

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
---	--	----	--

2		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
---	--	-----------	---

3		$\frac{1}{3}$	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
---	--	---------------	---

4		Yes (supported)	P1 for process to work out the total number of children, e.g. $117 \times 4 (= 468)$ P1 (dep P1) for process to work out total number of adults or the total number of people, e.g. " $468$ " $\times 5 \div 2 (= 1170)$ or " $468$ " $\times 7 \div 2 (= 1638)$ A1 for 1170 or 1638 P1 for process to work out the percentage of theatre full, e.g. $\frac{"468" + "1170"}{2600} \times 100 (= 63)$ or for a process to work out 60% of 2600 $(= 1560)$ C1 for a correct conclusion supported by correct figures e.g. 63% or 1560 and 1638 OR P1 for a process to work out 60% of 2600, eg. $\frac{60}{100} \times 2600 (= 1560)$ P1 (dep P1) for process to work out this total number of children, e.g. " $1560$ " $\times 2 \div 7 (= 445(.7...))$ A1 for 445(.7...) P1 for process to work out children in the circle, eg. " $445(.7...)$ " $\div 4 (= 111 \text{ to } 112)$ C1 for a correct conclusion supported by correct figures e.g. 111 to 112 [Where appropriate accept rounded or truncated values]
---	--	--------------------	---

5		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
---	--	------------	--

6		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
---	--	----------	--

7	$k(y - y) = x + kx$ $y(k - 1) = x(1 + k)$	$y = \frac{x(k+1)}{k-1}$	M1 $y + x = k(y - x)$ or $\frac{y+x}{y-x} = k$ oe M1 For isolating $x$ and $y$ on opposite sides eg $k(y - y) = x + kx$ A1 Completing correct algebraic reasoning to reach conclusion
---	--	--------------------------	---

8		$\frac{1}{11}$	<p>P1 for starting the process, eg by writing down a correct ratio or using a given number of cubes for one relationship, eg 2B 1Y or B:Y = 2:1 or 4G 1B or G:B = 4:1 or 8G, 1Y or G:Y = 8:1 oe or yellow = 2, blue = 4, or states 2:1:8 oe in any order (can be algebraic)</p> <p>P1 for complete process to find possible number of each colour or equivalent ratio, eg 8G 2B 1Y or G:B:Y = 8:2:1 oe or yellow = 2, blue = 4, green = 16 oe (can be algebraic)</p> <p>A1 <math>\frac{1}{11}</math> oe</p>
---	--	----------------	---

9	216	<p>P1 for process to work with ratio eg <math>72 \div (3 + 4 + 5) (= 6)</math> or <math>72 \div 12 (= 6)</math></p> <p>P1 for process to find length of base or height of triangle eg <math>3 \times "6" (= 18)</math> or <math>4 \times "6" (= 24)</math>  OR process to find area scale factor eg <math>"6" \times "6" (= 36)</math></p> <p>P1 complete process to find the area of the triangle eg <math>\frac{1}{2} \times "18" \times "24"</math> or <math>\frac{1}{2} \times 3 \times 4 \times "6"</math></p> <p>A1 cao</p>	
---	-----	---	--

10	0.12	<p>P1 for process to start eg <math>(1 - 0.2) \div (3 + 17) (= 0.04)</math>  or <math>(3 + 17) \div (1 - 0.2)</math> oe <math>(= 25)</math>  or <math>(100 - 20) \div (3 + 17) (= 4)</math>  or <math>3 \times 4 (= 12)</math> and <math>17 \times 4 (= 68)</math></p> <p>P1 full process to find the required probability eg <math>3 \times "0.04"</math> or <math>\frac{3}{20} \times (1 - 0.2)</math> oe or <math>3 \div "25"</math> or <math>3 \times "4" \div 100</math></p> <p>A1 oe</p>	<p>Just <math>1 - 0.2 = 0.8</math> is <b>not</b> sufficient for P1</p> <p>May be seen in a ratio</p> <p>0.12 using incorrect probability notation gets P2</p>
----	------	--	---

11	3 : 4	<p>P1 starts process eg <math>\overrightarrow{AB} = \mathbf{b} - \mathbf{a}</math> oe</p> <p>P1 for process to find <math>\overrightarrow{OM} = \mathbf{a} + \frac{1}{2} "(\mathbf{b} - \mathbf{a})"</math> oe <math>(= \frac{1}{2}(\mathbf{a} + \mathbf{b}))</math></p> <p>P1 for process to find <math>\overrightarrow{AP} = -\mathbf{a} + \frac{3}{5} "(\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{b})"</math> oe or (indep) for <math>\overrightarrow{AN} = -\mathbf{a} + "k"\mathbf{b}</math></p> <p>P1 process to find "k" using <math>\overrightarrow{AN} = -\mathbf{a} + "k"\mathbf{b}</math> as a multiple of <math>\overrightarrow{AP}</math></p> <p>A1 cao</p> <p>ALTERNATIVE</p> <p>P1 for producing <math>OM</math> to <math>C</math> such that <math>AC</math> is parallel to <math>OB</math></p> <p>P1 for process to show that <math>MC = OM</math>, using congruent triangles <math>ACM</math> and <math>BOM</math></p> <p>P1 for process to find <math>PC</math> as a multiple of <math>OM/5 (= 7OM/5)</math></p> <p>P1 for process to find <math>ON</math> as a multiple of <math>AC(OB) (= 3OB/7)</math> using similar triangles <math>ACP</math> and <math>NOP</math></p> <p>A1 cao</p>	<p>Formal geometric reasoning relating to congruent and similar triangles is not required</p>
----	-------	--	---

12	96	<p>P1 for process to find the ratio of the number of pens of each colour sold, eg <math>2 \times 7 : 5 \times 3 : 6 \times 4 (= 14 : 15 : 24)</math></p> <p>P1 for process to find the proportion of green pens sold, <math>\frac{212}{"14"+"15"+"24"}</math> or <math>\frac{"24"}{"14"+"15"+"24"}</math></p> <p>P1 for a complete process to find the number of green pens sold, <math>\frac{212}{"14"+"15"+"24"} \times "24"</math> or <math>\frac{"24"}{"14"+"15"+"24"} \times 212</math></p> <p>A1 cao</p>	<p>Does not have to be seen as a ratio but all three needed</p> <p>P3 can be implied by the values 56, 60 and 96</p>
----	----	--	--

13	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	

14	(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	

15	(a)	Explanation	C1	For stating the LCM of (4+7) and (5+3) is 88 or there is no smaller multiple of 8 and 11 (than 88)	May be seen in a two-way table or probability tree
	(b)	23	P1	for using a scale factor appropriately eg $4 \times 8 (=32)$ or $3 \times 11 (=33)$ or $7 \times 8 (=56)$ or $5 \times 11 (=55)$ or for writing a pair of suitable fractions, eg $\frac{7}{11}$ and $\frac{3}{8}$ or $\frac{4}{11}$ and $\frac{5}{8}$ or $\frac{3}{8}$ and $\frac{4}{11}$	
			P1	for finding the number of large cubes and red cubes or small and yellow or small and red eg $7 \times 8 (=56)$ and $3 \times 11 (=33)$ or $4 \times 8 (=32)$ and $5 \times 11 (=55)$ or $4 \times 8 (=32)$ and $3 \times 11 (=33)$ OR a suitable fractional equation, eg $\frac{7}{11} - x = \frac{3}{8}$ or $\frac{5}{8} - x = \frac{4}{11}$ or $x = 1 - \frac{3}{8} - \frac{4}{11}$ OR a suitable pair of probabilities with a common denominator, eg $\frac{56}{88}$ and $\frac{33}{88}$ or $\frac{32}{88}$ and $\frac{55}{88}$ or $\frac{33}{88}$ and $\frac{32}{88}$	
			A1	cao	

16	2 (supported)	P1	for a process to find the number of men, eg. $(60 \div 2) \div 3 (=10)$	60 $\div$ 3 = 20 scores no marks  Any ratio must come from correct processes to find the number of children and the number of men  Award 0 marks for 2 with no correct supportive working  Award full marks for 2 : 1 given as a final answer from correct supportive working
		P1	for a process to find the number of children, eg. 60 – “30” – “10” (= 20)	
		P1	for a start of a process to find the value of $n$ , eg. (“20” : “10”) $\div$ 5 or 20 : 10 = 10 : 5 or “20” $\div$ “10”	
		A1	for 2 with supportive working	

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

18	33	P1	for relating 24 to 8 parts or (1 part $\Rightarrow$ ) $24 \div 8 (= 3)$  or for $15 - 7 (= 8)$  or starts to use a build-up method, eg (8 :) 14 : 30	8 parts = 24
		P1	for $15 - 4 (= 11)$ and $24 \div 8 (= 3)$  or $15 \times 3 (= 45)$ and $4 \times 3 (= 12)$  or for 12 (: 21) : 45	
		A1	cao	