

Stage (9-12)

Worksheet 2 | Mark Scheme

1st Semester | 2023-2024

Grade

Subject: Math

Chapter: Number 4, Number 5

Objectives:

- To review compound percentages, inverse percentages, calculators, estimating, rounding upper and lower bounds

Date:

Name:

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes	
(a)	$8500 \times 0.023 (=195.5)$ or $8500 \times 1.023 (=8695.5)$ $((8500 + "195.5") \times 1.023) \times 1.023$	9100	3	M1 M1 A1	M2 for 8500×1.023^3 (M1 for 8500×1.023^n) for 9100 – 9100.1 (answer for 600(.1) gains M2A0)
(b)	$687\,700 \div 0.92 (=747\,500)$ or $687\,700 \div 1.15 (=598\,000)$ or $1.15 \times 0.92 (=1.058)$ $687\,7000 \div (0.92 \times 1.15)$	650 000	3	M1 A1	a correct first step Dep on M1 for completely correct method

Q2.

Question	Working	Answer	Mark	Notes	
	$0.08 \times 170\,000 (=13600)$ or $0.92 \times 170\,000 (=156400)$		3	M1	oe eg $170\,000 \div 12.5$
	e.g. $0.92 \times (0.92 \times "156400")$			M1	(dep)for a complete method
		132377		A1	or 132376.96
					(SCB2 for $170\,000 \times 0.92^4$) (=121786.(810)) (SCB1 for $170\,000 \times 0.24 (=40\,800)$) or $170\,000 \times 0.76 (=129\,200)$ or $170\,000 \times 1.08 (=183\,600)$ or $170\,000 \times 1.08^3 (=214151)$ or an answer of 129 200 or an answer of 214 151 – 214151.1(0))
					Total 3 marks

Q3.

Question	Working	Answer	Mark	Notes
(a)	$4 \times 120 (= 480)$			M1
	e.g. $120 \div 2 \times 5 (= 300)$ or $120 \times 0.4 \times 7 (= 336)$ or $(120 - '60' - '48') \times 8 (= 96)$ or $120 \times 0.1 \times 8 (= 96)$			M1 for a method to find the income for one of the selling prices
	e.g. $(120 \div 2 \times 5) + (120 \times 0.4 \times 7) + ((120 - '60' - '48') \times 8) (= 732)$ or $(120 \div 2 \times 5) + (120 \times 0.4 \times 7) + (120 \times 0.1 \times 8) (= 732)$ or $'300' + '336' + '96' (= 732)$			M1 for a complete method to find the total income
	e.g. $\frac{'732' - '480'}{'480'} \times 100$ or $'252' \div '480' \times 100$ or $\left(\frac{'732'}{'480'} \times 100 \right) - 100$ or $152.5 - 100$ or $\left(\frac{'732'}{'480'} - 1 \right) \times 100$ or 0.525×100			M1 for a complete method to find the percentage profit
		52.5	5	A1 accept 53
(b)	e.g. $1 + 0.2 (= 1.2)$ or $100(\%) + 20(\%) (= 120(\%))$ or $\frac{15}{120} (= 0.125)$ or $\frac{15}{120}$			M1
	e.g. $15 \div 1.2$ or $15 \div 120 \times 100$ or $15 \times 100 \div 120$			M1 dep
		12.5(0)	3	A1 accept (£)12.5, (£)12.50p, 1250p if the £ sign is crossed out
				Total 8 marks

ALT	(a)	$4 \times 120 (= 480)$			M1
		e.g. $120 \div 2 \times 1 (= 60)$ or $120 \times 0.4 \times 3 (= 144)$ or $(120 - '60' - '48') \times 4 (= 48)$ or $120 \times 0.1 \times 4 (= 48)$			M1 for a method to find the profit of one of the books
		e.g. $(120 \div 2 \times 1) + (120 \times 0.4 \times 3) + ((120 - '60' - '48') \times 4) (= 252)$ or $(120 \div 2 \times 1) + (120 \times 0.4 \times 3) + (120 \times 0.1 \times 4) (= 252)$ or $'60' + '144' + '48' (= 252)$			M1 for a complete method to find the total profit
		$'252' \div '480' \times 100$ oe			M1 for a complete method to find the percentage profit
			52.5	5	A1 accept 53
	(b)	e.g. $1 + 0.2 (= 1.2)$ or $100(\%) + 20(\%) (= 120(\%))$ or $\frac{15}{120} (= 0.125)$ oe			M1
		e.g. $15 \div 1.2$ or $15 \div 120 \times 100$ or $15 \times 100 \div 120$			M1 dep
			12.5(0)	3	A1 accept (£)12.5, (£)12.50p, 1250p if the £ sign is crossed out
					Total 8 marks

Q4.

Question	Working	Answer	Mark	Notes	
	$\frac{8}{100} \times 20000 (=1600)$		4	M1oe	Award M2 for 20000×1.08 or 21600
	$20000 + \frac{8}{100} \times 20000$ $(=21600)$ or $(20\ 000 - 19200) + \frac{8}{100} \times 20000 (=2400)$			M1	
	$\frac{"21600"-19\ 200}{19\ 200} (\times 100)$ or $\frac{"2400"}{19\ 200} (\times 100)$ or "21600" $\div$ 19200 ($\times 100$) oe			M1	or for 1.125 or $\frac{9}{8}$ or 112.5%
		12.5		A1	oe
				Total 4 marks	

Q5.

Question	Working	Answer	Mark	Notes	
a	$\frac{4}{100} \times 160\,000 \text{ oe}$ $ (=6400)$ $\frac{4}{100} \times (160\,000 -$ $ \text{"6400"}) (= 6144)$ $\frac{4}{100} \times (160\,000 -$ $ \text{"6400"} - \text{"6144"})$ $ (= 5898.24)$ $160\,000 - \text{"6400"}$ $ - \text{"6144"} -$ $ \text{"5898.24"}$	141 558	3	M1 M1 for a complete method (condone 4 years rather than 3)	M2 for $160\,000 \times 0.96^3$ or $160\,000 \times 0.96^4$ (=135 895.44..)) If not M2 then award M1 for $160\,000 \times 0.96$ (=153 600) or $160\,000 \times 0.96^2$ (=147 456) accept $(1 - 0.04)$ in place of 0.96 throughout

				A1 for 141 557.76 - 141 558 SC If no other marks gained, award B1 for $160\,000 \times 0.12$ oe (=19 200) or $160\,000 \times 0.88$ oe (=140 800) or an answer of 140 800 or an answer of in the range 179 978 – 179 978.24
b	E.g. $252\,000 \div 1.05$	240 000	3	M2 If not M2 then M1 for $x \times 1.05 = 252\,000$ or $252\,000 \div 1.05$ oe A1 NB: An answer of 239 400 scores M0 M0 A0

Q6.

Question		Working	Answer	Mark	Notes
		5.5 or 6.5 or 12.5 or 17.5		3	M1 Accept 6.49 for 6.5 and 17.49 for 17.5
		17.5 – 5.5			M1 for UB – LB where $15 < UB \leq 17.5$ and $5.5 \leq LB < 6$
			12		A1 dep on M2
					Total 3 marks

Q7.

Question	Working	Answer	Mark	Notes
	$\begin{array}{r} 7.5 \text{ or } 8.5 \text{ or } 4.65 \text{ or } 4.55 \\ 25 \text{ or } 15 \\ \underline{4.55} \\ 25 - 7.5 \end{array}$	0.26 oe	4	M1 M1 M1 for $\frac{LB_1}{UB - LB_2}$ with $4.55 \leq LB_1 < 4.6$ and $20 < UB \leq 25$ and $7.5 \leq LB_2 < 8$ A1 for 0.26 from correct working

Q8.

Question	Working	Answer	Mark	Notes
	$8.305 - 0.655$		2	M1 For either bound correct (used or seen). Accept $0.654\dot{9}$
		7.65		A1 dep on correct method shown
				Total 2 marks

Q9.

Question	Working	Answer	Mark	Notes
(a)		49.876(41697...)	2	B2 If not B2 then award B1 for $41.6(6\dots)$ or $\frac{125}{3}$ or $\frac{7.5}{0.18}$ or $8.2(0\dots)$
(b)		50	1	B1 ft from (a) provided 2 or more sig figs
				Total 3 marks

Q10.

Question	Working	Answer	Mark	Notes
(a)	$4.3333(3...) + 0.37894(7...) \text{ or } \frac{13}{3} + \frac{36}{95}$		2	M1 Evaluate either fraction correctly as a decimal to at least 5SF(rounded or truncated) or as a simplified fraction or an answer of 4.71(2)
		4.7122(80702)		A1 Correct to at least 5SF (rounded or truncated).
(b)		4.71	1	B1 ft if at least 4SF given in (a) (not 4.71̇)
				Total 3 marks