

Working it out – Solve problems requiring calculations with common measures

This example looks at a task that requires the learner to calculate monthly costs from annual figures. We explore where we would apply marks.

Task:

Angelina expects to travel 8000 miles per year. Her running costs are 20p per mile. Other motoring costs per year are:

Road tax	£95
Insurance	£495

How much should Angelina budget for her total motoring costs per month?

Marks available: 4

Mark scheme used by examiners:

The table shows how the examiners will apply all 4 marks for the task.

CAO = Correct Answer Only

FT = Follow Through

Method	Alternative method	Marks
0.2×8000 or $20 \times 8000 / 100$ or $20 \times 8000 \text{pence} = [(\text{£})1600]$	$8000 \div 12 \times .20 = (133.33)$	1
sum of other costs PLUS running per annum or month = $[(\text{£})2190]$	$495 \div 12 = (41.25)$	1
"their yearly cost"/12	$95 \div 12 = (7.92)$	1
answer in range 182-184	182-184	1

The use of brackets around a number (for example 133.33), indicates that the mark is awarded for sight of the method and/or 133.33.

Learner responses

Learner A: (Yearly method)

Mileage cost	= 8000 × 0.20 = 1600	✓
Road Tax	= 95	
Insurance	= 495	
Total for year	= 2190	✓
Cost per month	= 2190 ÷ 12	✓
	= £182.50	✓

4 marks awarded

1 mark awarded for correct calculation of mileage cost
 1 mark awarded for correct annual running cost
 1 mark awarded for correct calculation of monthly cost
 1 mark awarded for correct answer

Learner responses

Learner B: (Monthly method)

Monthly mileage	= 8000 ÷ 12 = 666.67	
Mileage cost per month	= 666.67 × 0.20 = 133.33	✓
Road Tax per month	= 95 ÷ 12 = 7.92	✓
Insurance per month	= 495 ÷ 12 = 41.25	✓
Cost per month	= 133.33 + 7.92 + 41.25 = £182.50	✓

4 marks awarded

1 mark awarded for correct calculation of mileage cost
 1 mark awarded for correct monthly cost
 1 mark awarded for correct calculation of monthly cost
 1 mark awarded for correct answer

Learner responses

Learner C:

Mileage cost	= $8000 \div 0.20$	= 400	✗
Road Tax		= 95	
Insurance		= 495	
Total for year		= 990	✓
Cost per month		= $990 \div 12$	✓
		= £82.50	✗

2 marks awarded

0 marks awarded as incorrect calculation for mileage cost

1 mark awarded for correct annual running cost applying follow through
1 mark awarded for correct calculation of monthly cost applying follow through

0 marks awarded as final answer is incorrect

Learner responses

Learner D:

Monthly mileage	= $8000 \div 12$	= 666.67	
Mileage cost per month	= $666.67 \div 0.20$	= 33.33	✗
Road Tax per month	= $95 \div 12$	= 7.92	✓
Insurance per month	= $495 \div 12$	= 41.25	✓
Cost per month	= $33.33 + 7.92 + 41.25$	= £82.50	✗

2 marks awarded

0 marks awarded for as incorrect calculation for mileage cost

1 mark awarded for correct monthly cost of road tax

1 mark awarded for correct calculation of monthly cost for insurance

0 marks awarded for as final answer is incorrect

Learner responses

Learner E:

$$\text{Monthly mileage} = 8000 \div 12 = 666.67$$
$$\text{Mileage cost per month} = 666.67 \div 0.20 = 33.33 \quad \times$$
$$\text{Road Tax per month} = 95 \div 10 = 9.50 \quad \times$$
$$\text{Insurance per month} = 495 \div 10 = 49.50 \quad \times$$
$$\text{Cost per month} = 33.33 + 9.50 + 49.50 = \text{£}92.33 \quad \times$$

0 marks awarded

0 marks awarded as incorrect calculation for mileage cost

0 marks awarded for incorrect road tax monthly cost

0 marks awarded for incorrect calculation of insurance monthly cost

0 marks awarded as final answer is incorrect

Learner responses:

Learner F:

$$\text{Costs} = \text{£}82.50$$

0 marks awarded

0 marks awarded as incorrect calculation for mileage cost

0 marks awarded for incorrect road tax monthly cost

0 marks awarded for incorrect calculation of insurance monthly cost

0 marks awarded as final answer is incorrect and not within range

Overall examiner comment:

In this activity, answers not given in money format were not penalised. However, in other activities a mark may be awarded for correct money format. **Learners should be advised to give all money answers in an appropriate format.**

Marking is based on either the monthly or yearly route through the activity. If a learner mixes up monthly and yearly routes, the marks for each route would be allocated and then the learner would be awarded the maximum mark of the two.

As with other tasks, clear displays of methods ensure that learners are able to be awarded part marks, if appropriate. Learner D, for example, was awarded 2 marks for correct calculations. However, if only their incorrect final answer was displayed without support calculations then no marks could be awarded, as there is no evidence of their approach or calculations. Learner F, for example, has the same final answer as learner D, but has not been awarded any marks as there is no evidence of any correct calculations. These examples illustrate the importance of including supporting calculations.