + 4$ ;
			Allow for $\frac{60}{100} \times 800$ or $\frac{60}{100} \times 8$
	(£)4.8(0) or 480(p)	A1	CAO; implies M1
	(4.80 + 5 =) (£)9.8(0) or 980(p)	B1	FT 'their 5' + 'their 4.8(0)' providing correct method shown for each  Allow £9.80p; correct answer implies 4 marks provided not from wrong working; mark final answer
<i>Alternative method</i>			
	$(15 \div 3 \times 2 =) (\text{£})10(.00)$ oe	B1	
	$8 \div 10 \times 4$ or $800 \div 10 \times 4$ oe	M1	May be a build-up method e.g. $10\% = 0.80$ , $50\% = 4$ , $50\% - 10\% = 4 - 0.80$ ;  Allow for $\frac{40}{100} \times 800$ or $\frac{40}{100} \times 8$
	(£)3.2(0) or 320(p)	A1	CAO; implies M1
	$(15 + 8 - 10 - 3.20 =)$ (£)9.8(0) or 980(p)	B1	FT 23 – 'their 10' + 'their 3.2(0)' providing correct method shown for each  Allow £9.80p; correct answer implies 4 marks provided not from wrong working; mark final answer
		(6)	

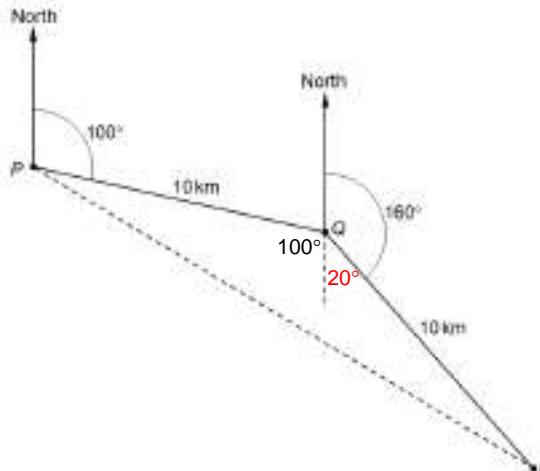
8. (a) $9 \times 6.5$ oe, si  (£) 58.5(0)	M1  A1	May be in stages; may be a build-up method but must clearly be for $9 \times 6.5$ not e.g. $9 \times 6$  CAO
8. (b) $\frac{314 - 160}{14} \text{ oe, si}$  (£) 11(0.00 per hour)	M2  A1	May be in stages; may use a build-up approach to find how many 14's are in 154  M1 for sight of $314 - 160 (= 154)$  CAO
		(5)
9. (a) $x + 8$	B1	mark final answer;
9. (b) $6 \times x + 10(x + 8)$  $6 \times x + 10 \times x + 80$  $16x + 80$	M1  M1  A1	FT 'their $x + 8$ ', need not be binomial  FT 'their $x + 8$ ', providing it is binomial  FT 'their $6x + ax + b$ ', for non-zero $a, b$ ; ignore attempts to factorise after correct answer seen;  If no marks award SC2 for $(6x + 6(x + 8) \rightarrow) 6x + 6x + 48$ and $12x + 48$ or $(10x + 6(x + 8) \rightarrow) 10x + 6x + 48$ and $16x + 48$ or $(10x + 10(x + 8) \rightarrow) 10x + 10x + 80$ and $20x + 80$  or award SC1 for the correct expansion of '10×their( $x + 8$ )' providing their( $x + 8$ ) is binomial or for the correct expansion of $10(x + 8)$ or $6(x + 8)$
		(4)
10. $(2^3 =) 8$ si  $(6^2 =) 36$ si  $\frac{2}{9}$ final answer	B1  B1  B1	
		FT $\frac{\text{'their 8'}}{\text{'their 36'}}$ simplified to a fraction in lowest terms; NB B0 if $\frac{\text{'their 8'}}{\text{'their 36'}}$ is already in lowest terms
		(3)

11. (a) 12, 13, 14, 14, 17 OR 12, 14, 14, 15, 17 OR 12, 14, 14, 16, 17	B2	<p>Ages can be in any order for B2</p> <p>B1 for a correct interpretation of the range or mode si e.g.  eldest child 17 indicated and no child younger than 12 given (range)  or  more than 1 child aged 14 indicated and no other mode (mode)</p>
11. (b) <p>Uses only the cost of  1 Mega Burger, 1 Chicken Burger  1 Fish Pie, 1 Vegetarian Lasagne</p> <p>Uses an appropriate calculation  e.g.  <math>9 + 9 + 10 + 7</math> or  <math>48 - 7 - 6</math> or  <math>50 - 8 - 7</math></p> <p>(£)35(.00)</p>	B1  M1  A1	<p>e.g.  does not include the £7(.25) and £6(.30) in their calculation for the bill</p> <p>FT 'their 4 list choices';  allow one incorrect estimate out of 4 or 6 e.g.  <math>9 + 9 + 9 + 7</math> or  <math>9 + 7.20 + 9 + 6.30 + 9.90 + 6.80</math></p> <p>allow e.g. <math>9 + 7 + 9 + 6 + 10 + 7</math>  OR rounding to the nearest 10p e.g.  <math>9 + 9 + 9.9 + 6.8</math> or  <math>9 + 7.30 + 9 + 6.30 + 9.90 + 6.80</math>  OR rounding to the nearest 50p e.g.  <math>9 + 7.50 + 9 + 6.50 + 10 + 7</math></p> <p>CAO; does not imply M1; not from wrong working  if B0 M1 award SC1  for (£)35(.00)  (from e.g. <math>9 + 7 + 9 + 10</math> discarding the two cheapest items)  or for (£)48(.00)  (from e.g. <math>9 + 7 + 9 + 6 + 10 + 7</math>)  or for (£)49(.00)  (from <math>9 + 7.50 + 9 + 6.50 + 10 + 7</math>)</p>
(5)	(5)	

12. (a) 432 ÷ 12  (£)36	M1  A1	May be awarded for a convincing build up method e.g. counting on in 12s
12. (b)  Sight of $(30 \times 20 =) 600$ (p) or $(30 \times 0.2(0) =) (£)6(0.00)$	B1	
Sight of $500 \times 14$ or $500 \times 0.14$ oe  7000(p) or (£)70(.00)	M1  A1	Accept $5 \times 14$ ; may be implied  CAO
$(7000 + 600 =) 7600$ (p) or $(70.00 + 6.00 =) (£)76(0.00)$	B1	FT 'their $500 \times 14$ ' + 'their derived 6' oe, providing M1 awarded and $30 \times 20$ oe attempted; may be implied in later work;
$(VAT =) 380$ (p) or (£)3.8(0)	B1	FT 5% of 'their 7600' or 'their 76(.00)' providing that 'their 7600 or 76' is from an attempt to sum both the fixed charge and electricity for <u>30 days</u>  may be embedded e.g. B1 for $7600 + 380$
7980(p) or (£)79.8(0) ISW	B1	FT providing previous B1 B1 awarded; if units are stated they must be correct; correct answer implies previous B1
	(8)	

<p>13.</p> <p><math>(\frac{1}{2} \text{ pt} = ) 300 \text{ ml or } 500 \text{ ml} = \frac{5}{6} \text{ pt si}</math></p> <p>or uses a common multiple of 600 and 500 or 300 and 500</p> <p>Valid method of comparison</p> <p>Accurate comparison showing bottle is better value</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Allow for 600 ml = £3; 300 ml implied by e.g. <math>150 \div 3</math></p> <p>Allow for use of a better pints/ml conversion e.g. 1 litre = 1.75 pints or 1 pint = 568 ml</p> <p>Examples of valid comparisons:</p> <table border="1" data-bbox="822 473 1335 832"> <thead> <tr> <th></th><th>Glass</th><th>Bottle</th></tr> </thead> <tbody> <tr> <td>per 100 ml</td><td><math>150 \div 3</math></td><td><math>200 \div 5</math></td></tr> <tr> <td>per 3000 ml</td><td><math>10 \times 1.5(0)</math></td><td><math>6 \times 2</math></td></tr> <tr> <td><math>\frac{5}{6} \text{ pt/ 500 ml}</math></td><td><math>1.50 \div 3 \times 5</math></td><td>(2)</td></tr> <tr> <td><math>\frac{3}{6} \text{ pt / 300 ml}</math></td><td>(1.50)</td><td><math>2 \div 5 \times 3</math></td></tr> <tr> <td>ml per 50p</td><td><math>300 \div 3</math></td><td><math>500 \div 4</math></td></tr> <tr> <td>ml per p</td><td><math>300 \div 150</math></td><td><math>500 \div 200</math></td></tr> <tr> <td>ml per £6</td><td><math>300 \times 4</math></td><td><math>500 \times 3</math></td></tr> </tbody> </table> <p>or (Glass) <math>150 \div 3</math> per 100 ml and their 50p <math>\times 5 = \dots</math></p> <p>or (Bottle) <math>200 \div 5</math> per 100 ml and their 40p <math>\times 3 = \dots</math></p> <p>For the M1 ignore units as long as the calculations are consistent</p> <p>M0 for considering the difference in capacity/cost</p> <p>FT 'their conversion factor' if used</p> <p>Examples of accurate comparisons:</p> <table border="1" data-bbox="822 1297 1335 1641"> <thead> <tr> <th></th><th>Glass</th><th>Bottle</th></tr> </thead> <tbody> <tr> <td>per 100 ml</td><td>50(p)</td><td>40(p)</td></tr> <tr> <td>per 3000 ml</td><td>(£)15</td><td>(£)12</td></tr> <tr> <td><math>\frac{5}{6} \text{ pt/ 500 ml}</math></td><td>(£)2.50</td><td>(£2)</td></tr> <tr> <td><math>\frac{3}{6} \text{ pt / 300 ml}</math></td><td>(£1.50)</td><td>(£)1.20</td></tr> <tr> <td>ml per 50p</td><td>100</td><td>125</td></tr> <tr> <td>ml per p</td><td>2</td><td>2.5</td></tr> <tr> <td>ml per £6</td><td>1200</td><td>1500</td></tr> </tbody> </table> <p>or (Glass) 50 p per 100 ml and <math>50p \times 5 = £2.50</math></p> <p>or (Bottle) 40 p per 100 ml and <math>40p \times 3 = £1.20</math></p> <p>Units may be missing but the values stated must then be in the same unit. If units are stated then they must be used correctly.</p>		Glass	Bottle	per 100 ml	$150 \div 3$	$200 \div 5$	per 3000 ml	$10 \times 1.5(0)$	$6 \times 2$	$\frac{5}{6} \text{ pt/ 500 ml}$	$1.50 \div 3 \times 5$	(2)	$\frac{3}{6} \text{ pt / 300 ml}$	(1.50)	$2 \div 5 \times 3$	ml per 50p	$300 \div 3$	$500 \div 4$	ml per p	$300 \div 150$	$500 \div 200$	ml per £6	$300 \times 4$	$500 \times 3$		Glass	Bottle	per 100 ml	50(p)	40(p)	per 3000 ml	(£)15	(£)12	$\frac{5}{6} \text{ pt/ 500 ml}$	(£)2.50	(£2)	$\frac{3}{6} \text{ pt / 300 ml}$	(£1.50)	(£)1.20	ml per 50p	100	125	ml per p	2	2.5	ml per £6	1200	1500
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14.(a)(i) 9 : 7	B2	B1 for sight of any simplified ratio not in simplest form or for 7 : 9; allow non-integer values for B1  NB 45000 : 35000 is B0
14. (a)(ii)  21 000 ÷ 7 × 9 – 21 000 ( = 27000 – 21000) oe si  or  21 000 ÷ 7 × (9 – 7) ( = 3000 × 2) oe si   (£)6000	M2    A1	For M2 or M1, allow 45000 and 35000 used correctly or any correct ratio whether in simplest form or not OR FT 'their 9 : 7' , providing B1 awarded in (a)(i)  M1 for 21 000 ÷ 7 × 9 ( = 27 000) oe or 21 000 ÷ 7 × 16 – 21 000 ( = 27 000) oe or 21 000 ÷ 7 × 16 ( = 48 000) oe  CAO
14. (b)  21 000 + (35 000 ÷ 10) × 3 oe, si (£)31 500	M1 A1  (7)	( = 21 000 + 10 500); may be in stages
15.  $t - 5 = 3n$ oe, si or $\frac{t}{3} = \frac{5}{3} + n$  $n = \frac{t - 5}{3}$ or $\frac{t}{3} - \frac{5}{3} = n$ oe	B1   B1   (2)	Isolates term in $n$ ; allow e.g. $-3n = 5 - t$ or correctly divides through by 3   May be unsimplified; allow e.g. $n = (t - 5) \div 3$ or $n = \frac{5 - t}{-3}$ If no marks, award SC1 for $n = \frac{t + 5}{3}$ or $\frac{t - 5}{3}$ (subject omitted)

<p>16. (a)</p> <p>Valid explanation e.g. 'Alternate angles (between parallel lines)'</p>	<p>E1</p>	<p>Allow 'Alt' but not 'Alternative', not 'Alternating'; ignore correct embellishments such as Z angles; do not ignore incorrect embellishments</p> <p>E0 for e.g. 'It is congruent to angle <math>P</math>' without any justification</p>
<p>16. (b)</p> <p><math>P\hat{Q}R = (100^\circ + 20^\circ =) 120^\circ</math> (Angles on a straight line (sum to 180))</p>	<p>B1</p>	<p>Angles may be seen on the diagram; degrees symbol may be omitted</p> 
<p><math>Q\hat{P}R = 30^\circ</math> (Base angles of an isosceles triangle (are equal))</p>	<p>B1</p>	<p>FT 'their <math>P\hat{Q}R</math>'</p>
<p>(Bearing =) 130°</p>	<p>B1</p>	
<p>At least one correct reason stated appropriately</p>	<p>E1</p>	
<p>(5)</p>		

<p>17. (a)</p> $1 - \left( \frac{6}{14} + \frac{5}{14} \right) \text{ oe, si}$ $\frac{3}{14} \text{ or equivalent fraction}$	<p>M2</p> <p>A1</p>	<p>M1 for <math>\frac{6}{14} + \frac{5}{14}</math> oe, si</p> <p>If M1 A0, award SC1 for a final answer of <math>\frac{11}{14}</math> or equivalent fraction</p>
<p>17. (b)</p> <p>540 (minutes) or <math>(324 \div 60) \times 5 \div 3</math> oe</p> <p>9 (hours)</p>	<p>B2</p> <p>B1</p>	<p>may be seen in stages B1 for <math>(324 \div 3) \times 5</math> oe or for <math>324 + (324 \div 60) \times 40 (= 324 + 216)</math> oe OR for <math>(324 \div 60) \times 5</math> oe or for <math>(324 \div 60) \div 3</math> oe OR for sight of <math>(324 \div 60) = 5.4</math> or <math>5\frac{24}{60}</math> (hours) 9 (hours) implies 3 marks provided not from wrong working.</p> <p>If no marks, award SC1 for their derived time in minutes converted correctly to hours; their time in minutes <b>and</b> the division by 60 must be seen</p>
		(6)

<p>18. (a)</p> <p>Valid criticism e.g. 'There should be no gaps between the bars.'</p>	<p>E1</p>	<p>Allow e.g. 'Some of the values overlap.' or 'There should not be gaps.' or 'The bars should all touch.' or 'The 12.4 appears on two bars.' or 'They have the same numbers twice.' or 'The bars should be together.'</p> <p>Ignore irrelevant embellishments but do not allow a contradiction or an incorrect statement e.g. 'It goes 12 to 12.4 and then 12.4 again. It should have gone on to 12.5' is E0</p>
<p>18. (b)</p> <p>(Frequencies of) 9, 12, 4, 5 si</p> <p>At least 1 of  <math>9 \times (360 \div 30)</math>  <math>12 \times (360 \div 30)</math>  <math>4 \times (360 \div 30)</math>  <math>5 \times (360 \div 30)</math></p> <p>For at least 3 of          (Angles) B 108, F 144, W 48, C 60</p> <p>Correct, labelled pie chart with no incorrect angles seen in working</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A2</p>	<p>Question requires working to be shown</p> <p>FT 'their frequencies'; allow for e.g. <math>9 \times 12</math>; allow for <math>360 \div 30 = 12</math> and sight of one correct angle e.g. 108 or sight of at least 2 correct angles</p> <p>Allow tolerance of <math>\pm 2^\circ</math> for all angles;  <b>Lines must be ruled</b></p> <p><b>If angles stated:</b> measure 3 angles and if in tolerance and no incorrect angles or percentages have been stated, allow the A2</p> <p><b>If 3 or 4 angles not stated:</b> measure all 4 angles and if all 4 in tolerance allow the A2 otherwise award A1</p> <p>A1 FT for at least 2 out of their 4 angles in tolerance; may be unlabelled</p> <p>NB B1 M1 M0 A1 is possible</p>
<p>(6)</p>		

<p>19.*</p> <p>Both to £:  <math>110 \times 0.9(0)</math> oe or 99  <b>and</b> <math>125 \div 1.25</math> oe or 100</p> <p>OR</p> <p>€ to £ and £ to \$:  <math>110 \times 0.9(0)</math> oe or 99  <b>and</b> <math>99 \times 1.25</math> oe or 123.75</p> <p>OR</p> <p>\$ to £ and £ to €:  <math>125 \div 1.25</math> oe or 100  <b>and</b> <math>100 \div 0.9(0)</math> oe or 111.11...</p> <p>Germany indicated with      (£)99 and (£)100 seen OR      (£)99 and (\$)123.75 seen OR      (£)100 and (€)111.11 seen</p>	<p>M2</p>	<p>Allow e.g. <math>1.25 \times 100 = 125</math> for <math>125 \div 1.25</math>;      Allow M2 for e.g.  <math>110 \times 0.9(0)</math> and <math>110 \times 0.9(0) \times 1.25</math> or  <math>125 \div 1.25</math> and <math>(125 \div 1.25) \div 0.9(0)</math>      (may be in stages)</p> <p>M1 for <math>110 \times 0.9(0)</math> oe or 99      or <math>125 \div 1.25</math> oe or 100 si</p> <p>Allow (\$)123(...) OR      (\$)123 or (\$)124 from correct working      Allow (€)111(...)</p>
<p>(3)</p>	<p>A1</p>	

20.* Second and fifth statements indicated and no others	B2	B1 for each if only two statements indicated OR for exactly three statements indicated of which two are correct
	(2)	
21.*(a) $\frac{1}{3} \times \pi \times 15^2 \times 30$ oe, si $\frac{1}{3} \times \pi \times 225 \times 30$ oe, si $2250\pi$ (cm <sup>3</sup> )	M1 A1 A1	Allow e.g. 3.14 substituted for $\pi$ ; may be in stages; Allow e.g. 3.14 substituted for $\pi$ ; may be in stages FT 'their 225', M1 A0 A1 is possible; Must be a multiple of $\pi$ ; do not ignore subsequent evaluation of e.g. $2250 \times 3.14$
21. (b) radius 3 cm or diameter 6 cm and height 6 cm si  For the plan: draws a circle, radius 3cm and for the side elevation: draws an isosceles triangle with base 6 cm and height 6 cm	B1 B3	Correct use of the scale; may be implied by correctly drawn plan and elevation;  FT 'their stated radius and their stated height' OR if no statement or calculation for radius and height, FT 'their diameter = their height = their base'  For B3, circle must be drawn with compasses and triangle must be ruled  B2 FT for either an accurately drawn, correct plan or an accurately drawn, correct elevation FT 'their stated radius and their stated height' OR if no statement or calculation for radius and height, FT 'their diameter = their base' or 'their base = their height' or 'their diameter = their height'  OR B2 FT for good sketches of both the correct plan and elevation or one sketch and one drawn accurately FT 'their stated radius and their stated height' OR if no statement or calculation for radius and height, FT 'their diameter = their height = their base'  B1 for a circular plan with any radius or for a side elevation that is an isosceles triangle with any dimensions ; allow good freehand for B1 but base of triangle must not be clearly curved  If B1 B0 or B0 B0, award SC1 for an accurate plan and elevation drawn in incorrect positions
	(7)	

22.* (a)		
Uniform scale used on vertical axis	B1	Plots accurate to within $\frac{1}{2}$ a small square but mark intent Must allow plots up to 225 litres and start at zero
Line starting at (0, 225)	B1	According to their scale
Single straight line with correct gradient si	B1	e.g. single straight line passing through any two of (10, 175), (20, 125), (30, 75), (40, 25), (45,0) according to their scale  or line drawn using e.g. 50 litres = 10 minutes to plot and join points
Ruled, single straight line ending at (45, 0)	B1	
22. (b) $(225 \div 10) \times 6$ or 135 OR $(225 \div 10) \times 4$ or 90 OR $(225 \div 10) \times 4 \div 5$ or $(45 \div 10) \times 4$ oe	M1	Ignore units if stated  Equivalent calculations for M1 e.g. $(50\% + 10\% = ) 112.5 + 22.5$ or $(50\% - 10\% = ) 112.5 - 22.5$
18 (minutes)	A1	if 90 or 135 found and using <b>correct</b> graph accept 17 – 19 mins  FT 'their single straight line' read at a volume = 135 providing that it has negative gradient; allow good freehand here  Accept 18 mins even if graph incorrect as can be done without it e.g. $90 \div 5$  18 (mins) without working implies M1 A1
	(6)	

23.*(a) 0.7 AND 0.9 correctly placed	B1																																														
23. (b) 0.6 × 0.3 oe  0.18 oe	M1  A1	ignore attempts to convert to a different form; ignore embellishments such as unlikely, even if incorrect																																													
23. (c) 0.4 × 0.1 oe  0.04 oe	M1  A1	ignore attempts to convert to a different form; ignore embellishments such as unlikely, even if incorrect																																													
	(5)																																														
24.*  2(h) or 120 (min)  × 6  ÷ 3  ÷ 8  oe  OR (8 machines $3000 \div 2 \div 6 \times 8 =$ 2000 erasers per hour or better  $\frac{1}{2}$ (hour) or 30 (mins)	M2	Operations may be done in any order and in stages  For complete correct method e.g. $\frac{2}{3} \div \frac{4}{3}$ or $\frac{2}{3} \times \frac{3}{4}$  M1 for partial correct method using time and using any two correct operations and no wrong operations  OR M1 for $3000 \div 2 \div 6 \times 8$ or $3000 \div 120 \div 6 \times 8$ oe  A1 If units are given they must be correct																																													
<b>Alternative method</b> Complete method e.g. <table border="1"><tr><th>Machines</th><th>Erasers</th><th>Hours</th></tr><tr><td>6</td><td>3000</td><td>2</td></tr><tr><td>2</td><td>1000</td><td>2</td></tr><tr><td>8</td><td>1000</td><td><math>\frac{1}{2}</math></td></tr></table> or <table border="1"><tr><th>Machines</th><th>Erasers</th><th>Hours</th></tr><tr><td>6</td><td>3000</td><td>2</td></tr><tr><td>8</td><td>4000</td><td>2</td></tr><tr><td>8</td><td>1000</td><td><math>\frac{1}{2}</math></td></tr></table>	Machines	Erasers	Hours	6	3000	2	2	1000	2	8	1000	$\frac{1}{2}$	Machines	Erasers	Hours	6	3000	2	8	4000	2	8	1000	$\frac{1}{2}$	M2	Correct step(s) to 1000 and correct step(s) to 8 or e.g.  <table border="1"><tr><th>Machines</th><th>Erasers</th><th>Hours</th></tr><tr><td>6</td><td>3000</td><td>2</td></tr><tr><td>1</td><td>500</td><td>2</td></tr><tr><td>1</td><td>250</td><td>1</td></tr></table> and (time needed is to make) $1000 \div 8 = 125$ (erasers per machine) oe  M1 for finding 1 machine makes 250 erasers per hour or (time needed is to make) $1000 \div 8 = 125$ (erasers per machine) or any one correct step e.g.  <table border="1"><tr><th>Machines</th><th>Erasers</th><th>Hours</th></tr><tr><td>6</td><td>3000</td><td>2</td></tr><tr><td>1</td><td>500</td><td>2</td></tr></table>	Machines	Erasers	Hours	6	3000	2	1	500	2	1	250	1	Machines	Erasers	Hours	6	3000	2	1	500	2
Machines	Erasers	Hours																																													
6	3000	2																																													
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$\frac{1}{2}$ (hour) or 30 (mins)	A1 (3)	If units are given they must be correct																																													

25.* (a) $8x^2 - 4x + 10x - 5$  $8x^2 + 6x - 5$	B2  B1	B1 for any two terms correct; $nx^2 + 6x + m$ implies two terms correct if not from wrong working  Implies previous B2; FT for equivalent level of difficulty, providing a quadratic expression with 4 terms to consider and like terms in $x$ to collect with opposite signs  mark final answer except ignore ' $=0$ ' 
25. (b)(i) $(x - 3)(x - 7)$ oe	B2	If not B2, award B1 for $(x \dots 3)(x \dots 7)$ or for $x(x - 7) - 3(x - 7)$ oe; ignore ' $= 0$ '  If no marks, award SC1 for factors $x - 3$ and $x - 7$ stated but not as a product
25. (b)(ii) $x = 3, x = 7$	B1	<b>STRICT FT</b> from 'their $(x \dots a)(x \dots b)$ ' where $a$ and $b$ are constants;
	(6)	

<p>26.*(a)</p> <p>(Proportion of marked moths in sample is)</p> $\frac{9}{12} \left( = \frac{3}{4} \right) \text{ oe, si or}$ <p>(Proportion of 2nd sample marked is)</p> $\frac{9}{30} \left( = \frac{3}{10} \right) \text{ oe, si}$ <p>Correct completion e.g.</p> $\frac{9}{30} = \frac{12}{40} \text{ (so 40 moths)}$ <p>OR <math>\frac{9}{12} = \frac{30}{40}</math> (so 40 moths)</p> <p>OR 75% (of population) is 30 (moths) so 100% (of population) is 30 + 10 = 40 (moths) oe</p>	B1	<p>Allow for e.g. '9 out of 12 (marked)' or '9 (marked) out of 30' allow for sight of e.g. <math>\frac{12 \times 30}{9} (= 40)</math></p> <p>Implies the first B1; Allow for</p> <ul style="list-style-type: none"> <li>• showing '12 out of 40' and '9 out of 30' are both '3 out of 10' or</li> <li>• <math>\frac{9}{12} = \frac{30}{x}</math> and <math>9x = 360, x = 40</math> oe</li> </ul> <p>NB <math>\frac{12 \times 30}{9} = \frac{360}{9} = 40</math> is B2</p>
<p>26. (b)</p> <p>Valid comment based on sample or population size e.g. 'It may not be very reliable as he only captured 12 moths in his first sample.' or 'Some of the moths may have been eaten so the results may not be accurate.'</p>	E1	<p>Allow e.g. 'Not reliable because the population would be bigger at different times of the year.'</p> <p>Allow comments which refer to the experiment needing to be repeated</p> <p>E1 for e.g. 'Somewhat reliable because it was done once and it could be different if repeated again' or 'Not reliable as he needs to do it more often.'</p> <p>Must not contain contradictions/errors but may contain irrelevant statements</p> <p>E0 for e.g. 'Not very reliable as there could have been more moths.' or 'Unlikely (to be reliable) because it has only been tested twice' or 'Not reliable because he could keep catching the same moths over and over.'</p>

(3)