

Stage (9-12)

# Worksheet 2 | Mark Scheme

1<sup>st</sup> Semester | 2023-2024

Grade 9 IG

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	M2 for $8500 \times 1.023^3$ (M1 for $8500 \times 1.023^n$ ) 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	
		A1	Dep on M1 for completely correct method		

Q2.

Question	Working	Answer	Mark	Notes		
	$0.08 \times 170\,000 (=13600)$ or $0.92 \times 170\,000 (=156400)$	132377	3	M1	oe eg $170\,000 \div 12.5$	
	e.g. $0.92 \times (0.92 \times "156400")$			M1	(dep)for a complete method	M2 for $170\,000 \times 0.92^3$
				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))		
				<b>Total 3 marks</b>		

**Q3.**

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

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

**Q4.**

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

**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 $160\,000 \times 0.96^3$ <b>or</b> $160\,000 \times 0.96^4$ (=135 895.44..)  If not M2 then award M1 for $160\,000 \times 0.96$ (=153 600) <b>or</b> $160\,000 \times 0.96^2$ (=147 456)  accept $(1 - 0.04)$ in place of 0.96 throughout

				<p>A1 for 141 557.76 - 141 558</p> <p>SC If no other marks gained, award</p> <p>B1 for <math>160\,000 \times 0.12</math> oe (=19 200)</p> <p>or <math>160\,000 \times 0.88</math> oe (=140 800)</p> <p>or an answer of 140 800</p> <p>or an answer of in the range 179 978 – 179 978.24</p>
b	E.g. $252\,000 \div 1.05$	240 000	3	<p>M2 If not M2 then M1 for <math>x \times 1.05 = 252\,000</math> or <math>252\,000 \div 105</math> oe</p> <p>A1</p> <p>NB: An answer of 239 400 scores M0 M0 A0</p>

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
				<b>Total 3 marks</b>

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
				<b>Total 2 marks</b>

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
				<b>Total 3 marks</b>



## Q10.

Question	Working	Answer	Mark	Notes
(a)	$4.3333(3\dots) + 0.37894(7\dots)$ 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)
				<b>Total 3 marks</b>