

Working it out – Working with formulae

Introduction

The structure of each question paper may vary, but these examples are typical of the activities that learners are expected to complete.

The examples of learner work are based on the sample paper *P000189 Company Car*. Additional notes are included to give guidance when working with other assessment papers as tasks and mark allocations will vary. The notes are intended to inform the preparation for all papers, and are therefore not only related to the Company Car sample paper.

The comments on the responses are intended to support improved preparation for the assessment, through encouraging an understanding of the skills required. The information provided is not intended to indicate what is a perfect, model answer as the activities can often be approached in different ways and with outcomes that look a little different. More important is that learners demonstrate the appropriate range of skills using ICT tools and features in the applications they have chosen to use.

Levels of response - Response A and Response B

The sample responses show different levels of performance. 'Response A' shows a good level of response from the learner, with a high or full mark likely. 'Response B' shows a response with some weaknesses or omissions that will result in the loss of marks, and demonstrates common weaknesses that are seen in live assessments.

Question 2: Work on costs

Your manager wants you to use a suitable ICT application to compare the cost of leasing a Ford Mondeo for 3 years, and buying a new Ford Mondeo and selling it after 3 years.

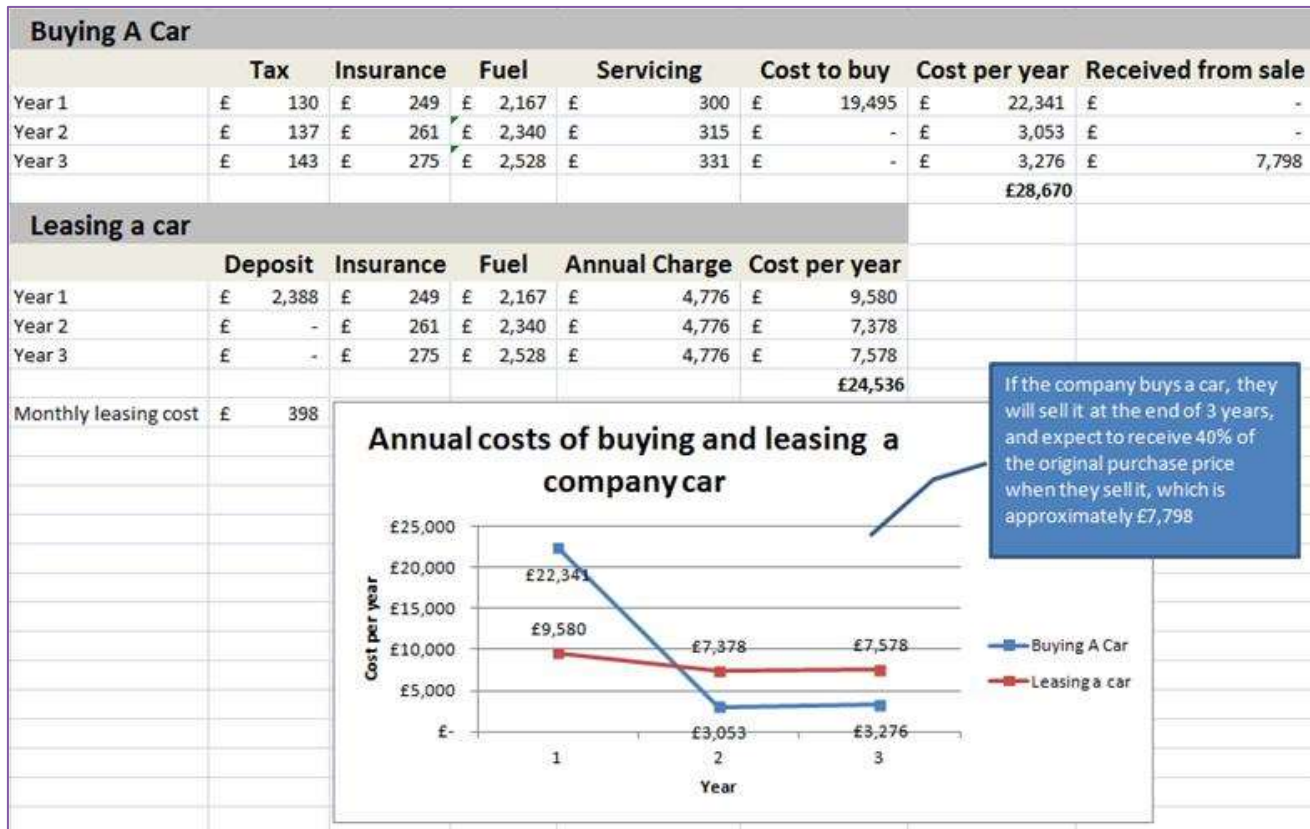
You will need to open and use the file **car costs.xls**

You will need this information:

- If the company buys a car, they have to pay the price of the car, plus annual vehicle licence (tax), servicing, insurance, and fuel costs.
- If the company leases a car, they have to pay a deposit, plus insurance, fuel costs and an annual leasing cost.
- Assume a vehicle licensing (tax) cost of £125 in Year 1
- Leasing includes a one-off, non-refundable deposit in Year 1 of £2,388
- Leasing cost 36 months at £398 per month (includes: servicing, parts, repairs, tyres, vehicle licence).
- Fuel costs are expected to rise by **8%** each year e.g. **cost of fuel for year 2 equals the cost of fuel for year 1 multiplied by 1.08**
- Car vehicle licence (tax), insurance and servicing are each expected to rise by **5%** each year, e.g. **cost of tax/insurance/servicing for year 2 equals the cost of tax/insurance/servicing for year 1 multiplied by 1.05**
- Use your software application to work out and display the cost each year and the total cost over the 3 years, for both buying and leasing a car.
- Make the titles stand out from the other information. Make sure that all information can be read. Apply appropriate formats to the data.
- Use your software application to create a fully labelled chart showing the annual costs for both leasing and buying a car over the 3 year period.
- If the company buys a car, they will sell it at the end of 3 years. They expect to receive 40% of the original purchase price when they sell it. Use text box, label, or other appropriate means to add a note **to your chart** explaining this. State the amount the company can expect to receive when they sell the car.

Marks available: 33

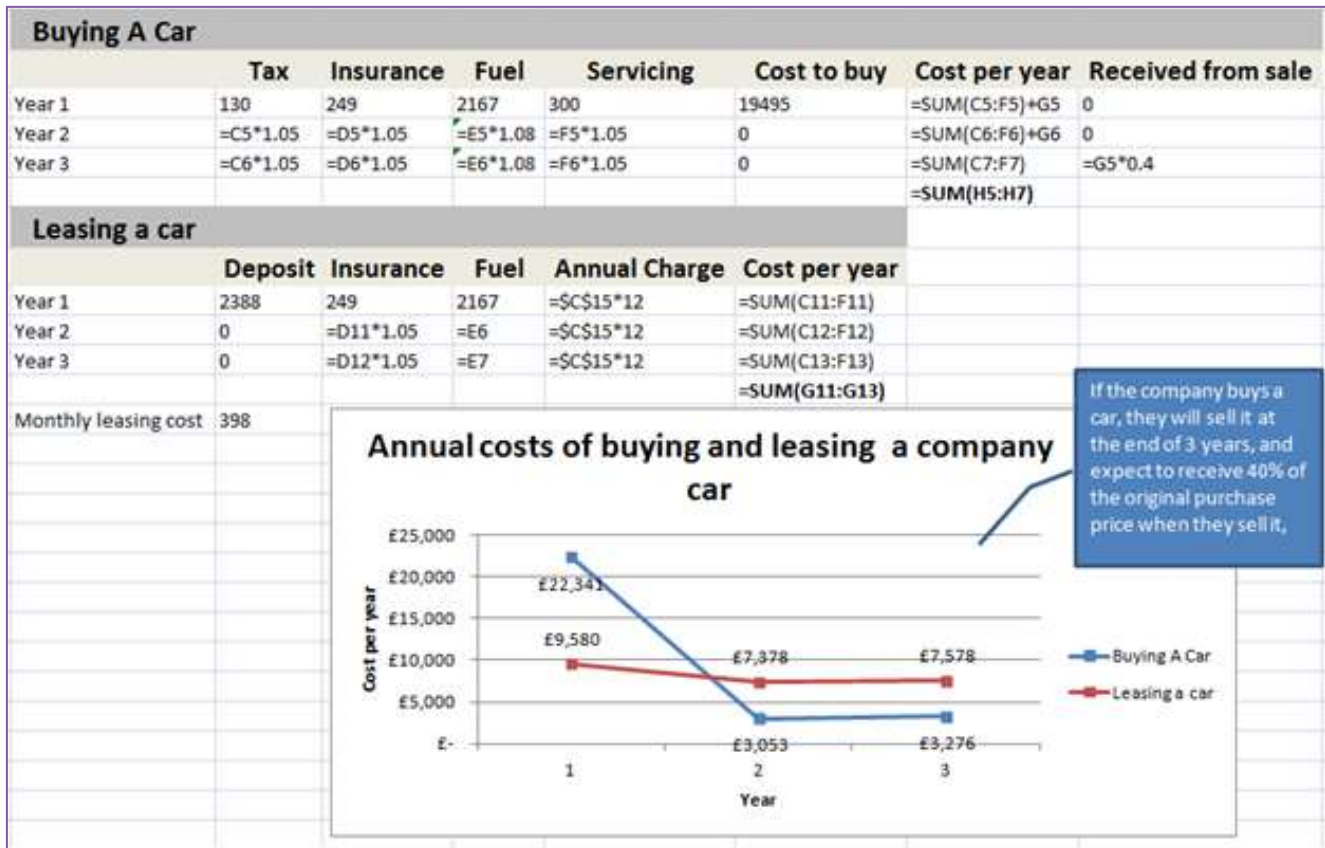
Response A:



This example is a completed spreadsheet for this activity. Features that will be awarded marks are:

- values entered from their internet search. 'Follow-through errors' are not penalised, so a mark will be awarded even if the value, e.g. the car tax, is incorrect
- titles and headings formatted to stand out
- currency values formatted appropriately
- the chart includes main title, axes titles and a legend
- a label is added to the chart to explain their calculated results.

Formula view:



Learners are expected to show their methods of calculation. In the online assessments this is visible, but in paper-based assessments the learners must change the view to show formulae.

Marks will be awarded in this example for:

- using formulae for calculations. In this example, multiplications and additions are required
- showing formulae that are correct for each row. Formula replication is expected.

Examiner comment:

Marks available: 33	Marks awarded: 33
Full marks shown in () below	
<p>Reasons: The learner has:</p> <ul style="list-style-type: none"> • opened and saved a spreadsheet file – 1 mark (1) • added the vehicle licence cost – 1 mark (1) • used formulae to calculate the increased costs for tax, insurance, fuel and servicing – 6 marks (6) • used a formula to calculate the leasing costs, with absolute cell references – 3 marks (3) • calculated total costs using formulae – 3 marks (3) • headings formatted, column width adjusted, currency values formatted – 5 marks (5) • chart produced with the correct data – 3 marks (3) • chart fully labelled and titled, with the x and y axes showing the data values with suitable titles, currency unit shown and a main title – 6 marks (6) • chart legend used effectively – 2 marks (2) • label added to explain the final price, displayed clearly and effectively – 3 marks (3) 	

Response B:

Buying A Car							
	Tax	Insurance	Fuel	Servicing	Cost to buy	Cost per year	Received from sale
Year 1	125	249	2167	300	19495	22336	0
Year 2	131.25	261.45	2340.36	315	0	3048.06	0
Year 3	137.8125	274.5225	2527.5888	330.75	0	3270.6738	7798
						28654.7338	
Leasing a car							
	Deposit	Insurance	Fuel	Annual Charge	Cost per year		
Year 1	£ 2,388	£ 249	£ 2,167	£ 4,776	£ 9,580		
Year 2	£ -	£ 261	£ 2,340	£ 4,776	£ 7,378		
Year 3	£ -	£ 275	£ 2,528	£ 4,776	£ 7,578		
Monthly leasing cost	£				£ -		

Annual costs

Year	Buying A Car	Leasing a car
1	22336	9580
2	3048	7378
3	3271	7578

In this example, marks are lost due to:

- Headings are not formatted to stand out
- The chart does not have axes titles or data labels.

Formula view:

Buying A Car							
	Tax	Insurance	Fuel	Servicing	Cost to buy	Cost per year	Received from sale
Year 1	125	249	2167	300	19495	=SUM(C5:F5)+G5	0
Year 2	=SUM(C5*1.05)	=SUM(D5*1.05)	=SUM(E5*1.08)	=SUM(F5*1.05)	0	=SUM(C6:F6)+G6	0
Year 3	=SUM(C6*1.05)	=SUM(D6*1.05)	=SUM(E6*1.08)	=SUM(F6*1.05)	0	=SUM(C7:F7)	=G5*0.4
							=SUM(H5:H7)
Leasing a car							
	Deposit	Insurance	Fuel	Annual Charge	Cost per year		
Year 1	2388	249	2167	=398*12	=C11+D11+E11+F11		
Year 2	0	=D11*1.05	=E6	=398*12	=C12+D12+E12+F12		
Year 3	0	=D12*1.05	=E7	=398*12	=C13+D13+E13+F13		
					=C14+D14+E14+F14		
Monthly leasing cost	398						

Year	Buying A Car	Leasing a car
1	~22000	~10000
2	~3000	~7000
3	~3000	~7000

In this example, marks are lost due to:

- inappropriate use of SUM in formulae, e.g. =SUM(C5*1.05) – this suggests a lack of understanding of the formula function
- no absolute cell references, which will make replication more difficult
- cell references rather than a cell range, e.g. C11+D11+ etc
- values used rather than a cell reference, e.g. the 398 value
- the chart does not have axes titles or data labels.

Examiner comment:

Marks available: 33	Marks awarded: 21
Full marks shown in () below	
<p>Reasons: The learner has:</p> <ul style="list-style-type: none"> • opened and saved a spreadsheet file – 1 mark (1) • added a vehicle licence cost but not used a current or correct value – 0 mark (1) • used formulae to calculate the increased costs for tax, insurance, fuel and servicing. The formulae indicate a misunderstanding of the use of 'SUM', but will calculate and are awarded marks – 6 marks (6) • used a formula to calculate the leasing costs, but used a number rather than a cell reference and did not use absolute cell references to assist replication – 1 marks (3) • calculated total costs using formulae, but used =C11+D11+ etc rather than the more efficient range, e.g. C11:F11 – 2 marks (3) • column width is adjusted, but not all currency values are formatted and the main title and headings are not formatted, e.g. bold – 3 marks (5) • column chart produced with the correct data – 3 marks (3) • chart is not fully labelled and titled. Although there are axes scales, the x and y axes do not show the units, there are no axes titles – 3 marks (6) • chart legend used effectively – 2 marks (2) • a label is not added to explain the final price – 0 marks (3) 	

Examiner guidance on using formulae:

The qualification specifications are not prescriptive on what formulae should be used. It is more important that the methods used are appropriate for the problem and required solution.

Formulae could include:

- Addition, subtraction, multiplication and division
- Average (mean)
- Maximum, minimum
- Percentages

Important points to note:

- All formulae must use cell references rather than values, to allow results to be automatically updated, and to support replication. An exception can be when a fixed value is used and is not already present in another cell.
- =SUM is only used for addition.
- Cell ranges should be defined, e.g. B2:B8, rather than B2+B3+B4+B5 etc.
- Absolute cell references (with \$) may be appropriate to allow effective replication.
- IF statements, although not an essential requirement, can be a time-efficient method of completing some data.

Examiner tip:

Working with numbers and calculations: The obvious choice for such work is a spreadsheet. Candidates should be familiar with the use of formulae and cell references. Candidates often put 'SUM' at the start of any formula, but depending on the level, candidates should understand the different formulae for calculating additions, multiplications, divisions, maximum/minimum, averages and percentages.

Charts and graphs: Many candidates are not fluent in the use of axes titles or data labels. The result is charts that only give part of the required information. Particularly at level 2, candidates may also need to select data that is not in adjacent rows or columns.