Ratio Problems

June 2023 Paper 3

Question	Answer	Mark	Mark scheme	Additional guidance
15	175	M1 A1	for a complete method eg 35 × (4 + 1) oe cao	

Question	Answer	Mark	Mark scheme	Additional guidance
15	7	P1	for 750 × 9 (=6750)	
			or 1 + 9 (=10)	
			or 750 ÷ 1000 (= 0.75)	
		P1	(dep) for "6750" + 750 (=7500)	
			or for "10" × 750 (=7500)	
			or "0.75" × "1 + 9" (= 7.5)	
		A1	cao	
			Alternative	
		P1	for 100 + 900 (= 1000)	This can be implied by (1 litre of drink =) 100 (m*l*) of squash and 900 (m*l* of water)
		P1	(dep) for 750 ÷ 100 (= 7.5)	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
17	No, with correct figures	P1	for start to process to find amount of each paint colour needed eg $24 \div (4 + 3 + 1)$ $(= 3)$ **or** $8 : 6 : 2$ **or** for start to process to simplify 12 : 7 : 5 to a ratio that can be compared to 4 : 3 : 1 eg $12 \div 4 (= 3)$ **or** $7 \div 3$ $(= 2.3 \ldots)$ **or** $5 \div 1$ $(= 5)$	
		P1	for complete process to find amount of each paint colour needed eg "3" × 4 (= 12) **and** "3" × 3 (= 9) **and** "3" × 1 (= 3) **or** $12 : 9 : 3$ **or** for complete process to cancel 12 : 7 : 5 to a ratio that can be compared to 4 : 3 : 1 eg $12 : 7 : 5$ as $4 : "\frac{7}{3}" : "\frac{5}{3}"$ or $4 : "2.3 \ldots" : "1.6 \ldots"$ **or** $12 : 7 : 5$ as $"5\frac{1}{7}" : 3 : "2\frac{1}{7}"$ or $"5.14 \ldots" : 3 : "2.14 \ldots"$ **or** $12 : 7 : 5$ as $"2\frac{2}{5}" : "1\frac{2}{5}" : 1$ or $"2.4" : "1.4" : 1$	
		C1	No, with correct figure(s) for comparison. eg No with $12 : 9 : 3$ No, 9 litres of yellow needed No with $4 : 2.3 \ldots : 1.6 \ldots$	No may be indicated by eg 'not enough yellow'.

Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	$\frac{70}{100}$	M1	for 100 – 30 (= 70) or $\frac{30}{100}$ oe	
		A1	for $\frac{70}{100}$ oe	Accept any equivalent fraction, decimal form 0.7 or percentage form 70%
(b)	45	P1	for start to process, eg 30 ÷ 2 (= 15)	
		A1	cao	
(c)	No with reason	C1	for No with reason **or** ft (b) **Acceptable examples** the number of red and yellow counters is an odd number 25 cannot be divided by 2 to give a whole number You can't have half a counter You can't split it evenly **Not acceptable examples** Yes ….. they are in the ratio 2 : 3 one must be more than the other	If the reason is supported by numerical evidence then that evidence must be accurate. can ft (b) Note: if the answer to part (b) is an even number then 'yes' with supporting evidence is an acceptable answer

Question	Answer	Mark	Mark scheme	Additional guidance
18	60	P1	for 240 ÷ (5 + 3 + 2) (= 24)	
		P1	for complete process to find the number of cans of each drink eg 5 × "24" (= 120) and 3 × "24" (= 72) and 2 × "24" (= 48)	
		P1	for process to find the number of cans removed eg "72" ÷ 2 (= 36) and "48" ÷ 12 (= 4)	
		P1	for process to find percentage eg $\frac{"120"}{240-("36"+"4")} \times 100$ or $\frac{"120"}{"120"+("72"-"36")+("48"-"4")} \times 100$	
		A1	cao	
			Alternative	
		P1	for process to find proportion of lemonade and orange cans removed, eg $3 \times \frac{1}{2}$ (= $1\frac{1}{2}$) and $2 \times \frac{1}{12}$ (= $\frac{1}{6}$)	
		P1	for process to find proportion of lemonade and orange cans remaining, eg 3– "$1\frac{1}{2}$" + 2 – "$\frac{1}{6}$" (= $3\frac{1}{3}$)	
		P1	for 5 + "$3\frac{1}{3}$" (= $8\frac{1}{3}$)	
		P1	for process to find percentage eg (5 ÷ "$8\frac{1}{3}$") × 100	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
20	1.75	P1	for an initial process eg 1.80 ÷ 12 (=0.15) or 1.80 ÷ 3 (=0.6)	Accept 1.8 ÷ 12 = 15 (p) They can work in pounds or pence
		P1	for a correct second step eg “0.15” ÷ 3 (=0.05) or “0.6” × 7 (=4.2) or 3÷ “0.15”(=20) or 7 ÷ 3 (=2.3..) or “0.15” × 7 (=1.05)	
		P1	for finding the price of one pen eg-“0.05” × 7 (=0.35) or “4.2” ÷ 12 (=0.35) or 7 ÷ “20”(=0.35) or “2.3.... × “0.15” (=0.35) or “1.05” ÷ 3 (=0.35)	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
22	No with reason	C1	for No and valid reason, eg compares $\frac{1}{3}$ with $\frac{1}{2}$ or 16 (with 24) **Acceptable examples** No, $\frac{1}{3}$ are red not $\frac{1}{2}$ There are 16 red counters (not 24) No as she has used the ratio 1:1 (not 1:2) Incorrect as it is 16 : 32 No as she should divide by 3 (as 1 + 2 = 3) No as they would both be 24 so it doesn't fit in the ratio 1 : 2 No because 24 + 48 = 72 **Not acceptable examples** Yes, … No as the number of red counters would be lower There is 1 red for every 2 blue	

Question	Answer	Mark	Mark scheme	Additional guidance
22	Description	C1	Identifies a mistake in the working **Acceptable examples** Rob should divide by 8 He should have added the 3 and 5 first He divided 120 by 3 and 5 instead of 8 He did not do it as $120 \times \frac{3}{8}$ and $120 \times \frac{5}{8}$ He did not add the two ratios first **Not acceptable examples** He has done it in two parts but he should do it in one The answer should be 45 : 75 They do not add up to 120 He is supposed to add his numbers 40 + 24 does not equal 120	

November 2021 Paper 3

Question	Answer	Mark	Mark scheme	Additional guidance
22	12.85 or 12.86 or 13.5(0)	P1	for 9 + 2 + 1 (=12)	Award this mark for sight of 4500, 1000 or 500
		P1	for working out how many lots of 175g are needed eg 6000 ÷ "12"× 2 ÷ 175 (=5.71..)	Process may lead to 5 or 6 instead of 5.71
		P1	for a complete process eg "5.71…" × 2.25 (=12.857..)	"5.71…" (ft) or a figure rounded or truncated eg "6"
		A1	for 12.85 or 12.86 or 13.5(0)	

Question	Answer	Mark	Mark scheme	Additional guidance
23	No	P1	for 3000 ÷ (2 + 3) (= 600)	
	(supported)	P1	for "600" × 2 (= 1200) **or** "600" × 3 (= 1800) **or** "600" ÷ 6 (= 100) **or** "600" ÷ 20 (= 30)	
		P1	for "1200" ÷ 6 (= 200) **or** "1800" ÷ 20 (= 90) **or** "100" × 2 (= 200) **or** "30" × 3 (= 90)	
		P1	for "90" ÷ ("200" + "90") × 100 (= 31.0...) oe **or** "90" ÷ ("200" + "90") (= 0.31...) **or** 0.3 × ("200" + "90") (= 87)oe	Full method to compare
		C1	correct conclusion **and** fully correct calculations with accurate figure eg No and 87 **or** No and 31% **or** No and 0.31	No may be implied by a statement No working, answer only no marks

Question	Answer	Mark	Mark scheme	Additional guidance
24	33	P1	for relating 24 to 8 parts, **or** (1 part =) 24 ÷ 8 (= 3) **or** 15 – 7 (= 8) **or** starts to use a build-up method, eg (8 :) 14 : 30	8 parts = 24
		P1	for (15 – 4) **and** (24 ÷ 8) **or** 15 × 3 (= 45) **and** 4 × 3 (= 12) **or** for 12 (: 21) : 45	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
25	168	P1	for a start to the process, eg $\frac{57}{100} \times 800$ (= 456) or $57 \div (12 + 7)$ (= 3) **or** $800 \div (12 + 7)$ (= 42.1...) **or** [amount] $\times \frac{57}{100}$ or [amount] $\times \frac{7}{12 + 7}$	May be seen as part of other calculations, eg $\frac{7}{12 + 7} \times 57$ (= 21) or $\frac{7}{12 + 7} \times 800$ (= 294.7...) [amount] can be any figure considered as being 57% of 800 or 43% calculated incorrectly or a figure calculated from using full or partial ratio incorrectly as a first step
		P1	for a complete process to find the weight of glass, eg $\frac{57}{100} \times 800 \times \frac{7}{12 + 7}$ oe	
		A1	for an answer in the range 167.9 to 168 SCB2 for an answer of 288	

Question	Answer	Mark	Mark scheme	Additional guidance
25	30	P1	for 160 ÷ (3+7) (= 16) **or** $\frac{3}{3+7}$ (= $\frac{3}{10}$)	
		P1	for "16" × 3 (= 48) **or** "$\frac{3}{10}$" × 160 (= 48)	
		P1	for a correct step using 48 eg "48" ÷ 8 (= 6) **or** "48" × 25 ÷ 100 (= 12) **or** (indep) for combining $\frac{1}{8}$ and 25%, eg $\frac{1}{8}$ + $\frac{1}{4}$ (=$\frac{3}{8}$) or "0.125" + "0.25" (= 0.375) or "12.5"(%) + 25(%) (= 37.5(%))	
		P1	for a complete process to find the number of petrol cars, eg "48" – "6" – "12" oe **or** (1 − "$\frac{3}{8}$") × "48" oe **or** $\frac{3}{10}$ × (1 − "$\frac{3}{8}$") × 160 oe	
		A1	cao SC B2 for an answer of 100 if P0 scored	Award no marks for a correct answer with no supportive working

Question	Answer	Mark	Mark scheme	Additional guidance
26	21	P1	for process to work correctly with initial ratio, eg 120 ÷ 4 × 9 (= 270) **or** 90 + 120 + 60 (= 270)	Can be implied by 90 : 120 : 60 or by a second ratio that totals to 270
		P1	for process to find the value of 1 part in the new ratio, eg "270" ÷ (2 + 5 + 3) (= 27)	
		P1	for process to find both values for Errol, eg ("27" × 3) (= 81) **and** (120 ÷ 4 × 2) (= 60)	
		A1	cao	