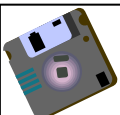


KEY SKILLS MODELLING: TASK 3

Item	No. people per person	Money spent
Bus hire	1	1000.00
Catering	1	100.00
Travel insurance	1	100.00
...
Total		£1073.00
Profit Loss		£907.00

MODELLING : TASK 3 - CONTENTS

- Absolute Cell Reference
- If....Then formulae

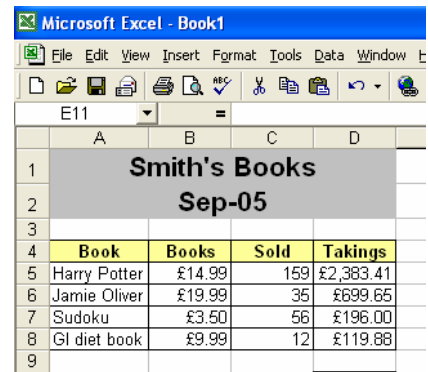


Wherever you see this symbol, make sure you remember to save your work!

MODELLING : 3

Up until now, you have been using 'Relative Cell References' when you have been writing any formulae in your spreadsheets

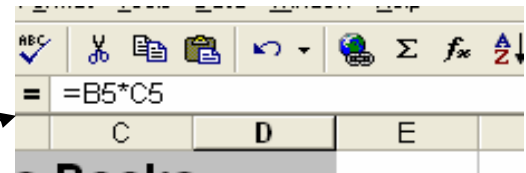
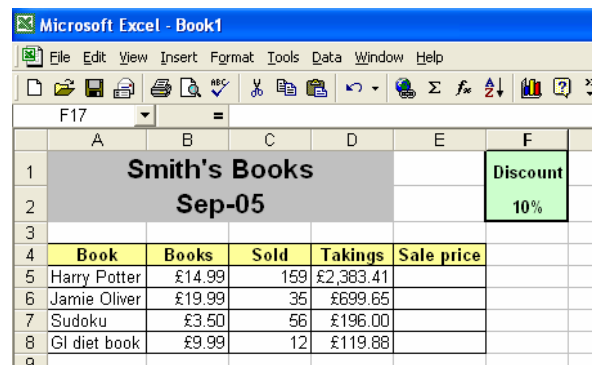
Relative cell references are basic cell references that adjust and change when copied or when using AutoFill.



	A	B	C	D
1	Smith's Books			
2	Sep-05			
3				
4	Book	Books	Sold	Takings
5	Harry Potter	£14.99	159	£2,383.41
6	Jamie Oliver	£19.99	35	£699.65
7	Sudoku	£3.50	56	£196.00
8	GI diet book	£9.99	12	£119.88
9				

TASK 1

- Open a new worksheet
- Copy out the table on the right.
- Write the correct formula to calculate the takings for Harry Potter.
- Copy the formula down using autofil.
- Click your mouse into cell D5. Look at the formula displayed in the formula bar
- Click your mouse into cell D6. Notice how the formula has changed.
- Do the same for cells D7 and D8. When you used autofil, Excel 'knew' that it needed to adjust the row number by 1 each time.
- In cell B9, add up the total from cells B5:B8
- Use autofil to drag that formula across to cells C9 and D9.
- Click your mouse in cell B9 and look at the formula.
- Click your mouse into cells C9 and D9 and note how Excel has changed the formula by one column letter each time.
- In cell F1, type the word 'Discount'
- In cell F2, type the discount to be given: 10%
- In cell E5, type 'Sale price'
- We now need to calculate the new selling price with the discount.
- In cell E5, multiply the book cost in Cell B5 by the discount value in Cell F2.
- Drag this formula down. What happened?

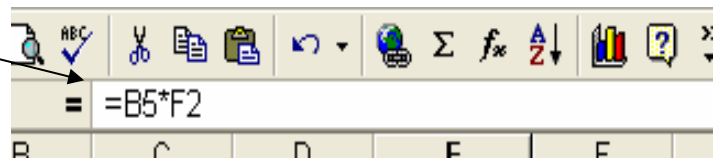
	A	B	C	D	E	F
1	Smith's Books					Discount
2	Sep-05					10%
3						
4	Book	Books	Sold	Takings	Sale price	
5	Harry Potter	£14.99	159	£2,383.41		
6	Jamie Oliver	£19.99	35	£699.65		
7	Sudoku	£3.50	56	£196.00		
8	GI diet book	£9.99	12	£119.88		
9						

- Your results should look like this:
- Normally, Excel would 'realise' that you are dragging a formula down, and adjust the formula for you each row you drag down.

	A	B	C	D	E	F
1	Smith's Books					Discount
2	Sep-05					10%
3						
4	Book	Books	Sold	Takings	Sale price	
5	Harry Potter	£14.99	159	£2,383.41	£1.50	
6	Jamie Oliver	£19.99	35	£699.65	£0.00	
7	Sudoku	£3.50	56	£196.00	£0.00	
8	GI diet book	£9.99	12	£119.88	£0.00	
9						

- Click your mouse into cell E5 and look at the formula in the formula bar.

- It should be the same as this



- Click your mouse into cell E6 and see if the formula has changed.

- Repeat for cells E7 and E8.

- You should find that Excel did in fact change the row number for you. So what went wrong?

- Check the formulae again in cells E5 to E8. They change from F2 to F3 to F4 to F5.

- Now have a look at what is in cell F2. It is the 10% discount.

- So when you wrote the formula in cell E5, it worked out the discount correctly. The problem arose when you tried to drag this formula down.

- Check what is in cells F3 to F5 - Nothing! That is why your calculations didn't work, because you were trying to multiply by a blank cell. Excel was trying to be too helpful.

- What you need is some way to tell Excel not to move out of cell F2 even when you drag the formula down. This is called an 'Absolute Cell Reference'.

- When you use the dollar sign \$ in front of the letters or numbers in a formula, Excel realises that it should not try to change those, but keep them absolutely where they are.

- Generally if you are dragging down and only the numbers are changing, as in this case, the \$ is only needed in front of the number part of the formula i.e. =B5*\$F2

- If you are dragging the formula across and the column letters are the ones that will change, then you would only need the \$ in front of the letter part of the formula =B5*\$F2.

- However, to save you having to remember this, you can put the dollar sign in front of both parts every time i.e. =B5*\$F\$2. The exam board will accept this as an answer.

- Delete the formula that you wrote in cell E5 and write it again with the dollar signs in front of the F and the 2.
- Now drag down your formula and see if it has worked this time.
- Click into cells E5, E6, E7 and E8 and you should see that the reference \$F\$2 did not change in any of the formulae.
- Congratulations, you have written your first Absolute Cell Reference formula!

Summary of absolute cell reference uses:

\$A1	Allows the row reference to change, but not the column reference.
A\$1	Allows the column reference to change, but not the row reference.
\$A\$1	Allows neither the column nor the row reference to change.

An absolute cell reference is one that refers to a constant cell and therefore overrides relative cell referencing (which is the default in spreadsheets)

TASK 2

- Open a new worksheet
- Set up this table.
- Merge cells A1 to E1
- Make the heading bold and size 16
- Make the text in cells B3, C3 and A10 bold
- Ensure that the column widths are correctly sized to view all of the data.
- Format cells B4:B7 as currency with 0 decimal places.
- Place a thick border around the outside of the main table and also under the titles as shown above.
- Write a formula in cell C4 to calculate the commission earned by Bob - remember to use an absolute cell reference.

Commissions November 2005				
	Total Sales	Commission		
Bob	£26,000			
Sally	£35,350			
Joseph	£42,000			
Laura	£28,800			
Rate	15%			

- Drag this formula down for cells C5:C7.
- Did this work? Check the formula in each cell and make sure that it always referenced cell B10.

TASK 3

- Open a new worksheet
- Set up the table like the one on the right.
- Make cells A1, B1, D2, A1:A13 bold text
- Format cells E2 and B2:B9 as currency to 2dp
- Place a thick border around cells D2:E2
- Write a formula using an absolute cell reference in Cell B2 to calculate the money earned.
- Drag this formula down for cells B3:B9.
- Check that your formula is correct.
- Write a formula in cell B10 to calculate the total amount of money in cells B2:B11 (remember to use a SUM formula)
- Write a formula in cell B11 to calculate the average of cells B2:B11
- Write a formula in cell B12 to calculate the Maximum value in cells B2:B11
- Write a formula in cell B13 to calculate the Minimum value in cells B2:B11

	A	B	C	D	E
1	Number bought	Money in			
2	2			Item cost	£5.00
3	3				
4	5				
5	2				
6	3				
7	2				
8	4				
9	4				
10	Total income				
11	Average income				
12	Highest sales				
13	Lowest sales				
14					

IF...Then Function

Some functions do not calculate *values* but instead do logical tests using logical comparisons like

= (equal to)

< (less than)

> (greater than)

or the combinations <=, >=, <>.

Such a test allows you to do one thing when the comparison is TRUE and something different when it is FALSE.

The IF function has three arguments inside parentheses (brackets) which are separated by commas:

- the comparison statement
- the cell value to use when the comparison is true
- the cell value to use when the comparison is false.

The general form of an IF function is -

=IF(logical comparison, value if TRUE, value if FALSE)

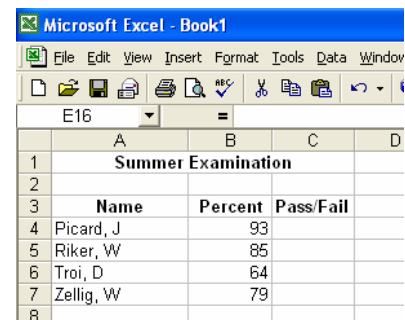
A value can be a number, text within double quotes, a cell reference, a formula, or another logical test.

This probably sounds horribly complicated - it isn't really once you have had a go at a few.

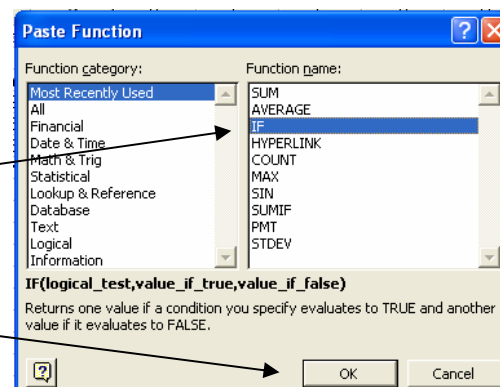
You WILL get an IF Function in your exam, so it is important that you understand them.

TASK 4

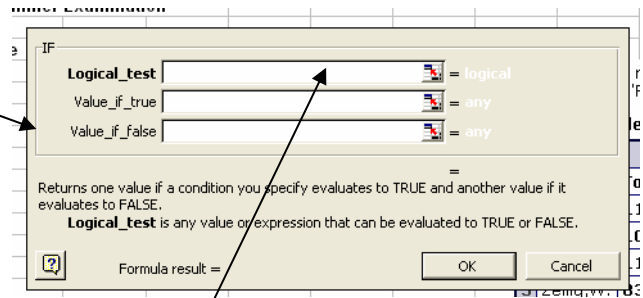
- Open up a new worksheet.
- Set up the spreadsheet on the right
- We want to know whether students have passed or failed their examination. The pass mark is 70.
- If students have passed their exam, we want 'Pass' to be placed into column C. If they have failed their exam, we want 'Fail' to display.
- Click your mouse into cell C4
- We want to use the function wizard to help us write this formula.
- Click on the f_x button to the left of the formula bar.
- This screen will appear.
- Highlight 'IF' in the left hand pane and then click 'OK'



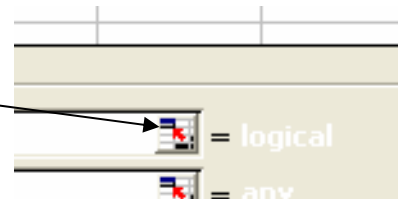
	A	B	C	D
1	Summer Examination			
2				
3	Name	Percent	Pass/Fail	
4	Picard, J	93		
5	Riker, W	85		
6	Troi, D	64		
7	Zellig, W	79		
8				



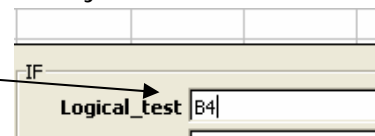
- This screen will now appear.
- There are three boxes that you need to complete.
- The first box, 'Logical test' is where you need to put the cell reference that you are looking at and the condition that you are interested in.



- In this case, we want to know if cell B3 is greater than 70.
- To fill this section in, click into the logical test box
- Then click the blue and red button to the right hand side of

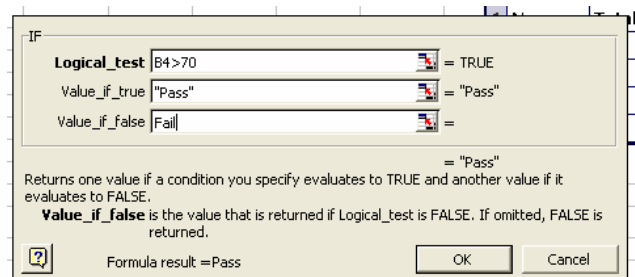


- This will allow you to click into cell B4.
- Once you have clicked into cell B4, press the return or enter key.
- You will see that B4 has appeared in the box



- Now that we have the cell we are interested in, we need to tell it what our condition is. In this case, we want to know if the result is over 70.
- We simply need to type >70 (greater than 70) next to B4 - no spaces needed.

- Once we have our Logical test in place, we simply need to tell it what we want to display if this condition is met (True) and what we want to display if this condition is not met (False).



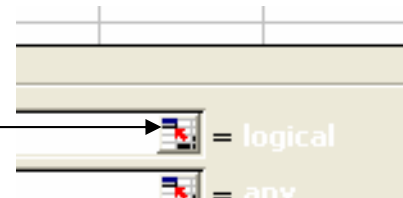
- In this case, if our condition is met (the exam mark is greater than 70), we want Pass to display, and if our condition is not met (the exam mark is less than 70), we want Fail to display.
- Fill in your box like the one shown here. You do not need to put the speech marks around the word 'Pass' - Excel will do that for you.
- When you have filled this in correctly, click 'OK' and you will see that 'Pass' has been displayed, because Picard.J did indeed get over 70 marks.
- Drag this formula down and check to see if the right pass/fail result has been displayed.

TASK 5

- Open a new worksheet
- Enter the data shown on the right.
- We have details here of five salespeople. They have a monthly sales target of £24,000.
- We need to know if they have met their sales target in cell B10.
- Because we want to include £24,000 in the test, we can't just put the symbol '>' or Joanna would be shown as not meeting her target. Thus this time, we need to use '>=' greater or equal to.

Sales Targets		
Name	Sales	Target met
David	£23,500	
John	£31,250	
Matthew	£23,160	
Joanna	£24,000	
Olivia	£19,876	
Sales Target	£24,000	

- So, click your mouse into cell C4.
- Click on the f_x button to the left of the formula bar.
- In the 'logical test' box, use the blue and red button to allow you to select cell B4 - after all, we are interested in whether David has met his sales target.



- Once you have B4 displayed in the logical test box, you need to write your condition.
- This condition needs to include >= and the cell reference which contains the sales target to be met.

- It should look something like this:
- In the 'value if true', type 'met'
- In the 'value if false' type 'not met'
- and click 'OK'.

- Drag your formula down.
- Your results should look something like this:
- Does that look right? Not really - Matthew and Olivia clearly haven't met their targets, and yet it is displaying 'Met'.
- What could have gone wrong?
- Remember the absolute cell reference from above? In this case, we are accessing one cell - B10 and then dragging the formula down. Excel is trying to be too helpful.

Sales Targets		
Name	Sales	Target met
David	£23,500	Not met
John	£31,250	Met
Matthew	£23,160	Met
Joanna	£24,000	Met
Olivia	£19,876	Met
Sales Target	£24,000	

- We need to alter our formula so that when it is dragged down, it only looks at cell B10.
- Click into cell C4.
- Go to the formula bar and put dollar signs in front of the B and the 10 (\$B\$10).
- Your formula should look like this:

- =IF(B4>=\$B\$10,"Met","Not met")

- Use autofill to drag the formula down to cells C5:C8
- Your results should now look like this:
- Check them closely - are they right? They should be now.

Sales Targets		
Name	Sales	Target met
David	£23,500	Not met
John	£24,000	Met
Matthew	£23,160	Not met
Joanna	£24,000	Met
Olivia	£19,876	Not met
Sales Target	£24,000	

OK, now it's time for you to try some IF..Then functions on your own.

TASK 6

- Open a new worksheet
- Enter the data as shown on the right.
- If an athlete jumps 70m or more, they will qualify.
- Write a function that will display 'Qualify' if they have met or exceeded the 70m requirement, or 'Not Qualify' if they have jumped below this limit.

Long jump results		
Athlete	Distance (m)	Qualify?
A	74.2	
B	72.2	
C	77.2	
D	62.4	
E	47.5	

TASK 7

- Open a new worksheet
- Enter the data as shown on the right
- Make row 3 deeper as shown.
- Wrap the text in cells A3:D3 so that it looks similar to the example.

Total number of days in school			
Pupil	Days in school	Percentage Attendance	Letter home
Jane Smith	181.0	95.26	
Peter Jackson	190.0	100	
Marie Sprake	154.0	81.05	
Alan Campbell	148.0	77.89	
	Average	88.5	

- Write a formula in cell D4 to display 'Yes' if the percentage attendance is below the 'average' in cell C9.
- Remember to use an absolute cell reference!
- Drag your formula down to cells D5:D7. Check that the results are what you expect.

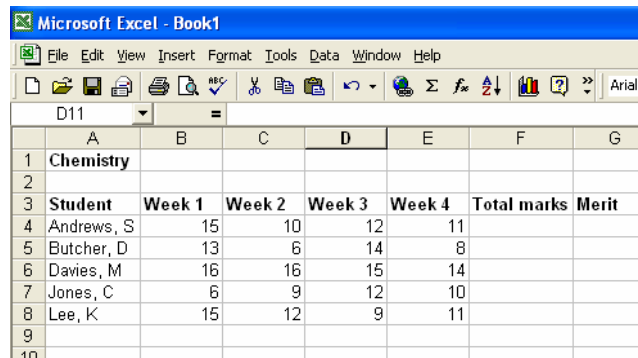
TASK 8

Open a new worksheet

Enter the data as shown on the right.

In cells F4:F8 write a formula to calculate the total marks gained over the four week period.

If a student gains over 45 total marks in a four week period, they will be given a merit slip.



The screenshot shows a Microsoft Excel spreadsheet titled 'Microsoft Excel - Book1'. The worksheet contains the following data:

	A	B	C	D	E	F	G
1	Chemistry						
2							
3	Student	Week 1	Week 2	Week 3	Week 4	Total marks	Merit
4	Andrews, S	15	10	12	11		
5	Butcher, D	13	6	14	8		
6	Davies, M	16	16	15	14		
7	Jones, C	6	9	12	10		
8	Lee, K	15	12	9	11		
9							
10							

In cell G4, write a function that will display 'merit' if the mark is 45 or more and display 'no' if they have failed to earn a merit.