

RATIO AND PROPORTION

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

1.

10	6 : 15 : 20	P1	<p>chooses a multiplier to equate the two fractions in terms of b</p> <p>eg $\frac{2}{5} \times \frac{3}{3} (= \frac{6}{15})$ or $\frac{3}{4} \times \frac{5}{5} (= \frac{15}{20})$</p> <p>or lists equivalent fractions to $\frac{2}{5}$ up to at least $\frac{6}{15}$, eg. $\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \dots$</p> <p>or lists equivalent fractions to $\frac{3}{4}$ up to at least $\frac{15}{20}$, eg. $\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}, \dots$</p> <p>or $(a : b) 2 : 5$ and $(b : c) 3 : 4$</p> <p>or for 6 : 15 or 15 : 20 seen</p>	<p>Need not be written in ratio form</p> <p>Accept equivalent ratios Accept $a = 6, b = 15$ and $c = 20$</p>
		P1	<p>puts into related terms ready for ratio eg $\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$ and $\frac{3}{4} \times \frac{5}{5} = \frac{15}{20}$</p> <p>or for $(a : b) 6 : 15$ and $(b : c) 15 : 20$</p> <p>or lists equivalent ratios up to a common element for b, eg $a : b = 2 : 5, 4 : 10, 6 : 15$ and $b : c = 3 : 4, 6 : 8, 9 : 12, 12 : 16, 15 : 20$</p>	
		A1	for 6 : 15 : 20 oe	

Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

2.

3	No (supported)	P1	for $3000 \div (2 + 3) (= 600)$	<p>Full method to compare</p> <p>No working, answer only no marks No may be implied by a statement</p>
		P1	for $"600" \times 2 (= 1200)$ or $"600" \times 3 (= 1800)$ or $"600" \div 6 (= 100)$ or $"600" \div 20 (= 30)$	
		P1	for $"1200" \div 6 (= 200)$ or $"1800" \div 20 (= 90)$ or $"100" \times 2 (= 200)$ or $"30" \times 3 (= 90)$	
		P1	for $"90" \div ("200" + "90") \times 100 (= 31.0\dots)$ oe or $"90" \div ("200" + "90") (= 0.31\dots)$ or $0.3 \times ("200" + "90") (= 87)$ oe	
		C1	correct conclusion and fully correct calculations with accurate figure eg No and 87 or No and 31% or No and 0.31	

Pearson Edexcel – Monday 8 June 2020 - Paper 3 (Calculator) Higher Tier

3.

21	(a)	3 : 4	P1	<p>for start of process, eg isolate terms in c, eg $4c = 3d$</p> <p>or divide all terms by d, eg $\frac{5c}{d} + 1 = \frac{c}{d} + 4$</p>	<p>Accept any equivalent ratio or $c = 3, d = 4$</p>
	(b)	5 : 2	A1	for 3 : 4	
			P1	<p>for start of process: to take all terms to one side eg $6x^2 - 7xy - 20y^2 (= 0)$</p> <p>or divide all terms by y^2, eg $\frac{6x^2}{y^2} = \frac{7xy}{y^2} + \frac{20y^2}{y^2}$</p> <p>or substitute a value of x ($x > 0$) or a value of y ($y > 0$) into the equation, eg $x = 5, 150 = 35y + 20y^2$</p>	<p>Accept $x = 5, y = 2$ or equivalent ratios, eg, $1 : \frac{2}{5}$</p>
			P1	<p>for second step in process, eg $(2x - 5y)(3x + 4y) (= 0)$ or $6p^2 - 7p - 20 (= 0)$ (where $p = \frac{x}{y}$)</p> <p>or $20y^2 + 35y - 150 (= 0)$</p>	
			A1	5 : 2	

Pearson Edexcel - Tuesday 21 May 2019 - Paper 1 (Non-Calculator) Higher Tier

4.

6	96	P1	for process to find the ratio of the number of pens of each colour sold, eg $2 \times 7 : 5 \times 3 : 6 \times 4$ (= 14 : 15 : 24)	Does not have to be seen as a ratio but all three needed P3 can be implied by the values 56, 60 and 96
		P1	for process to find the proportion of green pens sold, eg $\frac{212}{"14"+"15"+"24"} \text{ or } \frac{"24"}{"14"+"15"+"24"}$	
		P1	for a complete process to find the number of green pens sold, eg $\frac{212}{"14"+"15"+"24"} \times "24" \text{ or } \frac{"24"}{"14"+"15"+"24"} \times 212$	
		A1	cao	

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5.

17	-1, 2.5	P1	for process to form an equation, eg $\frac{x^2}{3x+5} = \frac{1}{2}$ or $2x^2 = 3x + 5$	
		P1	for writing in a suitable form ready for solution, eg $2x^2 - 3x - 5 (= 0)$ or $-2x^2 + 3x + 5 (= 0)$	
		P1	(dep 1st P1) for process to solve quadratic equation of form $ax^2 + bx + c (= 0)$ eg $(2x - 5)(x + 1) (= 0)$ or $\frac{- -3 \pm \sqrt{(-3)^2 - 4 \times 2 \times -5}}{2 \times 2}$	
		A1	for -1, 2.5 oe	

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

6.

3	(i)	65	M1	for working with proportion eg $10 \div 30 \times 195 (=65)$	Condone use of 200 for 195
			A1	cao	
	(ii)	statement	C1	for statement Acceptable examples sample is representative (otherwise answer wrong) random sample (otherwise answer will be different) the 30 students are from the 195 (otherwise not accurate) 10 out of every 30 want to go to the Theme Park (otherwise answer will be different/wrong) there is no bias Not acceptable examples There would be more than 10 people who want to go to the Theme Park I rounded my answer	

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7.

7	168	P1	for working with ratio to find the amount for C or D eg $1.5 \times 2 (=3)$ or (A, B, C, D =) 2, 7, 3, 3 oe OR for suitable expressions linking A with C or D, eg. $A = x, C = 1.5x$	
		P1	for “2 + 3 + 3 + 7” (=15) OR adds 4 suitable expressions, eg. “ $x + 3.5x + 1.5x + 1.5x$ ” (= 7.5x)	
		P1	for a complete process to find the amount of money eg $360 \div “15” \times 7$ OR $360 \div “7.5” \times 3.5$	
		A1	cao	

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8.

9	(a)	100 : 81	M1	for a scale factor of 0.9 oe used; OR for 10 : 9 oe OR 81 : 100 oe OR 81%	eg. 1 : 0.81, accept 1.23(4...): 1
			A1	for 100 : 81 oe	
	(b)	6 : 5	P1	for 1.44 oe used as the scale factor or 1.2 oe OR for 144 : 100 oe or $\sqrt{144} : \sqrt{100}$ oe OR 5 : 6 oe	
			A1	for 6 : 5 oe	

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9.

20	(a)	2a	M1	for $\mathbf{a - b + a + b (=2a)}$	Accept ft from (a) providing vectors are clearly stated $\overrightarrow{CX} = \frac{n-1}{n+1}\mathbf{a} + \frac{n+2}{2(n+1)}\mathbf{b} \quad \overrightarrow{XE} = \frac{2}{n+1}\mathbf{a} + \frac{n}{2(n+1)}\mathbf{b}$ $\overrightarrow{XC} = \frac{1-n}{n+1}\mathbf{a} + \frac{-n-2}{2(n+1)}\mathbf{b} \quad \overrightarrow{EX} = \frac{-2}{n+1}\mathbf{a} - \frac{n}{2(n+1)}\mathbf{b}$
			A1	cao	
	(b)	4	P1	for a process to find $\overrightarrow{MF} = -0.5\mathbf{b} - \mathbf{a} - (\mathbf{a} - \mathbf{b}) (=0.5\mathbf{b} - 2\mathbf{a})$ or $\overrightarrow{CE} = \mathbf{a} + \mathbf{b}$ or $\overrightarrow{FM} = \mathbf{a} - \mathbf{b} + \mathbf{a} + 0.5\mathbf{b} (=2\mathbf{a} - 0.5\mathbf{b})$	
			P1	For finding a suitable vector expression for two of (\overrightarrow{CE} or \overrightarrow{EC}), (\overrightarrow{CX} or \overrightarrow{XC}) or (\overrightarrow{EX} or \overrightarrow{XE}) eg, $\overrightarrow{CX} = \mathbf{a} + 0.5\mathbf{b} + \frac{1}{n+1}(0.5\mathbf{b} - 2\mathbf{a})$ or $\overrightarrow{CX} = -\mathbf{a} + \mathbf{b} + \frac{n}{n+1}(2\mathbf{a} - 0.5\mathbf{b})$ $\overrightarrow{XE} = \frac{1}{n+1}(2\mathbf{a} - 0.5\mathbf{b}) + 0.5\mathbf{b}$ or $\overrightarrow{XE} = \frac{n}{n+1}(0.5\mathbf{b} - 2\mathbf{a}) + 2\mathbf{a}$ or $\overrightarrow{XC} = \frac{n}{n+1}(0.5\mathbf{b} - 2\mathbf{a}) + \mathbf{a} - \mathbf{b}$ or $\overrightarrow{XC} = \frac{1}{n+1}(2\mathbf{a} - 0.5\mathbf{b}) - 0.5\mathbf{b} - \mathbf{a}$ or $\overrightarrow{EX} = -0.5\mathbf{b} + \frac{1}{n+1}(0.5\mathbf{b} - 2\mathbf{a})$ or $\overrightarrow{EX} = -2\mathbf{a} + \frac{n}{n+1}(2\mathbf{a} - 0.5\mathbf{b})$	
			P1	for complete process to equate the coefficients of \mathbf{a} and \mathbf{b} eg $\frac{n-1}{n+1} = \frac{n+2}{2(n+1)}$	
			A1	cao	

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10.

15	3 : 10	P1	process to find ratio of lengths $A:B = \sqrt{4}:\sqrt{25} (= 2:5 \text{ or } \frac{2}{5} \text{ or } 2, 5)$	Accept working in fractions for the award of process marks but the final answer must be in correct simplified ratio notation
		P1	for process to find ratio of lengths $B:C = \sqrt[3]{27}:\sqrt[3]{64} (= 3:4 \text{ or } \frac{3}{4} \text{ or } 3, 4)$	
		P1	for process to write as one ratio eg. finding a common multiple of 3 and 5 or 6 : 15 : 20 oe	
		A1	cao	

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11.

21	3 : 4	P1	starts process eg $\overrightarrow{AB} = \mathbf{b} - \mathbf{a}$ oe	Formal geometric reasoning relating to congruent and similar triangles is not required
		P1	for process to find $\overrightarrow{OM} = \mathbf{a} + \frac{1}{2}(\mathbf{b} - \mathbf{a})$ oe $(= \frac{1}{2}(\mathbf{a} + \mathbf{b}))$	
		P1	for process to find $\overrightarrow{AP} = -\mathbf{a} + \frac{3}{5}(\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{b})$ oe or (indep) for $\overrightarrow{AN} = -\mathbf{a} + k\mathbf{b}$	
		P1	process to find "k" using $\overrightarrow{AN} = -\mathbf{a} + k\mathbf{b}$ as a multiple of \overrightarrow{AP}	
		A1	cao	
		P1	ALTERNATIVE for producing OM to C such that AC is parallel to OB	
		P1	for process to show that $MC = OM$, using congruent triangles ACM and BOM	
P1	for process to find PC as a multiple of $OM/5 (= 7OM/5)$			
P1	for process to find ON as a multiple of $AC(OB) (= 3OB/7)$ using similar triangles ACP and NOP			
A1	cao			

Pearson Edexcel - Thursday 8 November 2018 - Paper 2 (Calculator) Higher Tier

12.

17	4 : 1	P1	for associating algebraic expressions with the correct ratio eg $p - 5 : q - 5 (= 5 : 1)$ or $p + 20 : q + 20 (= 5 : 2)$	Award for one of the two simultaneous equations eg $5q - p = 20, 5q - 2p = -60$ oe	
		P1	for $\frac{p+20}{q+20} = \frac{5}{2}$ or $\frac{p-5}{q-5} = \frac{5}{1}$ oe or $p - 5 = 5(q - 5)$ or $2(p + 20) = 5(q + 20)$ oe		
		M1	for a complete method shown to find p or q		Award for a simultaneous equation method to eliminate one variable leading to either $p = 80$ or $q = 20$
		M1	for a complete method shown to find p and q or two values for p and q that are in the ratio 4 : 1 or an unsimplified ratio 4 : 1 (eg 80 : 20) or an answer of 1 : 4		Award for a simultaneous equation method to eliminate both variables leading to either $p = 80$ and $q = 20$
		A1	cao		

Pearson Edexcel - Thursday 24 May 2018 - Paper 1 (Non-Calculator) Higher Tier

13.

2	140	P1	for beginning to solve the problem eg $50 \div 5 \times 8 (= 80)$ or 14 : 8 : 5 oe or 14 : 8 and 8 : 5 oe (linked)	80 may be seen in the ratio 80 : 50
		P1	for a full process to solve the problem eg "80" $\div 4 \times 7$ or $\frac{50}{5} \times "14"$ or 140 : 80 : 50	
		A1	cao	

If 140 clearly identified as houses in working award full marks

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14.

4	3 : 5	P1	for process to find 20% or 120% of the cost, eg 8500×0.2 (= 1700) oe 8500×1.2 (= 10 200) oe	When partitioning all figures quoted must be correct or a full method shown eg $10\% = 8500 \div 10$ (=850) and $20\% =$ "850" + "850" (=1700) May be seen as a fraction of the total eg $\frac{3825}{10200}$ ($=\frac{3}{8}$) Figures at this stage must be expressed as part of a ratio eg $51:85$, $\frac{3}{8} : \frac{5}{8}$ Ignore consistent units
		P1	for process to find total cost of payments, eg 12×531.25 (= 6375)	
		P1	for complete process to find value of deposit, eg "10 200" – "6375" (= 3825) or $8500 - "6375"$ (=2125) and "2125" + "1700" (=3825) OR the deposit as a proportion of the total cost, eg $1 - \frac{"6375"}{"10200"}$ ($=\frac{3}{8}$)	
		P1	for finding a correct un-simplified ratio, eg "3825" : "6375" oe 5:3 or $1.\dot{6} : 1$ or $\frac{5}{3} : 1$	
		A1	Accept $1 : 1.\dot{6}$, $1 : \frac{5}{3}$	

Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Higher Tier

15.

12	BDAC	B2	all correct	
		(B1)	for at least 2 correct)	

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier

16.

2		14:21:42	P1	for 2 out of 3 expressions in one letter eg from $x, x+7, 2x+14$ or see a set of numbers to show interpretation of the relationships, eg 10, 17, 34
			P1	(dep) for sum of their 3 expressions =77 eg $x + x+7+2x+14 =77$ oe or 2 systematic correct trials including addition
			P1	for a correct process to isolate their term in x or $x=14$
			A1	for ratio 14:21:42 oe

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17.

14	$ky - y = x + kx$ $y(k-1) = x(1+k)$	$y = \frac{x(k+1)}{k-1}$	M1	$y + x = k(y - x)$ or $\frac{y+x}{y-x} = k$ oe
			M1	For isolating x and y on opposite sides eg $ky - y = x + kx$
			A1	Completing correct algebraic reasoning to reach conclusion

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

18.

4		15	P1	strategy to start the problem, eg 8 : 20 and 20 : 5
			P1	process to solve the problem, eg $\frac{5}{33} \times 100$ or 24 : 60 : 15
			A1	cao

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19.

14		Shown	M1	for $\sqrt[3]{\frac{8}{27}} (= \frac{2}{3})$ or $\sqrt[3]{\frac{27}{8}} (= \frac{3}{2})$ or 2 : 3 or 3 : 2
			M1	for $(\sqrt[3]{\frac{8}{27}})^2 (= \frac{4}{9})$ or $(\sqrt[3]{\frac{27}{8}})^2 (= \frac{9}{4})$ or 4 : 9 or 9 : 4
			A1	132 from correct arithmetic

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20.

14		$\frac{1}{3}$	P1	process to solve the problem e.g. $\frac{3}{10} \times \frac{4}{9} (= \frac{12}{90} = \frac{2}{15})$ OR finds the number of white circles for their chosen number OR for 9 : 21 (or a multiple of 9 : 21)
			P1	second step of the process e.g. $\frac{7}{10} \times \frac{2}{7} (= \frac{14}{70} = \frac{2}{10} = \frac{1}{5})$ OR finds the number of black circles for their chosen number OR for a multiple of 2 : 5 where the ratio parts sum to "21"
			P1	for complete process e.g. " $\frac{2}{15}$ " + " $\frac{1}{5}$ " $(= \frac{4}{30} + \frac{6}{30})$ OR finds the total number of circles for their chosen number OR for 3 ratios that could be used to solve the problem eg 9 : 21 with 4 : 5 with 6 : 15
			A1	for $\frac{1}{3}$ oe

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21.

19		$\frac{2}{5}$	P1	for first step to solve the problem e.g. $\overrightarrow{AC} = -\mathbf{a} + \mathbf{c}$ or $\overrightarrow{OX} = \frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{c}$ or demonstrates the location of D and X on the diagram
			P1	for a correct vector statement using \overrightarrow{CD} eg $\overrightarrow{CD} = \overrightarrow{CX} + \overrightarrow{XD}$ or $\overrightarrow{CD} = \overrightarrow{OD} - \overrightarrow{OC}$ or $\overrightarrow{OD} = \frac{7}{2}\mathbf{c}$ or $\overrightarrow{CD} = 2.5\mathbf{c}$ oe
			P1	for a correct equation or ratio using k eg equating $\overrightarrow{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a} = \frac{1}{2}(-\mathbf{a} + \mathbf{c}) + \frac{1}{k}\mathbf{c}$ or $\frac{\overrightarrow{OD}}{\overrightarrow{OC}} = \frac{k+1}{k}$ or $k = \frac{1}{2.5}$ or using a ratio approach eg $(\overrightarrow{OC} : \overrightarrow{CD}) = k : 1 = 1 : 2.5$
			A1	cao

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22.

12		3 : 4 : 11	P1	Makes a start e.g. by using multipliers e.g. $1 + 5 = 6$ and $7 + 11 = 18$ and $6 \times 3 = 18$ or $AB:BD = 3:15$ or $x=3y$ (appropriate x and y shown) or $\frac{1}{6} = \frac{3}{18}$
			P1	Complete process to find ratios e.g. $(7 + 11) \div (1 + 5) = 3$ and $1 \times "3" : 7 - ("3" \times 1) : 11$
			A1	oe

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

23.

6	$6 : 5 = 12 : 10$ $2 : 1 = 10 : 5$ $C : S : P = 12 : 10 : 5$ $\frac{10}{27} \times 189$	70	P1 P1 for strategy to start to solve the problem eg $12 : 10$ and $10 : 5$ P1 P1 for process to solve the problem eg $\frac{10}{27} \times 189$ A1 A1 cao
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Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

24.

21	$\frac{2x-1}{x-4} = \frac{16x+1}{2x-1}$ $(2x-1)^2 = (16x+1)(x-4)$ $12x^2 - 59x - 5 = 0$ $(12x+1)(x-5) = 0$	$-\frac{1}{12}, 5$	P1 for process to write as an equation P1 for process to clear the fractions P1 for process to write equation in form $ax^2 + bx + c = 0$ P1 for process to solve the equation A1 cao
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25.

1		171	P1 for process to find one share P1 for process to find total A1 cao
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26.

10		1 : 2.53	P1 for substituting values to find surface gravity of either Earth (= 9.805..) or Jupiter (= 24.796..) P1 for complete process A1 for 1 : 2.528 to 2.53
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27.

10 (a)		5	P1 begins to work with scaling factors (eg 5) or +6 A1 cao
(b)		10	P1 works with 1:2 ratio eg no. red counters is $30 \div 2 (=15)$ A1 ft

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28.

1		96	P1 a strategy to start to solve the problem eg $18 \div (7 - 4) (=6)$ P1 for completing the process of solution eg “6” $\times (4 + 5 + 7)$ A1 cao
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29.

8		6 : 2 : 1	M1 for correct interpretation of any one statement eg. 3 : 1; 1 : 0.5 A1 accept any equivalent ratio eg. 3 : 1 : 0.5
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30.

8	(a)		4 : 3	2	M1 for $720 \div 540$ oe or for 3 : 4 or $1 : \frac{4}{3}$ oe or $\frac{3}{4} : 1$ oe A1 for 4 : 3 or $\frac{4}{3}$ (or 1 .33....) : 1 or $1 : \frac{3}{4}$ (or 0.75)
	(b)		480	2	M1 for $720 \div 3 (=240)$ or scale factor of $\frac{3}{2}$ or $\frac{2}{3}$ oe or $720 : 480$ A1 cao

Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier

31.

5			20	3	M1 for $330 \div 120 (=2.75)$ or $200 \div 60 (=3 \frac{1}{3})$ or $450 \div 180 (=2.5)$ M1 for $450 \div 180 (=2.5)$ AND $8 \times "2.5"$ A1 cao OR M1 for $120 \div 8 (=15)$ or $60 \div 8 (=7.5)$ or $180 \div 8 (=22.5)$ M1 for $330 \div (120 \div 8) [=22]$ or $200 \div (60 \div 8) [=26.6..]$ or $450 \div (180 \div 8)$ A1 cao OR M1 for multiples of 120:60:180 M1 for multiplication linked to 450 and $8+8+4$ A1 cao
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Pearson Edexcel - Friday 6 November 2015 - Paper 2 (Calculator) Higher Tier

32.

20		$\pi 2^2 \times 2 = 8\pi$ $\pi 2^2 \times \frac{20}{360} \times 3 + \pi 2^2 \times \frac{340}{360} \times 2$ $8\pi : \frac{74}{9}\pi :$ $72 : 74$ Or $\frac{20}{360} \times 3 + \frac{340}{360} \times 2 = \frac{37}{18}$ $2 : \frac{37}{18}$ $36 : 37$	36:37	4	M1 method to find relative cost of design A e.g. $\pi 2^2, k \times \pi 2^2$ M1 for a complete method to find the relative cost of the watch face for design B e.g. $\pi 2^2 \times \frac{20}{360} \times \frac{3}{5} + \pi 2^2 \times \frac{340}{360} \times \frac{2}{5}$ M1 (dep on M1, M1) for the cost of design A: cost of design B A1 cao Or M1 for method to find fraction of the sectors in design B $\frac{20}{360}, \frac{340}{360}$ M1 for complete method to find the relative cost of the watch face for design B M1 (dep on M1, M1) for the cost of design A: cost of design B A1 cao
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Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier

33.

8			68 34 51	3	M1 for $153 \div (4 + 2 + 3) (=17)$ or for a correct method to scale up to at least 44:22:33 without error M1 (dep M1) for " 17 " \times 4 or " 17 " \times 2 or " 17 " \times 3 or for a complete method to build up to 68:34:51 with at least two of these values correct A1 for 68, 34, 51 in any order (If M0,SC B2 for two correct lengths)
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34.

2	(a)		12	2	M1 for $32 \div 8 (=4)$ or $\frac{3}{8} \times 32$ oe A1 for 12
	(b)		36	2	M1 for correct method to find 45% of 80 A1 cao

Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier

35.

7			28% or $\frac{14}{50}$	4	M1 for $100 - 30 (=70)$ or $1 - \frac{3}{10} (= \frac{7}{10})$ M1 for " 70 " \div (3 + 2) (= 14) or " $\frac{7}{10}$ " \div (3+2) (= $\frac{7}{50}$) M1 for " 14 " \times 2 or $\frac{7}{50} \times 2$ A1 for 28% or $\frac{14}{50}$ oe OR M1 for a correct method to find (100-30)% of any actual sum of money M1 for " 350 " \div (3 + 2) (= 70) M1 for " 70 " \times 2 A1 for 28% or $\frac{14}{50}$ oe OR M1 for starting with two numbers in ratio 3:2, eg 21 and 14 M1 for equating sum of their numbers to $100 - 30 (=70\%)$, eg ' 21 ' + ' 14 ' (=35) M1 for scaling sum of their numbers to 100%, eg ' 35 ' \div 70×100 (=50) A1 for 28% or $\frac{14}{50}$ oe SC: award B3 for oe answers expressed in an incorrect form eg $\frac{2.8}{10}$
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Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

36.

12			240	4	<p>M1 for 16×2 (= 32 girls) M1 for $16 + '16 \times 2'$ (= 48) M1 (dep on the previous M1) for $(16 + '32') \times 5$ or $(16 + '32') \times (4 + 1)$ A1 cao</p> <p>OR</p> <p>M1 for $1 : 2 = 3$ parts M1 for 5 schools \times 3 parts (= 15 parts) M1 (dep on the previous M1) for '15' parts \times 16 A1 cao</p> <p>SC B2 for 176 given on the answer line</p>
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Pearson Edexcel - Tuesday 6 November 2012 - Paper 1 (Non-Calculator) Higher Tier

37.

13*		<p>$180 \div 9 \times 1 : 180 \div 9 \times 3 : 180 \div 9 \times 5$ $= 20 : 60 : 100$ Not enough cement (but enough sand and enough gravel)</p> <p>OR</p> <p>$1 \times 15 : 3 \times 15 : 5 \times 15$ $= 15 : 45 : 75$ $15 + 45 + 75 = 135 (< 180)$ Not enough cement (to make 180kg of concrete)</p>	No + reason	4	<p>M1 for $180 \div (1+3+5)$ (= 20) or 3 multiples of 1: 3: 5 M1 for $1 \times '20'$ or $3 \times '20'$ or $5 \times '20'$ or 20 seen or 60 seen or 100 seen A1 for (Cement =) 20, (Sand =) 60, (Gravel) = 100 C1 ft (provided both Ms awarded) for not enough cement oe</p> <p>OR</p> <p>M1 for $(1 \times 15 \text{ and}) 3 \times 15 \text{ and } 5 \times 15$ or 9×15 or sight of the numbers 15, 45, 75 together. M1 for '15' + '45' + '75' A1 for 135 (<180) C1 ft (provided both Ms awarded) for not enough cement oe</p>
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Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier

38.

19		<p>16 metres: 8×10^8 km. $16 : 8 \times 10^8 \times 1000$ $16 : 8 \times 10^{11}$ $1 : 5 \times 10^{10}$</p> <p>OR</p> <p>2 m to 10^8 km 2m to 100 000 000 000m 1m to 50 000 000 000m</p>		$1 : 5 \times 10^{10}$	3	<p>M1 (indep) correct method to convert to consistent units</p> <p>M1 $\frac{'8 \times 10^8'}{'16'}$ (units may not be consistent) or 5×10^{10} oe or 5×10^7 oe</p> <p>A1 $1 : 5 \times 10^{10}$ or $1 : 50\,000\,000\,000$</p> <p>OR</p> <p>M1 (indep) correct method to convert to consistent units</p> <p>M1 $\frac{'16'}{8}$ to $'10^8'$</p> <p>A1 $1 : 5 \times 10^{10}$ or $1 : 50\,000\,000\,000$</p>
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Pearson Edexcel - Friday 2 March 2012 - Paper 3 (Non-Calculator) Higher Tier

39.

10		$2 \times 5 : 3 \times 10 = 10 : 30 = 1 : 3$	1 : 3	2	<p>M1 $2 \times 5 : 3 \times 10$ or $2 \times 1 : 3 \times 2$ or sight of 10 and 30 or 10p and 30p A1 for 1 : 3 cao (SC B1 for 3 : 1 or 1p : 3p or 10 : 30 or 5 : 15 or 10p : 30p)</p>
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Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

40.

12		$45 \div (2 + 3 + 4)$	Ann £10 Bob £15 Cath £20	3	<p>M1 for dividing 45 by the sum of the ratios $2 + 3 + 4$ M1 for multiplying "5" by 2 or 3 or 4 A1 for Ann £10, Bob £15, Cath £20, condone missing £ signs</p> <p>OR</p> <p>M1 for realising of $\frac{2}{"9"}$ or $\frac{3}{"9"}$ or $\frac{4}{"9"}$ M1 for multiplying 45 by $\frac{2}{"9"}$ or $\frac{3}{"9"}$ or $\frac{4}{"9"}$ A1 for Ann £10, Bob £15, Cath £20, condone missing £ signs</p> <p>NB: Award M1M1A0 for 2 out of 3 answers on answer line or 10 : 15 : 20 seen as final ratio</p>
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Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

41.

1		$24 \div 2$	36	2	<p>M1 for $24 \div 2$ or $\frac{3}{2} \times 24$ oe or 12 A1 cao</p>
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Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier

42.

13		$180 \div 9$ (=20) 20×4	80	3	<p>M2 for $180 \div (2 + 3 + 4) \times 4$ or 40, 60, 80 seen (M1 for $180 \div (2 + 3 + 4)$ or 20 seen A1 cao</p>
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OCR GCSE – Tuesday 3 November 2020 – Paper 4 (Calculator) Higher Tier

43.

3		2 [h] 15 [m]	4	<p>M3 for a fully correct method e.g.</p> $2.5 \times \frac{405}{270} \times \frac{3}{5}$ <p>OR</p> <p>M2 for three correct steps from</p> $2.5 \times \frac{405}{270} \times \frac{3}{5} \text{ e.g. } 2.5 \times \frac{405}{270} \times 3$ <p>OR</p> <p>M1 for one correct step e.g.</p> $\frac{270}{2.5}, \frac{270}{150}, \frac{270}{3}, 2.5 \times 3, 150 \times 3, \frac{3}{5}, \frac{405}{270}$ <p>or $\frac{405}{5}$</p> <p>if M0 or M1 scored allow SC1 for <i>their</i> final time as a decimal hour or <i>their</i> final time in minutes correctly converted to hours and minutes e.g. 2.3333[h] = 2[h] 20[min]</p>	<p>M3 implied by 2.25, 2 [h] 25 [min] or 135 nfw note : (405 – 270 ÷ 2) = 135 = 2[h] 15[min] scores M0</p> <p>M2 could be implied by 180, 11.25, 675 or 3 nfw</p> <p>M1 could be implied by 108, 1.8, 90, 7.5, 450, 0.6, 1.5 or 81</p> <p>allow alternative methods</p>
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OCR GSCE – Tuesday 3 November 2020 – Paper 4 (Calculator) Higher Tier

44.

16		$y = \frac{50}{x^2}$ final answer	3	<p>M2 for $2 = \frac{k}{5^2}$ or better</p> <p>OR</p> <p>M1 for $y = \frac{k}{x^2}$ oe or B1 for [k =] 50</p>	Condone proportionality symbol for equals in M1
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OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier

45.

3	(a)	5	2	B1 for 225 [min] or for 0.75 and 3.75 oe seen	
3	(b)	<p>$\frac{9}{9+16} [x k]$ or $\frac{16}{9+16} [x k]$ oe or better</p> <p>Correct method to convert <i>their</i> fraction to a percentage or a fraction with 100 as denominator or a decimal or correct method for 60% of 25</p> <p>64[%] or 15 or a pair of other correctly calculated comparative values with a correct conclusion and no error seen</p>	<p>M1 or [60% =] 0.6 oe</p> <p>M1 or $0.6 \times k$ oe</p> <p>A1 eg 64 > 60 64%, so Reece is correct</p>	<p>Where <i>k</i> is a chosen value</p> <p>implied by 64, 0.64, $\frac{64}{100}$, 15 and all imply previous M1 <i>k</i> is same value as used previously. Same <i>k</i> must be used in both parts to get this second mark</p> <p>accept 0.64 and 0.6[0], $\frac{64}{100}$ and $\frac{60}{100}$ or equivalent fractions with same denominator or with correctly evaluated values from using <i>k</i></p>	

OCR GSCE – Monday 9 November 2020 – Paper 6 (Calculator) Higher Tier

46.

9		$z = 1.2x$ or $z = \frac{6x}{5}$	4	<p>B3 for a correct equation involving just x and z but not in required form</p> <p>OR</p> <p>B1 for $y = 6x$ oe B1 for $y = 5z$ oe M1 for a correct equation involving just x and z using <i>their</i> two equations</p> <p>OR</p> <p>B1 for $y = 60$ when $z = 12$ B1 for $x : [y :] z$ is $10 : [60 :]12$ M1 for a correct equation involving just x and z using <i>their</i> triple ratio or <i>their</i> two ratios with a common y value</p> <p>If 0 scored SC1 for $y = kx$ and $k = 6$ found oe or for $y = kz$ and $k = 5$ found oe</p>	<p>Condone \propto for $=$ in B1 marks and SC1 but not at B3 or full marks</p> <p>e.g. $5z = 6x$, or $x = \frac{5z}{6}$</p> <p><i>Their</i> two equations of the form $y = ax$ oe and $y = bz$ oe</p> <p>Allow B2 for other triple ratios of the form $5k : 30k : 6k$ or two correct ratios with a common y value</p>
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OCR GSCE – Tuesday 5 November 2019 – Paper 4 (Calculator) Higher Tier

47.

1		Correct working leading to correct reason e.g. yes and 21.[3..] and 24 or 1280 and 1440 or [80 and] 90 or 2.6[.] or 2.7 [and 3] or 7.[1..] and 8	5	<p>M1 for unit calculation e.g. $48 \div 3$ M1 for scale factor e.g. 80×16 possibly in one stage M1 for first conversion e.g. $1280 \div 60$ M1 for second conversion e.g. 3×8 possibly in one stage A1 dep on M3 or M4 for 'Yes' and two correct comparative figures</p>	<p>Accept any correct method e.g. M1 for $48 \div 3$ soi by 16 M1 for $80 \times$ <i>their</i> 16 soi by 1280 M1 for <i>their</i> $1280 \div 60$ soi by 21.33... M1 for 3×8 soi by 24 A1 for yes and 21.33... < 24</p> <p>Allow 21 hours 20 minutes</p>
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OCR GSCE – Tuesday 5 November 2019 – Paper 4 (Calculator) Higher Tier

48.

4	(a)	50×30 $\frac{50 \times 30}{1+2+3}$ [x1, 2 or 3] $2 \times 250 = 500$	1 1 1	Accept any correct method e.g. M1 for $\frac{2}{1+2+3} = \frac{2}{6}$ M1 for $\frac{2}{6} \times 50$ or $50/3$ M1 for $\frac{50}{3} \times 30 = 500$ Alternative method M1 for $30 \div 6 = 5$ M1 for <i>their</i> $(30 \div 6) \times 2$ M1 for $50 \times 10 = 500$	watch for wrong method $50 \times 20 = 1000$. $1000 \div 2 = 500$ Mark to candidates advantage
	(b)	32	5	M1 for $\frac{250}{25}$ or $\frac{500}{20}$ or $\frac{750}{15}$ M1 for <i>their</i> $10 \times 5.5[0]$ or <i>their</i> $25 \times 2[.00]$ or <i>their</i> $50 \times 3.9[0]$ M1 for <i>their</i> $10 \times 5.5[0] + \text{their } 25 \times 2[.00] + \text{their } 50 \times 3.9[0]$ M1 for $\frac{396}{\text{their } 300}$ or $\frac{396 - \text{their } 300}{\text{their } 300}$ Alternative method M1 for $\frac{30 \times 1}{25}$ or $\frac{30 \times 2}{20}$ or $\frac{30 \times 3}{15}$ or $\frac{396}{50}$ M1 for $5.5[0] \times \text{their } [0].2$ or $2[.00] \times \text{their } [0].5$ or $3.9[0] \times \text{their } 1$ M1 for <i>their</i> $(5.5[0] \times [0].2) + \text{their } (2[.00] \times [0].5) + \text{their } (3.9[0] \times 1)$ M1 for $\frac{7.92}{\text{their } 6}$ or $\frac{7.92 - \text{their } 6}{\text{their } 6}$	M1 may be implied by 10 or 25 (<i>no. of bags/part bags of cement, sand, stone</i>) M2 may be implied by 55 and 195 (<i>cost of cement, sand, stone</i>) M3 may be implied by 300 or 6 nfw (<i>total production cost</i>) M1 may be implied by 0.2, 0.5 or 1 or 7.92 (<i>no. of bags/part bags of cement, sand, stone or price of 1 bag</i>) M2 may be implied by 1.1[0], 1[.00] or 3.9[0] (<i>cost of cement, sand, stone for 1 bag</i>) M3 may be implied by 6 nfw (<i>total production cost of 1 bag</i>)

OCR GSCE – Tuesday 5 November 2019 – Paper 4 (Calculator) Higher Tier

49.

6		$\frac{21}{50}$	3	M1 for two ratios with a common number of sherberts e.g. 14 : 21 or 21 : 15 or 50 and M1 for $\frac{\text{their } 21}{\text{their } (14+21+15)}$ only after valid attempt to create a triple ratio eg 0 for $\frac{3+7}{2+3+7+5}$ etc allow any correct method	Alternative : M1 for 7 + 3 implied by 2.3[3...] oe or better and M1 for 5 + 2.3[3...] oe implied by 2.1428..... (exact = $\frac{15}{7}$) or 2 x 2.3[3...] oe and e.g. 2 : 3 : <i>their</i> $\frac{15}{7}$ (= 14 : 21 : 15) or <i>their</i> $\frac{14}{3} : 7 : 5$
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OCR GSCE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier

50.

7		2700	4	B3 for Emma's amount = 4500 or 4050 or old total = 7200 or new total = 6750 or M2 for $6k : 10k$ and $6k : 9k$ seen where k is a positive integer or for $\frac{5}{3}[-] \frac{3}{2}$ oe seen or for correct unsimplified equation to find Emma or Sundip or the total amount or M1 for $6k : 10k$ or $6k : 9k$ seen where k is a positive integer or for $\frac{5}{3}$ or $\frac{3}{2}$ or $\frac{5}{8}$ or $\frac{3}{8}$ or $\frac{3}{5}$ or $\frac{2}{3}$ oe seen or used	M2 implied by $\frac{1}{6}$ eg $\frac{3E}{5} = \frac{2}{3}(E - 450)$ where E is Emma's original share For M1 accept decimal versions of fractions
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OCR GSCE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier

51.

14		3.5	3	<p>M2 for $\frac{7 \times \sqrt{25}}{\sqrt{100}}$ oe</p> <p>Or M1 for $\frac{y}{7} = \frac{\sqrt{25}}{\sqrt{100}}$ oe</p> <p>OR</p> <p>M1 for $y = \frac{k}{\sqrt{x}}$ oe</p> <p>B1 for $k = 35$</p>	<p>Accept $ky = \sqrt{x}$</p> <p>Accept $k = \frac{5}{7}$</p>
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OCR GSCE – Tuesday 21 May 2019 – Paper 4 (Calculator) Higher Tier

52.

2		20	2	<p>condone 1 : 20 for 2 marks</p> <p>B1 for [50 :] 1000 oe or $\frac{1000}{50}$ ignoring units or answer with units e.g. 20g, 1g : 20g</p>
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OCR GSCE – Tuesday 21 May 2019 – Paper 4 (Calculator) Higher Tier

53.

3	(a)	$\frac{5}{36}$ or equivalent fraction	3	<p>M2 for $\frac{5}{3+4+5} \times \frac{1}{3}$ oe implied by e.g. [0].139, [0].1388..., 13.9%, 13.88..%, $\frac{1.6}{12}$, $\frac{1.66[6..]}{12}$, $\frac{1.67}{12}$, $\frac{1.7}{12}$, $\frac{5}{36}$ or better</p> <p>OR</p> <p>B1 for $\frac{5}{12}$ or equivalent fraction or 0.41$\dot{6}$ or better</p> <p>OR</p> <p>M1 for $(\frac{3}{3+4+5}$ or $\frac{4}{3+4+5}) \times \frac{1}{3}$ or $\frac{1}{3} \times 5$ oe, implied by 1.$\dot{6}$, 1.66[6...], 1.67 or 1.7 or better</p>
3	(b)	4000	2	<p>M1 for $1600 + 8$ or $(5+7+8) + 8$ implied by 200 or 2.5</p>

OCR GSCE – Tuesday 21 May 2019 – Paper 4 (Calculator) Higher Tier

54.

16	(a)	<p>any correct method e.g. two of $[y \times \sqrt{x} =] 6 \times \sqrt{4} = 12, 3 \times \sqrt{16} = 12, 2 \times \sqrt{36} = 12$ oe</p> <p>or</p> <p>use one pair to find $y = \frac{12}{\sqrt{x}}$ and check with another pair</p>	2	<p>accept 6 for $\sqrt{36}$ etc</p> <p>M1 for correct method with one error or omission or uses $y = \frac{k}{\sqrt{x}}$ to find $k = 12$ or one of $[y \times \sqrt{x} =] 6 \times \sqrt{4} = 12, 3 \times \sqrt{16} = 12, 2 \times \sqrt{36} = 12$</p> <p>alternative method : show x is $\times 4$ and $\times 9$ and y is $+ 2$ and $+ 3$.</p>
16	(b)	$a = \frac{60}{b^2}$ oe	3	<p>condone answer of $a \propto \frac{60}{b^2}$ for 2 marks or</p> <p>M1 for $a = \frac{k}{b^2}$ oe implied by $3.75 = \frac{k}{4^2}$</p> <p>B1 for $[k =] 60$</p>

OCR GSCE – Thursday 6 June 2019 – Paper 5 (Non-Calculator) Higher Tier

55.

4	(a)	7	3	B2 for 6.5 or $6\frac{1}{2}$ oe or M1 for $\frac{\text{their } (106 - 80)}{4}$ oe	For M1 accept attempted repeated subtraction from 106 to 80 or from 26 to 0 or repeated addition of 4 from 80 to 106 or from 0 to 26 condone 1 error At least 4 correct additions or subtractions needed soi FT one error
	(b)	Fewer days oe	1		e.g. smaller, less, days would be shorter, would decrease, ignore reference to numbers of days if lower

OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

56.

2	(a)	<p>a correct distance conversion e.g. $400 \div 1000$ or $[0].4$ or 5×1000 or 5000</p> <p>a scale factor e.g. $5[000] \div 400$ soi figs 125 or $840 \div 66$ soi 12.727... or 12.73 or figs 127</p> <p>correct time conversion e.g. 14×60 or 840 or $66 \div 60$ or 1[m] 6[s] or 1.1 or $825 \div 60$</p> <p>correct figures e.g. <table style="display: inline-table; vertical-align: middle;"> <tr><td>13.75 or 13.7 or 13.8</td><td>[14]</td></tr> <tr><td>5.09... or 5.1</td><td>[5]</td></tr> <tr><td>5090[. ...] or 5100</td><td>5000</td></tr> <tr><td>825</td><td>840</td></tr> <tr><td>12.5</td><td>12.7...</td></tr> <tr><td>5.95 or 5.9 or 6</td><td>6.06... or</td></tr> <tr><td>6.1</td><td></td></tr> </table> </p>	13.75 or 13.7 or 13.8	[14]	5.09... or 5.1	[5]	5090[. ...] or 5100	5000	825	840	12.5	12.7...	5.95 or 5.9 or 6	6.06... or	6.1		<p>M1 accept any correct method</p> <p>M1</p> <p>M1</p> <p>A1 Dep on M3</p>	
13.75 or 13.7 or 13.8	[14]																	
5.09... or 5.1	[5]																	
5090[. ...] or 5100	5000																	
825	840																	
12.5	12.7...																	
5.95 or 5.9 or 6	6.06... or																	
6.1																		
	(b)	an acceptable response e.g. [he will not maintain this rate because] he will get tired	1		Accept any correct reason must not be contradicted.													

OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

57.

14		$y = \frac{120}{\sqrt{x}}$ oe	3	M1 for $y = \frac{k}{\sqrt{x}}$ oe B1 for $[k =] 120$	e.g. condone $y = \frac{k}{\sqrt{9}}$ for M1
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OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

58.

22		<p>accept any correct method e.g.</p> <p> $\frac{2}{3} \times P(R/M) = \frac{2}{5}$ $P(R/M) = \frac{2}{5} + \frac{2}{5} = \frac{3}{5}$ </p> <p> $\frac{1}{3} \times P(R/F) = \frac{1}{4}$ $P(R/F) = \frac{1}{4} + \frac{1}{3} = \frac{3}{4}$ </p> <p> $\frac{3}{4} = 0.75 > \frac{3}{5} = 0.6$ </p>	<p>B1 Could be table or the correct probability notation e.g. $P(R \cap M) = P(R/M) \times P(M)$</p> <p>M1 Correct method to find the probability that a male is right-handed</p> <p>M1 Correct method to find the probability that a female is right-handed</p> <p>A1 Must be two figures which can be compared</p>	<p>If they use a table see appendix based on 100 Award B3 for all red elements in table correct, B2 for 3 or 4 correct, B1 for 2 correct M1 for Prop.(F) = 25+33.333 or 0.75 M1 for Prop.(M) = 40+66.666 or 0.6</p>
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OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

59.

6		<p>No and she can only get 12[.5] strips nfw or No and $31\frac{1}{5}$ oe [> 30] oe nfw</p>	4	<p>B3 for 12.5 or $\frac{25}{2}$ oe or $31\frac{1}{5}$ oe or B2 for $28\frac{4}{5}$ oe seen or $1\frac{1}{5}$ oe or for $30 \times \frac{5}{12}$ oe or $\frac{150}{5} \div \frac{12}{5}$ oe or M1 for $30 \div 2\frac{2}{5}$ oe or $13 \times 2\frac{2}{5}$ oe</p>	<p>Amount of material used for 12 strips Amount left over from 12 strips</p> <p>For M1 accept attempt for repeated addition of $2\frac{2}{5}$ oe to make 30 (at least 3 repeats) condone 1 error in the addition</p>
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OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

60.

17		3 : 2 nfw	4	<p>B3 for 15 [shaded] and 10 [unshaded] or M2 for $5^2 - 4^2$ oe or $4^2 - 1^{[2]}$ oe or M1 for 4^2 or 5^2 oe seen</p>	
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OCR GSCE – Monday 12 November 2018 – Paper 6 (Calculator) Higher Tier

61.

6		375	4	<p>M3 for $1025 \div (5k + 15k + 21k) \times 15k$ oe or M2 for $1025 \div (5k + 15k + 21k)$ oe or M1 for two ratios with a common number of cashews implied by 5k (almonds) and 21k (peanuts) seen, $k > 0$ or for 5 : 15 [: 21] or [5 :] 15 : 21 or 41 seen</p>	<p>M3 implied by 125, 375, 525 with 375 not selected</p>
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OCR GSCE – Monday 12 November 2018 – Paper 6 (Calculator) Higher Tier

62.

9	(a)	A	1		
	(b)	C	1		

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

63.

1	(a)	250	2	B1 for [2 :] 500 If 0 scored SC1 for answer of figs 25	Ignore any units seen
	(b)	4500	2	M1 for $\frac{7200}{1+2+5}$ [×5] soi by 900	

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

64.

11		32.25	4	accept any correct method e.g. B1 for 1.15 M1 for $y = k(1.15 \times x)^2$ M1 for $(1.15^2 - 1) [\times 100]$ or [0].3225 OR B2 for 1.15^2 or 1.3225 or B1 for 1.15 M1 for $(1.15^2 - 1) [\times 100]$ or [0].3225 If 0 scored award B1 for $y = kx^2$	accept if k replace by a numerical value
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OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

65.

10	(a)	440	3	M2 for $165 \div 3 \times 8$ or M1 for 165 is $1 - \frac{5}{8}$ soi or for $165 \div 3$ soi If 0 scored, SC1 for answer 264	M1 implied by 55 or 275 seen (from $165 \div 5 \times 8$)
	(b)	Correct comment	1	Any statement that implies the assumption that the rate of petrol consumption remains constant	e.g. Speed stays the same Same type of roads The car uses fuel at the same rate Does not get stuck in traffic Weather stays the same See AG

OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

66.

14		3 nfw	5	<p>B4 for $4r^3 = 108$ or better or B3 for $r^3h = 108$</p> <p>or M3 for $\pi \times 2^2 \times 9 = \frac{1}{3}\pi r^2 4r$ oe</p> <p>or for $\pi \times 2^2 \times 9 = \frac{1}{3}\pi \left(\frac{h}{4}\right)^2 h$ oe</p> <p>or B2 for 36π or M1 for $\pi \times 2^2 \times 9$ or better or B1 for $4r$ or $\frac{h}{4}$ seen</p>	<p>nfw - must check method before giving 5 marks must not come from wrong working</p> <p>Condone use of other letter for r (or h) e.g. x For method marks allow use of 3.14, 3.142 or 22/7 for π</p>
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OCR GSCE – Tuesday 12 June 2018 – Paper 6 (Calculator) Higher Tier

67.

2		18 nfw	4	<p>B1 for [green] 36 or ratio(s) equivalent to 5 : 9 : 36</p> <p>AND</p> <p>M2 for $\frac{\text{their } 9}{\text{their } (5 + 9 + 36)} [\times 100]$ or M1 for $\text{their } (5 + 9 + 36)$ soi</p>	<p>For B1 accept 5 : 36 or 9 : 36 or ratio(s) involving a common term for blue eg 10 : 18 and 18 : 72 eg 1 : 1.8 : 7.2 eg $\frac{5}{9} : 1$ [: 4] (decimals should be accurate rot to 3 figs)</p> <p><i>Their</i> (5 + 9 + 36) must come from a ratio (or ratios) with a common term. 1 + 4 + 5 + 9 = 19 followed by $\frac{5}{19}$ scores 0.</p>
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OCR GSCE – Tuesday 12 June 2018 – Paper 6 (Calculator) Higher Tier

68.

6		0.1 oe nfw	3	<p>M2 for $80 \times 0.04 = y \times 32$ or $3.2 = 32y$ or $y = \frac{3.2}{32}$ oe</p> <p>OR</p> <p>M1 for 80×0.04 soi by 3.2 or $\frac{16}{5}$ or $y = \frac{k}{x}$ soi</p>	
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OCR GSCE – Tuesday 12 June 2018 – Paper 6 (Calculator) Higher Tier

69.

14	(a)	$21.45 \times 4663 + 100\,000 = 1.0002[1..]$ (km) or $21.45 \times 4663 = 100\,020$ to $100\,021.4 > 100\,000$ (cm) or. $100\,000 + 21.45 = 4662[0..] < 4663$ or $100\,000 + 4663 = 21.44[5..] < 21.45$ Note the first method does not require a comparison against 1 (km)	4	B1 for (minimum length =) 21.45 seen B1 for 1 km = 100 000 cm so ie such as + 100 then + 1000 or use of 1m = 100cm and 1km = 1000m if working in metres. M1 for <i>their</i> $21.45 \times 4663 (+ 100\,000)$ or $100\,000 + \textit{their} 21.45$ or $100\,000 + 4663$ If M0 scored, allow SC1 for $k \times 4663 (+ 100\,000)$ or $100\,000 + k$ with k in the range 10.25 to 10.35 or 6.45 to 6.55	Allow access to all marks if brick and 1 km are in consistent units. Allow these conversions even with <i>their</i> volume or surface area. eg $21.5 \times 10.3 \times 6.5 = 1439.425$ $\text{cm}^3/\text{cm}^2/\text{cm}^3 = 0.01439425 \text{ km}$ <i>their</i> 21.45 must be in the range 21.45 to 21.55 but accept equivalent if attempting the unit conversion first eg B0B0M1 for 21.5 cm = 0.0215 km followed by 0.0215×4663 Thus, use of width or height of the brick may score B0,B1,SC1 whereas use of volume may score B0/1,B1,SC0 Accept equivalent if working in m or km	
	(b)	(i)	7017 to 7020	3	B1 for 20 000 or 2.849[...] or 2.85 or 0.0028[...] seen M1 for <i>their</i> $20\,000 + \textit{their} 2.85$ or $20 + \textit{their} 0.00285$	Ignore other bound ie a division after an attempt to reach consistent units <i>their</i> 2.85 must be in the range 2.75 to 2.85 inc.; <i>their</i> 0.00285 must be in the range 0.00275 to 0.00285. B0M0 for $20 + 2.8$ as no attempt to reach consistent units
		(ii)	The truck may not have enough room or Safety regulations may not allow it	1	Mark their best reason. 0 for we do not know the exact weight of the bricks or 0 for because the truck may need to carry other loads 0 there may not be enough bricks available	

OCR GCSE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

70.

1	(a)	$93 + 3$ or 31 or $100 + 3$ or $33.3..$ or $55 + 1.55$ or $3300 + 93$ or 35.5 or $35.48...$ or $55 + 93$ or 0.6 or $0.59...$ <i>their</i> 31×100 or 3100 or <i>their</i> $33.3... \times 93$ or <i>their</i> 35.5×3 <i>their</i> $3100 \div 60$ so by $51.6[6..]$ or 51.7 or 52 or $51[\text{min}] 40[\text{sec}]$ or 55×60 so 3300 or $106[.5]$ or $106.45...$ 106.45 or $106[.5] > 100$ or $51.6[6]....$ or 51.7 or 52 or $51[\text{min}] 40[\text{sec}] < 55$ or $31[00] < 33[00]$ or So he can swim that distance	1	accept any correct method	e.g. 106.45 lengths in 55 mins
	(b)	he swims at the same rate	1	accept any correct statement e.g. he does not slow down, no breaks	See appendices
	(c)	he will get tired/he will slow down/not take breaks	1	accept any correct statement	See appendices

OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

71.

6			21	4	B1 for 6 and 9 M1 for <i>their</i> (6 × 5) M1 for <i>their</i> (6×5) – <i>their</i> 9	implied by 6:30
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OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

72.

11			$y = \frac{80}{x^2}$ oe	3	M1 for $y = \frac{k}{x^2}$ oe B1 for $k = 80$	implied by $5 = \frac{k}{4^2}$ oe
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OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

73.

8	(a)		$180 + (1 + 2 + 3) \times 3 [= 90]$	2	M1 for $180 + (1 + 2 + 3)$ If 0 scored, SC1 for angles 30, 60, 90	Condone 6 for 1 + 2 + 3
	(b)		7.5	4	B1 for $\sin 30^\circ$ or $\cos 60^\circ = \frac{1}{2}$ sol M2 for 15 $\sin 30$ oe or M1 for $x/15 = \sin 30$ oe	

OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

74.

9			80	4	M3 for $250 + (8k + 10k + 7k) \times 8k$ oe or M2 for $250 + (8k + 10k + 7k)$ oe or M1 for two ratios with a common number of women implied by 8k (men) and 7k (children) seen, $k > 0$ or for 8 : 10 [:7] or [4:] 5 : 3.5 seen	M3 implied by 80 , 100, 70 with 80 not selected e.g. 0.8 and 0.7, 4 and 3.5
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OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

75.

6	(a)	(i)	$\frac{1}{5}$ of Bag A's counters [are red] or The ratio of red to yellow in Bag B is 1:3	1	Accept $1 : 4 = \frac{1}{5}$ Accept $\frac{1}{4} = 1 : 3$	Equivalents may be percentages or decimals Eg. Bag A: 20% red, Bag B: 25% red.									
		(ii)	Correct answer is any integer multiple of this. <table border="1" style="margin-left: 40px;"> <tr> <td></td> <td>Red</td> <td>Yellow</td> </tr> <tr> <td>Bag A</td> <td>4</td> <td>16</td> </tr> <tr> <td>Bag B</td> <td>5</td> <td>15</td> </tr> </table>		Red	Yellow	Bag A	4	16	Bag B	5	15	3	B1 for (Bag A) yellow = 4 × red and A total = B total B1 for (Bag B) yellow = 3 × red If 0 scored SC2 for correct figures but transposed horizontally	8 32 10 30
	Red	Yellow													
Bag A	4	16													
Bag B	5	15													

	(b)	20 nfw	3	<p>B1 for two ratios equivalent to 3:4</p> <p>M1 for <i>their</i> 15:20 reduced to (15-3):20</p> <p><u>Alternative approach</u></p> <p>B1 for two fractions equivalent to $\frac{3}{7}$</p> <p>M1 for <i>their</i> $\frac{15}{35}$ reduced to $\frac{15-3}{32}$</p>	<p>6:8, 9:12, 12:16, 15:20,...</p> <p><i>their</i> 15:20 any ratio but not 3:4</p> <p>using equivalent fractions:</p> <p>Eg $\frac{6}{14}$ or $\frac{9}{21}$ or $\frac{12}{28}$ or $\frac{15}{35}$</p> <p><i>their</i> $\frac{15}{35}$ any fraction but not $\frac{3}{7}$</p>
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OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

76.

13	(a)	1.4355 or 1.436 or 1.44	2	M1 for 16.5×87 possibly soi by figs 14355, 1436 or 144	
	(b)	Yes (Trevor is correct) because Eg $220 \div 87^3 \times 100^3 = 334.[...]$ or $334 \times 87^3 \div 100^3 = 219.9...$ to 220	3	<p>M2 for $220 \div 87^3 \times 100^3$ or $334 \times 87^3 \div 100^3$</p> <p>OR</p> <p>B1 for 87^3 or 658503 or 100^3 or 1000000 soi</p>	

OCR GSCE – Thursday 8 June 2017 – Paper 5 (Non - Calculator) Higher Tier

77.

*3		<p>A - Yes with appropriate reasoning involving rounding and correct simplification to 3 : 8 or 3 : 11 or 8 : 11 or ratios reversed</p> <p>OR</p> <p>B - Yes it is approximately correct oe and simplification of 6400 : 16200 to 32 : 81</p> <p>OR</p> <p>C - Yes with a correctly evaluated calculation using e.g. ratio 3 : 8 with a comparison comment</p> <p>OR</p> <p>D - Yes and e.g. $16200 \div 8$ and $6400 \div 3$ correctly evaluated</p>	3	<p>M2 eg for showing 6000 : 16000 and reducing to 3 : 8 or for appropriate rounding at some stage in correctly simplifying ratio leading to 3 : 8 isw</p> <p>or reduces 6400 : 16200 to 32 : 81 isw or reduces 6400 : 22600 to 32 : 113 isw</p> <p>or for ratio calculation leading to one of the following values seen 6075, 6163 to 6165, 16436 to 16440, 17066 to 17067 or 22275 or 23463 to 23467 seen isw</p> <p>or for 2025 and 2133 to 2134 seen isw or 2025 and 2054 to 2055 seen isw or 2133 to 2134 and 2054 to 2055 seen isw</p> <p>Or M1 for 6000 or 16000 or 20000 or 22000 or 23000 seen or for appropriate rounding of one number at some stage in simplifying ratio or for intention to find $\frac{3}{8}$ of 16200 or for $\frac{8}{3}$ of 6400 or $\frac{3}{11}$ of (16200 + 6400) or $\frac{8}{11}$ of (16200 + 6400) isw</p> <p>or for $6400 \div 3$ and one of $16200 \div 8$ or $(6400 + 16200) \div 11$ seen isw or $16200 \div 8$ and $(6400 + 16200) \div 11$ seen isw</p>	<p>For all marks accept method with equivalent fractions or decimals [3sf or better] Allow equivalent methods working with the totals e.g. 3 : 11, condone 22600 rounded to 22000 For 3 or M2, allow clear 'reverse' methods working from e.g. 3 : 8 to 6000 and 16000 Accept clear working if not in ratio form e.g. 3.2 and 8.1 shown not in ratio</p> <p>The figures in the part marks column are guidance on accuracy required for 3 marks or M2</p> <p>SEE APPENDIX</p>
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OCR GSCE – Thursday 8 June 2017 – Paper 5 (Non - Calculator) Higher Tier

78.

*7	(a)		22 : 15	2	<p>M1 for any equivalent ratio or for two correct ratios with a common number of children seen implied by 22k and 15k seen ($k > 1$ and an integer)</p> <p>Or for $\frac{11}{3} : \frac{5}{2}$ or for 11 : 7.5</p>	<p>15k : 22k implies M1</p> <p>Accept 3.66 to 3.67 : 2.5</p>
	(b)		258	3	<p>M2 for $\frac{36}{2} \times 5 + \frac{36}{3} \times 11 [+36]$ oe or $((2 \times 11) + (3 \times 5)) \times 36 + 6 [+36]$ oe or $\frac{6}{6+15+22} \times x = 36$ oe or M1 for $\frac{36}{2} \times 5$ or $\frac{36}{2} \times 7$ soi or $\frac{36}{3} \times 11$ or $\frac{36}{3} \times 14$ soi oe</p>	<p>M2 implied by 222 [+36] not spoiled</p> <p>90 + 132 [+ 36]</p> <p>Implied by 90 or 126 or 132 or 168 seen</p>

OCR GSCE – Tuesday 13 June 2017 – Paper 6 (Calculator) Higher Tier

79.

4			4 : 11 or exact equivalent	<p>3 2 AO1.3b 1 AO3.1d</p>	<p>B2 for $\frac{4}{15}$ nfwv oe soi by 0.26[6...] to 0.27 or answer 11 : 4 or answer 4 : 15</p> <p>OR</p> <p>M1 for $\frac{2}{3} \times \frac{2}{5}$</p> <p>OR</p> <p>B1 for $\frac{2n}{3}$ evaluated where n is their total number of students</p> <p>Alternative method: [Spanish : Other : None] B2 4 : 6 : 5 soi</p> <p>OR</p> <p>Spanish : Other [: None] M1 2 : 3 [: 2.5]</p>	<p>Implied by eg $\frac{4n}{15}$ evaluated where n is their total number of students</p> <p>NB 0.26 : 0.73 scores 3 marks but 0.26 : 0.74 only scores B2</p> <p>NB $\frac{4}{15}$ from $\frac{2}{3} - \frac{2}{5}$ scores 0</p> <p>0 for just 2 : 3 without labelling</p>
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OCR GSCE – Tuesday 13 June 2017 – Paper 6 (Calculator) Higher Tier

80.

12			<table border="1"> <tr> <td>x</td> <td>10</td> <td>6</td> <td>[±] 15</td> </tr> <tr> <td>y</td> <td>9</td> <td>25</td> <td>4</td> </tr> </table>	x	10	6	[±] 15	y	9	25	4	<p>4 1 AO1.1 3 AO1.3a</p>	<p>B3 for one value correct</p> <p>OR</p> <p>M2 for $9 \times 10^2 = y \times 6^2$ oe or $9 \times 10^2 = 4 \times x^2$ oe</p> <p>OR</p> <p>M1 for 9×10^2 or $y = \frac{k}{x^2}$ soi</p>	<p>Do not follow through mis-reads.</p>
x	10	6	[±] 15											
y	9	25	4											

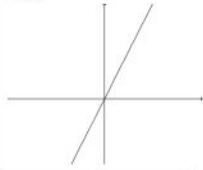
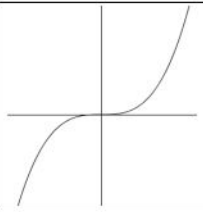
OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

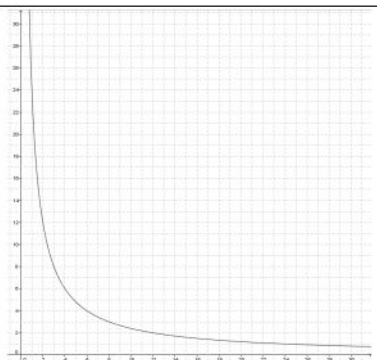
81.

1		23.6 – 23.8 Accept 24 provided full method shown	3 1 AO1.3b 2 AO3.1c	M2 for $\frac{329 \times 130}{18 \times 100}$ Or M1 for any two of $\frac{329}{100}$ or $\frac{130}{100}$ or $\frac{329}{18}$ or 329×130	May be done in stages
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OCR GCSE – Sample Papers – Paper 4 (Calculator) Higher Tier

81.

4	(a)	(i)	Any straight line through the origin e.g. 	2 1 AO1.1 1 AO2.3b	B1 for a straight line	
		(ii)		2 1 AO1.1 1 AO2.3b	B1 for a cubic with two turning points	
	(b)	(i)	At least one point plotted correctly	1 1 AO2.3b		

		(ii)		3 1 AO2.3b 1 AO3.1b 1 AO3.2	B2 for at least 5 points correctly plotted OR B1 for at least 3 points correctly plotted AND B1 for <u>curve</u> drawn through <i>their</i> points	
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OCR GCSE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

82.

4	(a)	400 g 200 g 300 g	2 1 AO1.3a 1 AO3.1c	M1 for 9 <i>soi</i>	
	(b)	Profit = £18.20	5 2 AO1.3b 2 AO3.1d 1 AO3.3	M1 Multiply <i>their</i> weights by 5 M1 Find number of each required M1* calculate total cost *M1 dep subtract from £60	

OCR GCSE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

83.

19		4 : 1	<p>6 2 AO1.3b 4 AO3.1d</p>	<p>M1 for $(x + 20) : (y + 20) = 5 : 2$ or $(x - 5) : (y - 5) = 5 : 1$ A1 for $\frac{x+20}{y+20} = \frac{5}{2}$ oe A1 for $\frac{x-5}{y-5} = \frac{5}{1}$ oe M1 for solving <i>their</i> simultaneous equations A1 for $x = 80$ or $y = 20$</p>	<p>Do not accept wrong notation for ratio in the final mark, e.g. for 4/1, 4, etc</p>
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AQA GCSE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

84.

10	Alternative method 1		
	2400 ÷ (3 + 5) or 2400 ÷ 8 or 300	M1	oe accept $\frac{1}{8}$ of 2400
	5 × their 300 or 1500 or 3 × their 300 or 900 or their 300 ÷ 6 or 50	M1dep	oe
	5 × their 300 ÷ 6 or (2400 – 3 × their 300) ÷ 6 or 1500 ÷ 6	M1dep	oe
	250	A1	
	Alternative method 2		
	2400 ÷ 6 or 400	M1	oe
	their 400 ÷ (3 + 5) or 50	M1dep	oe 2400 ÷ 48 scores M1M1
	5 × their 50 or 400 – (3 × their 50)	M1dep	oe
	250	A1	
	Additional Guidance		
	Answer 400 with 1500 or 900 in working	M1M1M0A0	
	Answer 400 with 250 in working	M1M1M1A0	
	Condone incorrect representation of a division if recovered eg $8 \div 2400 = 300$	M1	

AQA GCSE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

85.

Q	Answer	Mark	Comments
15	1 : 6	B1	

AQA GCSE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

86.

Q	Answer	Mark	Comments
22(a)	$y = kx^3$ or $17 = 4^3k$	M1	oe
	$k = 17 \div 4^3$ or $k = 17 \div 64$ or $k = \frac{17}{64}$ or $\frac{17}{64}x^3$	M1dep	oe in the form $k =$
	$y = \frac{17}{64}x^3$ or $y = 0.265625x^3$	A1	oe equation eg $64y = 17x^3$ SC2 $y = \frac{17}{4^3}x^3$ or $y = \frac{17}{64} \times 4^3$
	Additional Guidance		
	Allow the proportion sign instead of = for M1 only		

Q	Answer	Mark	Comments
22(b)	$\div 2$	B1	

AQA GCSE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier

87.

8	40 (women) and 44 (men) and No or 40 : 44 and No or 84 and No or 8 (women leave) and 2 (men arrive) and No	B2	oe B1 40 (women) and 44 (men) or 40 : 44 or 84 or 8 (women leave) and 2 (men arrive)
	Additional Guidance		
	NB 84 from incorrect working eg $41 + 43 = 84$		B0
	For B1 the values may be seen among others eg1 20 : 22 30 : 33 40 : 44 50 : 55 eg2 21, 42, 63, 84, 105, ... eg3 10, 20, 30, 40, 50, ... and 11, 22, 33, 44, 55, ... eg4 $\frac{44}{84}$ (implies 84)		B1
For B2 the value(s) must be chosen by eg circling or a list stopping at that point and No must be indicated			

AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

88.

1	9	B1	
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AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

89.

11	Alternative method 1		
	$330 \div (7 + 4)$ or 30	M1	oe
	$7 \times$ their 30 or 210 and $4 \times$ their 30 or 120	M1dep	oe
	45	A1	
	Alternative method 2		
	$330 \div (7 + 4)$ or 30	M1	oe
	$(7 - 4) \times$ their 30 or 90	M1dep	oe
	45	A1	
	Alternative method 3		
	$330 \div (7 + 4)$ or 30	M1	oe
	$7 \times$ their 30 or 210 or $4 \times$ their 30 or 120 and $330 \div 2$ or 165	M1dep	oe
	45	A1	
	Alternative method 4		
	$330 \div (7 + 4)$ or 30	M1	oe
	their 30×1.5	M1dep	oe
	45	A1	
	Additional Guidance		

AQA GCSE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

90.

3	5 : 2	B1	
	Additional Guidance		

91.

11	Alternative method 1		
	(65% =) $\frac{13}{20}$ or 7 : 13	M1	
	13	A1	must be selected as the answer
	Alternative method 2		
	(100 – 35) ÷ 35 × 7 or 7 ÷ 35 × 100 – 7 or 20 – 7	M1	oe eg 35 ÷ 7 = 5 and 65 ÷ 5
	13	A1	must be selected as the answer
	Alternative method 3		
	$\frac{35}{7} \times n = 100 - 35$ or $5n = 65$	M1	oe equation eg $\frac{7}{n} = \frac{35}{100 - 35}$ or $35n = 455$
	13	A1	must be selected as the answer
	Additional Guidance		
	35 : 65 with no other valid working		M0
	Condone answer £13		M1A1
	Answer 13% or 13n		M1A0
	65% = 0.65		M0
Alt 2 65 ÷ 35 = 1.9 1.9 × 7 = 13.3 (evidence of premature approximation) Answer 13		M1 A0	
Alt 2 65 ÷ 35 = 1.9 1.9 × 7 = 13 (assume full calculator value used)		M1 A1	

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

92.

11	$(200 + 160 + 104 + 100) \div 4$ or $564 \div 4$ or 141	M1	
	their $141 \div 3 \times 8$ or 47×8 or $1128 \div 3$ or 376	M1dep	oe accept $141 \times 2.66(\dots)$ or 141×2.67
	their 376×5 or 1880	M1dep	
	427	A1	
	Additional Guidance		
	$(270 + 400 + 483 + 300 + 427) \div 5$ embedded answer		M1M1M1A0
	$(1453 + x) \div 5 = 376$ and $1453 + x = 1880$		M1M1M1
	$(1453 + x) \div 5 = 376$		M1M1M0
	$200 + 160 + 104 + 100 \div 4$ scores M0 unless recovered		

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

93.

14	Class X has a greater proportion of boys than class Y	B1	
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AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

94.

20(a)	$d \propto v^2$ or $d = k \times v^2$ or $6 = k \times 20^2$ or $c \times d = v^2$ or $c \times 6 = 20^2$	M1	oe eg $v = kd^{1/2}$
	(k =) $6 \div 20^2$ or 0.015 or (c =) $20^2 \div 6$ or 66.66...or 66.67	M1dep	oe eg $\frac{6}{400}$ or $\frac{3}{200}$ $\frac{400}{6}$ or $\frac{200}{3}$
	$d = 0.015 \times v^2$ or $\frac{200}{3} \times d = v^2$	A1	oe equation
	Additional Guidance		
	Working for second M mark must follow from their initial equation		
	$d \propto 0.015 \times v^2$		M1M1A0
(k =) 0.015 or (c =) $\frac{200}{3}$ with no incorrect working		M1M1A0	
$0.015v^2$ or $\frac{200}{3}d$		M1M1A0	

20(b)	their 0.015×30^2 their 0.015×900 or $6 \times \left(\frac{30}{20}\right)^2$ or $30^2 + \text{their } \frac{200}{3}$ or $900 + \frac{200}{3}$ or $6 + \left(\frac{20}{30}\right)^2$	M1	oe	
	13.5	A1ft	oe ft their 0.015 provided using $d = \text{their } 0.015 \times v^2$	
	Additional Guidance			
	Must use $\times 30^2$ or $\times 900$ or $\times \left(\frac{30}{20}\right)^2$ for M1			
	$d \propto 13.5$			M1A0
	If in part (a) $d = k \times v \quad 6 = k \times 20 \quad d = \frac{6}{20}v$ and in part (b) $d = \frac{6}{20} \times 30, \quad m = 9$			M0 part (a) M0 part (b)
If in part (a) $d = k \times v \quad 6 = k \times 20 \quad d = \frac{6}{20}v$ and in part (b) $d = \frac{6}{20} \times 30^2, \quad d = 270$			M0 part (a) M1A1ft part (b)	

AQA GCSE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier

95.

13	Alternative method 1		
	$2 \times 5 : 3 \times 5$ or $10 : 15$ and $5 \times 3 : 4 \times 3$ or $15 : 12$	M1	oe common value for f eg $10 : 15 : 12$ or $\frac{2}{3} : 1 : \frac{4}{5}$
	$10 : 12$	M1dep	oe unsimplified ratio condone fractions or decimals
	$5 : 6$	A1	
	Alternative method 2		
	$3e = 2f$ and $4f = 5g$	M1	oe equations
	$6e = 5g$	M1dep	oe equation
	$5 : 6$	A1	
	Additional Guidance		
	Variables in an otherwise correct answer: the same variable scores 2 marks, eg $5f : 6f$ different variables do not score, unless earlier marks can be awarded, eg $5e : 6g$ with no working worth M1 or M1M1		M1M1A0 M0M0A0

AQA GCSE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier

96.

23	Alternative method 1		
	$\sqrt{4} : \sqrt{9}$ or $2 : 3$	M1	length A : length B
	$30 + \text{their } 3 \times \text{their } 2$ or 20	M1dep	length A
	$480 + \text{their } 20$ or 24	M1dep	area cross section A
	their $24 + 4 \times 9$	M1dep	
	54	A1	
	Alternative method 2		
	$\sqrt{4} : \sqrt{9}$ or $2 : 3$	M1	length A : length B
	$(\sqrt{4})^3 : (\sqrt{9})^3$ or $8 : 27$	M1dep	volume A : volume B
	$480 + \text{their } 8 \times \text{their } 27$ or 1620	M1dep	volume B
	their $1620 + 30$	M1dep	
	54	A1	

97.

15	Alternative method 1		
	45 ÷ (22 ÷ 3) or 45 ÷ 25 or 1.8	M1	oe eg $\frac{45}{25}$
	22 × their 1.8 or 39.6 or 3 × their 1.8 or 5.4	M1dep	
	their 39.6 × 8.96 + their 5.4 × 7.31 or [354, 355] + [39, 40]	M1dep	
	394.29 or 394.3	A1	
	Alternative method 2		
	45 ÷ (22 ÷ 3) or 45 ÷ 25 or 1.8	M1	oe eg $\frac{45}{25}$
	their 1.8 × 8.96 or [16.1, 16.13] or their 1.8 × 7.31 or [13.1, 13.2]	M1dep	
	their [16.1, 16.13] × 22 + their [13.1, 13.2] × 3 or [354, 355] + [39, 40]	M1dep	
	394.29 or 394.3	A1	

Alternative method and Additional Guidance continued on the next page

15 cont	Alternative method 3		
	45 ÷ (22 ÷ 3) or 45 ÷ 25 or 1.8	M1	oe eg $\frac{45}{25}$
	22 × 8.96 or [197, 197.12] or 3 × 7.31 or [21.9, 22]	M1	
	their [197, 197.12] × their 1.8 + their [21.9, 22] × their 1.8 or [354, 355] + [39, 40]	M1dep	oe dep on M1M1
	394.29 or 394.3	A1	
	Additional Guidance		
	Allow up to M2 even if not subsequently used		
	Ignore units throughout		

AQA GCSE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

98.

21(a)	Alternative method 1		
	$y = \frac{k}{\sqrt{x}}$	M1	oe equation implied by $4 = \frac{k}{\sqrt{9}}$ oe
	$(k =) 4 \times \sqrt{9}$ or $(k =) 12$	M1dep	oe
	$y = \frac{12}{\sqrt{x}}$	A1	oe equation
	Alternative method 2		
	$ky = \frac{1}{\sqrt{x}}$	M1	oe equation implied by $4k = \frac{1}{\sqrt{9}}$ oe
	$(k =) \frac{1}{\sqrt{9}} \div 4$ or $(k =) \frac{1}{12}$	M1dep	oe
	$\frac{1}{12}y = \frac{1}{\sqrt{x}}$	A1	oe equation
	Additional Guidance		
	Alt 1 $(k =) 12$ or $(k \propto) 12$ with no incorrect working		M1M1
Condone use of \propto for up to M1M1A0 eg (Alt 1) $y \propto \frac{k}{\sqrt{x}}$ $k \propto 12$ $y \propto \frac{12}{\sqrt{x}}$		M1 M1dep A0	
$y = \frac{12}{\sqrt{x}}$ oe		M1M1A1	

21(b)	$\frac{12}{\sqrt{25}}$ or $\frac{\text{their } k}{\sqrt{25}}$	M1	oe their k from (a)
	2.4 or $\frac{12}{5}$ or $2\frac{2}{5}$	A1ft	ft $\frac{\text{their } k}{5}$
	Additional Guidance		
	$y \propto 2.4$		M1A0
	$y = \frac{\frac{4}{3}}{\sqrt{x}}$ in (a) $\frac{4}{\frac{3}{\sqrt{25}}}$ $\frac{4}{15}$ (allow [0.266, 0.267])		M1 A1ft

AQA GCSE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

99.

15	$2 \times \pi \times 8 \times 22$ or 352π or [1105, 1106]		M1	Area of lampshade A oe $2 \times \pi \times 0.08 \times 0.22$ or 0.0352π or [0.1105, 0.1106]	
	$4 \times \frac{1}{2} \times 15 \times 24$ or 720		M1	Area of lampshade B oe $4 \times \frac{1}{2} \times 0.15 \times 0.24$ or 0.072	
	their $352\pi \div 100^2 \times 400$ or 14.08 π or [44.2, 44.24]	their $720 \div 100^2 \times 400$ or 28.8(0)	M1dep	their $0.0352\pi \times 400$ or 14.08 π or [44.2, 44.24]	their 0.072×400 or 28.8(0)
				dep on 1st M1	dep on 2nd M1
	their $14.08\pi + 3.50$ or [47.7, 47.74] and their $28.8(0) + 7.5(0)$ or 36.3(0)		M1dep	dep on M3 and method for fabric cost for both lampshades correct	
	1.3(1...): 1 or 1.32 : 1		A1		
	Additional Guidance				
1 : 1.3(1...) or 1 : 1.32				M4A0	

AQA GCSE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

100.

10	$(x =) 3$ and $(y =) 2$ in correct positions	B2	B1 $y = \frac{24}{x}$ or $4 = \frac{k}{6}$ or $k = 24$ oe or $(x =) 3$ in correct position above 8 or $(y =) 2$ in correct position below 12
	Additional Guidance		
	$y = \frac{1}{kx}$ or $4 = \frac{1}{6k}$ oe followed by $k = \frac{1}{24}$, with no or incorrect values in table		B1

AQA GCSE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

101.

14(a)	At least 3 correct pairs from 15 and 16 20 and 20 25 and 24 30 and 28 35 and 32 40 and 36 or $9(10 + 5n) = 10(12 + 4n)$ or $9(5n) = 10(4n + 4)$ or $9(5 + 5n) = 10(8 + 4n)$ or 7 rows added to A	M1	oe pairs may be seen as ratios oe equation, where n is the number of new rows (correct answer is 6) oe equation, where n is the total number of rows (correct answer is 8) oe equation, where n is the number of new rows after Pattern A (correct answer is 7) not implied by answer 7
	6	A1	
	Additional Guidance		
	6 with no incorrect working		M1A1
	7 or 8 with no working		M0A0
Multiplication of ratio with no working worthy of M1 eg 10 : 9 20 : 18 30 : 27 40 : 36		M0A0	

14(b)	Alternative method 1		
	12 ÷ 20 or 0.6(0)	M1	oe
	their 0.6(0) × 3 ÷ 2 or 0.9(0) or 14.4(0) or 26.4	M1dep	oe
	26.40	A1	correct money notation
	Alternative method 2		
	12 × 3 ÷ 2 or 18	M1	oe
	their 18 ÷ 20 or 0.9(0) or their 18 ÷ 5 × 4 or 14.4(0) or 26.4	M1dep	oe
	26.40	A1	correct money notation
	Alternative method 3		
	12 ÷ 5 × 4 or 9.6(0)	M1	oe
	their 9.6(0) × 3 ÷ 2 or 14.4(0) or 26.4	M1dep	oe
	26.40	A1	correct money notation
	Alternative method 4		
	16 ÷ 2 × 3 or 24 or 44	M1	oe
	their 24 × 12 ÷ 20 or 14.4(0) or their 44 × 12 ÷ 20 or 26.4	M1dep	oe
	26.40	A1	correct money notation
	Additional Guidance		
	Condone 26.40p	M1M1A1	
	20 ÷ 12 or 1.66... or 1.67 with no working that is worthy of M1	M0M0A0	
£18 from using £12 as the cost of one line (may give a total of £528)	M1M0A0		

AQA GCSE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

102.

16	5 : 6	B1	
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AQA GCSE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

103.

26	Alternative method 1		
	$\frac{4}{5} : \frac{2}{3} : 1$	M1	
	$\frac{12}{15} : \frac{10}{15} : \frac{15}{15}$	M1dep	oe common denominator implied by correct unsimplified ratio eg 24 : 20 : 30
	12 : 10 : 15	A1	
	Alternative method 2		
	$a : c = 4 : 5$ or $b : c = 2 : 3$	M1	oe may be seen as part of a ratio with three values
	$a : c = 12 : 15$ and $b : c = 10 : 15$	M1dep	oe with c values equal
	12 : 10 : 15	A1	
	Alternative method 3		
	$(5a =) 6b = 4c$ or $1 : \frac{5}{6} : \frac{5}{4}$ or $\frac{6}{5} : 1 : \frac{6}{4}$	M1	oe ratio
	$\frac{12}{12} : \frac{10}{12} : \frac{15}{12}$ or $\frac{24}{20} : \frac{20}{20} : \frac{30}{20}$	M1dep	oe common denominator implied by correct unsimplified ratio eg 24 : 20 : 30
	12 : 10 : 15	A1	
	Alternative method 4		
	Picks values so that a is four fifths of c and b is two thirds of c	M1	eg $(a =) 60, (b =) 50, (c =) 75$ $(a =) 4, (b =) \frac{10}{3}, (c =) 5$
	Correct ratio for their values as integers or fractions with a common denominator	M1dep	eg 60 : 50 : 75 or $\frac{12}{3} : \frac{10}{3} : \frac{15}{3}$
	12 : 10 : 15	A1	

AQA GCSE – Thursday 7 June 2018 – Paper 2 (Calculator) Higher Tier

104.

3	3 : 2	B1	
	Additional Guidance		

105.

8	Alternative method 1		
	22.5(0) and 4 or 27 and 8 or 31.5(0) and 12 or 36 and 16 or 40.5(0) and 20 or 45 and 24 or 30 : 16 or 45 : 24	M1	
	45 and 24 chosen	A1	eg 45 : 24 is the final ratio seen
	6	A1	

Mark scheme and additional guidance continues on the next page

8 cont	Alternative method 2		
	18 + 4.5x and 4x seen or $\frac{18 + 4.5x}{15} = \frac{4x}{8}$	M1	any letter oe sets up correct equation
	8(18 + 4.5x) = 60x or 144 + 36x = 60x or 24x = 144	M1dep	eliminates denominators oe
	6	A1	
	Additional Guidance		
	Answer 6 that is not from incorrect method		M1A1A1
	45 and 24 followed by eg 49.5(0) and 28 (answer not 6)		M1A0A0
	Equivalent ratio to 15 : 8 that is not 30 : 16 or 45 : 24 eg 60 : 32 (answer not 6)		M0A0A0
	Final calculation $\frac{15}{8} \times 24 = 45$ (answer not 6)		M1A1A0

AQA GCSE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

106.

4	÷ 2	B1	
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AQA GCSE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

107.

13	Alternative method 1			
	$88 \div (7 + 4)$ or $88 \div 11$ or 8	M1	oe $11 \times 8 = 88$	
	their 8×7 and their 8×4 or their 8×7 and $88 -$ their value or their 8×4 and $88 -$ their value or 56 and 32 or their $8 \times (7 - 4)$ or their 8×3	M1dep	oe eg $8 \times 7 = 63$ and $88 - 63$ eg $8 \times 4 = 30$ and $88 - 30$	
	24	A1		
	Alternative method 2			
	One correctly evaluated trial for two numbers, other than 7 and 4, in the ratio 7 : 4	M1	eg $70 + 40 = 110$	
	56 and 32	M1dep	eg $56 + 32 = 88$	
	24	A1		
	Alternative method 3 using $x : y = 7 : 4$ (correct)			
	$4x = 7y$ and $4x + 4y = 352$	$4x = 7y$ and $7x + 7y = 616$	M1	oe forming equation from ratio and equating coefficients
	$11y = 352$ or $y = 32$	$11x = 616$ or $x = 56$	M1dep	oe equation in one variable
	24	A1		
	Alternative method 4 using $x : y = 4 : 7$ (incorrect)			
	$7x = 4y$ and $4x + 4y = 352$	$7x = 4y$ and $7x + 7y = 616$	M1	oe forming equation from ratio and equating coefficients
	$11x = 352$ or $x = 32$	$11y = 616$ or $y = 56$	M1dep	oe equation in one variable
	their answer	A0		

13 cont	Alternative method 5 using $x : y = 7 : 4$ (correct)		
	$x = \frac{7}{4}y$ or $y = \frac{4}{7}x$ or $x = 88 - y$ or $y = 88 - x$	M1	oe making one variable the subject
	$\frac{7y}{4} + y = 88$ or $\frac{11}{4}y = 88$ or $x + \frac{4}{7}x = 88$ or $\frac{11}{7}x = 88$	M1dep	oe equation in one variable
	24	A1	
	Alternative method 6 using $x : y = 4 : 7$ (incorrect)		
	$y = \frac{7}{4}x$ or $x = \frac{4}{7}y$ or $x = 88 - y$ or $y = 88 - x$	M1	oe making one variable the subject
	$\frac{7x}{4} + x = 88$ or $\frac{11}{4}x = 88$ or $y + \frac{4}{7}y = 88$ or $\frac{11}{7}y = 88$	M1dep	oe equation in one variable
	their answer	A0	
	Additional Guidance		
	-24 with no incorrect working implies 56 and 32		M1M1A0
$x = 32$ and $y = 56$		M1M1A0	

AQA GCSE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

108.

20	Alternative method 1		
	$h = kv^2$ or $5 = k \times 10^2$ or $5 \div 10^2$ or $5 : 10^2$	M1	oe
	$(k =) \frac{1}{20}$ or $(k =) 0.05$ or $h = \frac{1}{20}v^2$ or $h = 0.05v^2$	A1	oe Correct value for k or correct equation in h and v
	their $\frac{1}{20} \times 24^2$	M1dep	oe $\frac{1}{20} \times 24^2$ implies M1A1M1
	28.8	A1ft	ft their k and M1A0M1
	Alternative method 2		
	$kh = v^2$ or $k \times 5 = 10^2$ or $10^2 \div 5$ or $10^2 : 5$	M1	oe
	$(k =) 20$ or $20h = v^2$	A1	oe Correct value for k or correct equation or correct equation in h and v
	$24^2 \div$ their 20	M1dep	oe $24^2 \div 20$ implies M1A1M1
	28.8	A1ft	ft their k and M1A0M1

Mark scheme continues on the next page

Additional Guidance is on the next page

20	Alternative method 3		
	$\left(\frac{24}{10}\right)^2$ or $\frac{576}{100}$ or $24^2 : 10^2$	M1	oe
	$\frac{h}{5} = \left(\frac{24}{10}\right)^2$	A1	oe Correct equation in h
	$5 \times \text{their } \left(\frac{24}{10}\right)^2$	M1dep	oe $5 \times \left(\frac{24}{10}\right)^2$ implies M1A1M1
	28.8	A1ft	ft their $\left(\frac{24}{10}\right)^2$ and M1A0M1
	Alternative method 4		
	$\left(\frac{10}{24}\right)^2$ or $\frac{100}{576}$ or $10^2 : 24^2$	M1	oe
	$\frac{5}{h} = \left(\frac{10}{24}\right)^2$	A1	oe Correct equation in h
	$5 + \text{their } \left(\frac{10}{24}\right)^2$	M1dep	oe $5 + \left(\frac{10}{24}\right)^2$ implies M1A1M1
	28.8	A1ft	ft their $\left(\frac{24}{10}\right)^2$ and M1A0M1
	Additional Guidance		
	$h \propto v^2$ with no further valid working		Zero
	$h = kv$ or $h = kv^3$ or $h = \frac{k}{v^2}$ etc not recovered		Zero
	Up to first two marks can be awarded for correct working even if not subsequently used		
Allow use of other letters			

AQA GCSE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

109.

2	1 : 2	B1	
	Additional Guidance		

AQA GCSE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

110.

17	13 – 5 → 4152 or 8 → 4152	M1	oe eg 4152 ÷ 8 or 519 seen or 8 parts is 4152
	$\frac{x + 4152}{x} = \frac{13}{5}$ or $5x + 20\,760 = 13x$ or $20\,760 = 8x$ or $2595 = x$ or (number of men =) 6747 or (number of women =) 2595 or (total number of people =) 12 926 or $4152 \div 8 \times 7$ or 519×7	M1dep	oe
	3633	A1	
	Additional Guidance		

AQA GCSE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

111.

24	Alternative method 1			
	$4a = 9b$	M1	oe $\frac{a}{b} = \frac{9}{4}$	
	$4a = 9 \times \frac{7c}{10}$ or $40a = 63c$	$40a = 90b$ and $90b = 63c$	M1dep	oe $9 : \frac{40}{7}$
	$63 : 40$	A1	Accept $\frac{63}{40} : 1$ or $1.575 : 1$ or $1 : \frac{40}{63}$	
	Alternative method 2			
	$b : c = 7 : 10$	M1		
	$a : b = 63 : 90$ and $b : c = 90 : 40$ or $63 : 90 : 40$	M1dep	oe common value for b	
	$63 : 40$	A1	Accept $\frac{63}{40} : 1$ or $1.575 : 1$ or $1 : \frac{40}{63}$	

24 cont	Alternative method 3		
	$a = \frac{9b}{4}$ or $c = \frac{10b}{7}$	M1	
	$\frac{9b}{4} : \frac{10b}{7}$ or $\frac{9}{4} : \frac{10}{7}$	M1dep	oe
	63 : 40	A1	Accept $\frac{63}{40} : 1$ or 1.575 : 1 or 1 : $\frac{40}{63}$
	Alternative method 4		
	$c = \frac{10}{7}b$	M1	eg $a : c = a : \frac{10}{7}b$
	$9 : \frac{10}{7} \times 4$ or $9 : \frac{40}{7}$	M1dep	oe
	63 : 40	A1	Accept $\frac{63}{40} : 1$ or 1.575 : 1 or 1 : $\frac{40}{63}$
	Additional Guidance		
	2 nd method mark is for a link between a and c or a correct ratio in an unsimplified form		
40 : 63 on answer line		M1M1A0	

AQA GCSE – Wednesday 25 May 2017 – Paper 1 (Non - Calculator) Higher Tier

112.

4	b is $\frac{3}{4}$ of a	B1	
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AQA GCSE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

113.

17	Alternative method 1		
	50×1.2 or 60	M1	oe length of Q May be on the diagram
	$50 \times x \times 0.9$ or $45 \times x$	M1	oe area of P reduced by 10% May be on the diagram
	their $60 \times y =$ their $45 \times x$ or $\frac{y}{x} = \frac{\text{their } 45}{\text{their } 60}$ or $y : x =$ their $45 : \text{their } 60$ or equivalent ratio to $4 : 3$ not in simplest form or equivalent fraction to $\frac{4}{3}$ not in simplest form	M1dep	oe dep on M2 M3 $\frac{1.2}{0.9}$
	$4 : 3$ or $1 : \frac{3}{4}$ or $1 : 0.75$ or $\frac{4}{3} : 1$	A1	

Alternative method 2 and Additional Guidance continue on the next two pages

17 cont	Alternative method 2		
	50 × 1.2 or 60	M1	oe length of Q May be on the diagram
	Chooses a value for x and reduces area of P by 10%	M1	oe eg ($x = 8$) $50 \times 8 \times 0.9$
	their $60 \times y =$ their area of P reduced by 10% or equivalent ratio to 4 : 3 not in simplest form or equivalent fraction to $\frac{4}{3}$ not in simplest form	M1dep	oe eg $60y = 50 \times 8 \times 0.9$ or $60y = 360$ or ($y =$) $360 \div 60$ or 6 dep on M2 M3 $\frac{1.2}{0.9}$
	4 : 3 or $1 : \frac{3}{4}$ or $1 : 0.75$ or $\frac{4}{3} : 1$	A1	

Additional Guidance continues on the next page

		Additional Guidance	
17 cont		Allow 1.33(...) for $\frac{4}{3}$	
		4 : 3 in working with 3 : 4 on answer line	M3A0
		1 : $\frac{45}{60}$	M3A0
		(Alt 1) $50x = 60y \times 0.9$	M1M0M0A0
		(Alt 1) $50x = 60y \times 1.1$	M1M0M0A0
		(Alt 1) $45x : 60y$ Answer 3 : 4	M1M1 M0A0
		(Alt 1) $y : x = 3 : 4$ Answer 3 : 4	M3A0
		Alt 2 example $50 \times 10 = 500$ (working not seen for reduction by 10% but completed correctly in next line) $450 \div 60 = 7.5$ (60 here gains first M1) $10 : 7.5 = 20 : 15$	M1M1 M1A0
		Do not allow misreads eg increases length of P by 10% (instead of 20%)	
		Alt 2 Allow choice of x to be 50	

AQA GCSE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

114.

22	Alternative method 1		
	$d = kt^2$ or $45 = k \times 3^2$ or $45 \div 9$	M1	oe equation
	$d = 5t^2$ or $(k =) 5$	M1dep	oe equation 245 implies M2
	their 5×10^2 or 500	M1dep	oe M3 $\left(\frac{10}{3}\right)^2 \times 45$ oe
	455	A1	
	Alternative method 2		
	$kd = t^2$ or $k \times 45 = 3^2$ or $9 \div 45$	M1	oe equation
	$0.2d = t^2$ or $(k =) 0.2$	M1dep	oe equation 245 implies M2
	$10^2 \div$ their 0.2 or 500	M1dep	oe M3 $45 \div \left(\frac{3}{10}\right)^2$ oe
	455	A1	
	Additional Guidance		
	$d \propto t^2$ with no further valid working		Zero
	$d = kt$ or $d = kt^3$ or $d = \frac{k}{t^2}$ etc not recovered		Zero
	45 : 9 with no further valid working		Zero
	$d = 5t^2$ or $(k =) 5$ scores M2 even if not subsequently used		M2
	$d = kt^2$ or $45 = k \times 3^2$ or $45 \div 9$ scores M1 even if not subsequently used		M1
	$0.2d = t^2$ or $(k =) 0.2$ scores M2 even if not subsequently used		M2
$kd = t^2$ or $k \times 45 = 3^2$ or $9 \div 45$ scores M1 even if not subsequently used		M1	
Allow use of other letters			

115.

11	Alternative method 1		
	Any correct scaling of the ratio 5 : 2 eg 10 (:) 4 or 20 (:) 8 or 25 (:) 10	M1	oe
	22.5 (:) 9 or 22.5 (red) or 30 (:) 12 or 12 (blue)	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	
	Alternative method 2		
	9 ÷ 2 or 4.5 or 30 ÷ 5 or 6	M1	oe 2 ÷ 9 or 0.22... 5 ÷ 30 or 0.16... or 0.17
	5 × their 4.5 or 22.5 or 7 × their 4.5 or 2 × their 6 or 12 or 7 × their 6 or 42	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	
	Alternative method 3		
	$\frac{2}{7}$ × purple = blue $\frac{5}{7}$ × purple = red	M1	oe $\frac{2}{7}$ × purple = 9 $\frac{5}{7}$ × purple = 30
	$9 \times \frac{7}{2}$ or $30 \times \frac{7}{5}$ or 42	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	

Additional guidance is on the next page

11 cont	Additional Guidance	
	28 + 3.5 = 31.5	M1M1A1
	28 + 3.5	M1M1A0
	31.5, answer 31	M1M1A1
	31.5 + 42 = 73.5	M1M1A0
	10 4	M1M0A0
	10, 4	M1M0A0
	10 + 4	M1M0A0
	'He has 2.5 times more red than blue'	M1M0A0
	2.5 : 1	M1M0A0
	2.5	M0M0A0
	28 on its own	M0M0A0

AQA GCSE – Tuesday 13 June 2017 – Paper 3 (Calculator) Higher Tier

116.

14	y is directly proportional to $\frac{1}{x}$	B1	
	Additional Guidance		

AQA GCSE – Sample Paper 1 (Non - Calculator) Higher Tier

117.

10	Alternative method 1		
	$18 \div (3 + 2)$ or 3.6	M1	
	their $3.6 \times 3 \times 2.8(0)$ or 30.24(0)	M1dep	
	their $3.6 \times 2 \times 3.5(0)$ or 25.2(0)	M1dep	dep on first M1
	55.44	A1	
	Alternative method 2		
	$3 \times 2.8(0) + 2 \times 3.5(0)$ or 15.4(0)	M1	
	$18 \div (3 + 2)$ or 3.6	M1	
	their $3.6 \times$ their 15.4(0)	M1dep	dep on M1 M1
	55.44	A1	
	Alternative method 3		
	$3 \times 2.8(0) + 2 \times 3.5(0)$ or 15.4(0)	M1	
	their $15.4(0) \div 5$ or 3.08	M1dep	
	their 3.08×18	M1dep	
	55.44	A1	

AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

119.

10	Alternative method 1		
	2 parts \rightarrow 116	M1	oe
	$116 \div 2 \times 16$	M1	oe
	928	A1	
	Alternative method 2		
	Writes at least 3 ratios or numbers of boys and girls equivalent to 9 : 7	M1	eg 18 : 14 and 180 : 140 and 360 : 280
	522 and 406	M1	
	928	A1	

AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

120.

13	125 : 27	B1	
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AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

121.

20	Alternative method 1		
	$2 = k\sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$(k =) 2 \div \text{their } 6$ or $\frac{1}{3}$	M1dep	
	$5 \div \text{their } \frac{1}{3}$ or $15 (\sqrt{a} =)$	M1	oe
	225	A1	
	Alternative method 2		
	$2k = \sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$(k =) \text{their } 6 \div 2$ or 3	M1dep	
	$5 \times \text{their } 3$ or $15 (\sqrt{a} =)$	M1	oe
	225	A1	
	Alternative method 3		
	$2k = \sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$5 \div 2$ or 2.5	M1	
	$\text{their } 6 \times \text{their } 2.5$ or $15 (\sqrt{a} =)$	M1dep	dep on M1 M1
	225	A1	

AQA GCSE – Sample Paper 3 (Calculator) Higher Tier

122.

16	Alternative method 1		
	$\frac{5}{6+5+7} \text{ or } \frac{5}{18}$ or $\frac{7}{9+7+8} \text{ or } \frac{7}{24}$	M1	oe fraction, decimal or percentage
	Attempt to convert to any common denominator eg $\frac{20}{72}$ and $\frac{21}{72}$ or to decimals eg 0.27(7...) and 0.29 eg 3 0.28 and 0.29) or to percentages eg 28% and 29%	M1	Attempt to convert both to comparable form with one correct oe
	$\frac{20}{72}$ and $\frac{21}{72}$ and Yes	A1	oe fractions, decimals or percentages
	Alternative method 2		
	Chooses a number of counters that is a multiple of 18 and 24 eg 72	M1	
	$5 \times \frac{\text{their } 72}{18}$ or 20 or $7 \times \frac{\text{their } 72}{24}$ or 21	M1	
	20 and 21 and Yes	A1	
	Alternative method 3		
	35 : 42 : 49 and 35 : 45 : 40	M1	
	$\frac{35}{35 + \text{their } 42 + \text{their } 49} \text{ or } \frac{35}{126}$ or $\frac{35}{35 + \text{their } 45 + \text{their } 40} \text{ or } \frac{35}{120}$	M1	
	$\frac{35}{126}$ and $\frac{35}{120}$ and Yes	A1	