Name: _____

IGCSE (9-1) Maths
topics new to Foundation tier:
Reverse percentages

Date:

Time: 45 minutes

Total marks available: 38

Total marks achieved: _____

Q1.

(*a*) Helen's savings increased from £155 to £167.40
Work out the percentage increase in Helen's savings.

..... %
(3)

(*b*) Joe's savings increased by 4.5%.
His savings are now £125.40

What were his savings before the increase?

£ = ...
(3)

(Total 6 marks)

Q2. A clothes shop has a sale.

In the sale, normal prices are reduced by 12%
The normal price of a shirt is £30

(*a*) Work out the sale price of the shirt.

£ .....
(3)

The price of a coat is reduced by £9 in the sale.

(*b*) Work out the normal price of the coat.

£ .....
(3)

(Total 6 marks)

Q3.



Ying eats some yoghurt.

The yoghurt contains 192 mg of calcium.
This is 16% of the total amount of calcium that Ying should have each day.

Work out the total amount of calcium that Ying should have each day.

..... mg
(Total 3 marks)

Q4.

(*a*) Dilip buys a painting for $ 675
Later, he sells it and makes a percentage profit of 12%.
Work out the price for which Dilip sells the painting.

$ .....
(3)

(*b*) Renuka sells her car.
She makes a loss of $ 2162
Her percentage loss is 23%.

Work out the price for which Renuka sells her car.

$ .....
(3)

(Total 6 marks)

Q5. Max invests some money in a savings bond.
The savings bond pays interest at a rate of 2% per year.

At the end of the first year, his savings bond is worth £5763

How much money did Max invest in the savings bond?

£.....
(Total 3 marks)

Q6. In a sale, normal prices are reduced by 18%
The sale price of an umbrella is £25.83

Work out the normal price of the umbrella.

£ .....

(Total 3 marks)

Q7. The table gives some information about the average price of a litre of petrol in England.

	January 2007	January 2012
Average price of a litre of petrol (pence)	87.3	133.3

(*a*) Work out the percentage increase in the average price of a litre of petrol in England between January 2007 and January 2012.
Give your answer correct to 3 significant figures.

..... %

(3)

The average price of a litre of petrol in England increased by 20% from January 2010 to January 2012.

(*b*) Work out the average price of a litre of petrol in England in January 2010.
Give your answer in pence, correct to 1 decimal place.

..... pence

(3)

(Total 6 marks)

Q8. On 9th May, 2009, there were 3440 people in the world with swine flu.
Of these people, 1639 were in the USA.

(*a*) Express 1639 as a percentage of 3440
Give your answer correct to 1 decimal place.

..... %

(2)

The 3440 people who had swine flu on 9th May was an increase of 37.6% on the number of people who had swine flu on 8th May.

(*b*) Calculate the number of people who had swine flu on 8th May.

.....

(3)

(Total 5 marks)

Examiner's Report

Q1.

There were a number of approaches in part (a), some of which were correct. Credit wasn't given for $^{155}/_{167.40}$ but many picked up marks for partial methods even though students often didn't proceed to the correct answer. Such methods included $^{167.40}/_{155}$ or $^{12.4}/_{167.4}$, or for sight of 12.4 in the working. Others lost a mark where they correctly obtained either 1.08 or 108 but failed to subtract 1 or 100 to give the correct increase of 8%.

Like in part (a), there were a number of approaches seen that led to the correct answer in part (b). In all cases, an appreciation that £125.40 represented 104.5% (implied or stated) usually led to a correct solution. Students who didn't have this appreciation often thought that £125.40 represented 100% leading to an incorrect answer of 119.76.

Q2. [Edexcel Awards]

Part (a) of this question was done well by the vast majority of students, the occasional student forgetting to subtract 12% of £30 from £30; these students gained 1 method mark.

Part (b), although more challenging, was also done well, however with less success than part (a). Some students gained 1 mark for putting 9 = 12% but then they did not know how to progress. Some candidates added or subtracted £9 to lose the final accuracy mark. Common mistakes for incorrect responses was to multiply or divide by 1.12 or 0.88; also a misunderstanding of the question that £9 was the reduced price of the coat.

Q3. [Edexcel Awards]

Students were divided between those who tried to find 16% of 192 and those who employed the correct method which generally lead to the correct answer and the award of full marks.

Q4.

Part (a) was well done. In part (b) the common error was to reduce $2162 by 23%. Some candidates did not read the question carefully enough and gave $9400 rather than $7238 as their final answer.

Q5.

The candidature was split between those who recognised the problem as a reverse percentage and so divided by 1.02 and those who employed the incorrect method of decreasing the given amount by 2%. A few students did employ the correct method of solution but with the wrong multiplier, usually 1.2. Some multiplied by 1.02 rather than dividing.

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes		
(a)	167.4 – 155 (= 12.4) "12.4" ÷ 155 (= 0.08)	8	3	M1 M1 dep A1 cao If build up approach used, award M2A1 for correct answer, otherwise M0A0.	167.4 ÷ 155 (= 1.08) "1.08" – 1 (= 0.08)	167.4 ÷ 155 (= 1.08) "1.08" × 100 (= 108)
(b)	$\frac{125.4}{104.5} \times 100$ oe	120	3	M2 M1 for $\frac{125.4}{104.5}$ (= 1.2) or 104.5% = 125.4 or $1.045x = 125.4$ oe or 1.2 seen or 5.4 A1 If build up approach used, award M2A1 for correct answer, otherwise M0A0.		
						Total 6 marks

Q2.

Question	Working	Answer	Mark	Notes	
(a)	$\frac{12}{100} \times 30$ or 0.12×30 or 3.6 30 – "3.6"	26.4(0)	3	M1 M1dep A1	M2 for $\frac{88}{100} \times 30$ or 0.88×30
(b)	$\frac{9}{0.12}$ or $\frac{9}{12} \times 100$ oe	75	3	M2 M1 for $\frac{9}{12}$ or 9 = 12% or $9 = \frac{12}{100}$ oe A1 (NB: if 75 ± 9 calculated, M2 only)	
					Total 6 marks

Q3.

Question	Working	Answer	Mark	Notes
	$0.16x = 192$ **or** 16% = 192 oe **or** $\frac{192}{16}$ (=12)		3	M1
	$\frac{192}{0.16}$ **or** $\frac{192}{16} \times 100$ oe			M1
		1200		A1 cao
				Total 3 marks

Q4. [parts a–b only]

Question	Working		Answer	Mark	Notes		
(a)	$\frac{12}{100}\times 675$ oe or 81			3	M1		M2 for 675 × 1.12 oe
	675 + "81"				M1	(dep)	
			756		A1	cao	
(b)	23% of amount = 2162 or $(1\%=)\frac{2162}{23}$ or 94 seen			3	M1	M2 for $\frac{2162}{23}\times 100$ oe	
	"94" × 100 or 9400 or "94" × 77				M1		
			7238		A1	cao	
(c)	$\frac{40}{100}\times 1500$ oe or 600	OR 1500×0.6^3		3	M1	for eg $\frac{40}{100}\times 1500$ or 600	OR M2 for 1500×0.6^3 (M1 for 1500×0.6 or 900 or 1500×0.6^2 or 540 or 1500×0.6^4)
	$\frac{40}{100}\times$(1500–"600") = 360 $\frac{40}{100}\times$(1500–"600"–"360") = 216 1500–"600"–"360"–"216"				M1	for completing method	
						Accept (1− 0.4) as equivalent to 0.6	
			324		A1	cao	
							Total 9 marks

Q5. [part b only]

Question	Working	Answer	Mark	Notes		
a	8000 × 1.045 oe (=8360)			M1	or 8000 × 1.0275^3 (=8678.316375)	M2 for 8000 × 1.045 × 1.0275^3
	"8360" × 1.0275^3 oe			M1	"8678.316375" × 1.045	
		9068.84	3	A1	accept 9069 and answers in the range 9068.8(0) – 9068.9(0) SC: B1 for an answer of 9020 (8000 + 360 + 3×220)	
b	1 + 0.02 (=1.02)			M1		M1 for 100(%) + 2(%) (= 102(%))
	5763 ÷ "1.02" oe			M1	dep	M1 (dep) for 5763÷"102" × 100 oe
		5650	3	A1		
						Total 6 marks

Q6.

Question	Working	Answer	Mark	Notes
	$0.82x = 25.83$ **or** $82\% = 25.83$		3	M1 or for use of 0.82 in a calculation
	$\frac{25.83}{0.82}$ **or** $\frac{25.83}{82} \times 100$			M1
		31.5(0)		A1
				Total 3 marks

Q7.

Question	Working	Answer	Mark	Notes
(a)	$133.3 - 87.3$ or 46 or $\frac{133.3}{87.3}(\times 100)$		3	M1 Difference for two given years
	$\frac{133.3-87.3}{87.3}(\times 100)$ or $\frac{46}{87.3}(\times 100)$ or $\left[\frac{133.3}{87.3}-1\right](\times 100)$ or 0.527			M1 for difference divided by 87.3 oe
		52.7		A1 for answer rounding to 52.7
(b)	$1.2x = 133.3$ or $120\%x = 133.3$		3	M1 also allow $120\% = 133.3$ or $\frac{133.3}{120}$ or $\frac{133.3}{x} = 1.2$ or 1.11…
	$x = \frac{133.3}{1.2}$ or $x = \frac{133.3}{120} \times 100$			M1 oe
		111.1		A1 for answer rounding to 111.1
				Total 6 marks

Q8.

Question number	Working	Answer	Mark	Notes
(a)	$\frac{1639}{3440} \times 100$		2	M1 for $\frac{1639}{3440}$ or 0.476…
		47.6		A1 for ans rounding to 47.6
(b)	$\frac{3440}{1.376}$ or $3440 \times \frac{100}{137.6}$ oe		3	M2 for $\frac{3440}{1.376}$ or $3440 \times \frac{100}{137.6}$ oe M1 for $\frac{3440}{137.6}$ or 137.6% = 3440 or $\frac{3440}{x} = 1.376$ or 3440 = $1.376x$ or 25 seen
		2500		A1 cao
				Total 5 marks