

# Step by step 7.73 spreadsheet 48 exercise 2661

Think Ahead

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## Spreadsheet exercise

The purpose of the following exercise is to help you practise the common functionality which is available in the spreadsheet response area for both Applied Skills and Strategic Professional CBEs.

The exercise will take you through an example, step by step, using some of the main pieces of functionality you are likely to need in the exams. The content has been based on a basic investment appraisal calculation but it does not assume any knowledge of this topic; instead it is designed for you to practise how to use the spreadsheet response area.

#### **LEARNING OUTCOMES**

Over the course of completing this exercise, you will practise and gain skills in the following areas:

- Inputting text and carrying out basic formatting
- Formatting spreadsheets
- Inserting and applying formulae.

### Exercise

LXP Co wants to manufacture a new product, the MY10. A new machine, with a useful life of four years and a maximum output of 1,000,000 units of MY10 per year could be bought for \$800,000, payable immediately. The scrap value of the machine after four years would be \$40,000.

Forecast demand and production of MY10 over the next four years is as follows:

Year	1	2	3	4
Demand (units)	600,000	800,000	1,100,000	700,000

The selling price for MY10 is expected to be \$8.00 per unit and the variable cost of materials is \$5.00 per unit. Selling price inflation is expected to be 3% per year and material cost inflation is expected to be 4% per year.

Other variable costs of production are \$1.90 per unit. Fixed costs associated with the machine would be \$250,000 in the first year of production, increasing by \$20,000 per year in each subsequent year of operation.

LXP Co pays tax at an annual rate of 30% in the same year that the profits are earned.

LXP Co uses an after-tax weighted average cost of capital of 10% when appraising investment projects.

### Calculate the net present value of buying the new machine and advise on the acceptability of the proposed purchase.

This is a standard investment appraisal scenario and the exercise is going to use this information to build an answer using the spreadsheet functionality. To do this, you are going to follow a series of instructions to arrive at the solution. By the end of the exercise you will be more familiar with how to use the spreadsheet in Applied Skills and Strategic Professional CBEs.

#### **EXERCISE INSTRUCTIONS**

#### Step 1

Open up a spreadsheet in any blank workspace on the ACCA Practice Platform.

The question requirement will appear here.

	Format															
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4	А	В	С	D	E	F	G	н	I.	J	К	L	М	N	0	
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#### Step 2

Enter the following information in the spreadsheet by clicking on the relevant cell and typing the text as shown below. Be sure that the information is entered into the same cells as given below as this exercise will make reference to certain cells later on.



What you have now in your spreadsheet is a basic investment appraisal proforma. Lets use some of the spreadsheet functionality to improve the presentation of the proforma.

- Position the cursor between columns A and B until the left and right arrows display, then click and drag column A out to the right so that it is wide enough to include the text down the left hand side of the screen. Alternatively you can position the cursor between columns A and B until the arrows display and double click with your mouse, which will automatically resize column A to fit the longest text.
- Click and hold on column C and drag the cursor along the column headings to G. This will highlight the columns in grey. On the toolbar you can see the options available to either right-align, left-align or centre. Click on the option to centre. This will centre the text in the cells in these columns.
- Click on cell C1, hold the CTRL key on your keyboard and click on cells D1, E1, F1 and G1 (or drag your mouse over them – this is quicker) to highlight them. Once these are highlighted select 'B'<sup>1</sup> on the toolbar to bold the text. Perform the same function for cells C3 to G3.

Your spreadsheet should now look like this:

	D5													
1	A	в	С	D	E	F	G	н	1	J	К	L	М	
1			0	1	2	3	4							
2	Production units													
3			\$	\$	\$	\$	\$							
4	Sales													
5	Materials													
6	Other variable costs													
7	Fixed costs													
8														
9	Tax (30%)													
0	Investment													
1	Scrap value													
2	Net cash flow													
13	Discount factors at 10%													
4	Present value													
15														
.6	Net present value													
17	Decision													

#### Step 4

Populate the following cells with the number of units to be produced each year:

- D2 600000
- E2 800000
- F2-1100000
- G2 700000

You have two options here; when you type in the production units you can type them in using the 1000 separator (,) eg the cell D2 entry would be 600,000 or to use the functionality in the spreadsheet, click on cell D2, hold the CTRL key on your keyboard and click on cells E2, F2 and G2 (or drag your mouse over them). Once these are highlighted, right click with your mouse and select the option to Format Cells. This brings up a new window which has three tabs – Number, Alignment and Border. Ensure you are on the Number tab, select Number from the category list and click the check box for the 1000 separator. Click Apply, then OK.

An alternative option to format the cells would be to click on cell D2, hold the CTRL key on your keyboard and click on cells E2, F2 and G2 (or drag your mouse over them). Once these are highlighted select the '.00' <sup>2</sup> option from the toolbar, select Custom from the list and this will bring up the same window including the tabs Number, Alignment and Border. The approach is then the same.

KEY		
1 <b>B</b>	2 .00	

Click on cell D4. You are going to insert a formula to calculate the revenue to be earned in Year 1. Revenue will be calculated by taking the production units and multiplying that by the selling price of \$8 and then multiplying by 1.03 to add in the 3% inflation rate. To do this insert the sign '=', click on cell D2 to select it (this cell contains the production units), insert the sign \* (this denotes multiply), type in 8, insert the sign \* and type in 1.03. There should be no spaces between any entries in a formula.

It should look like this =D2\*8\*1.03 and hit Enter.

#### Step 6

Click on cell E4. You are going to insert a formula to calculate the revenue to be earned in Year 2. Revenue will be calculated in the same basic way as Step 5, however two years worth of inflation will apply in Year 2.

There are three ways to do this:

- Option 1 insert the sign =, click on cell E2 to select it, insert the sign \*, type in 8, insert the sign \*, type in 1.03, insert the sign \*, type in 1.03 again. It should look like this =E2\*8\*1.03\*1.03 and hit Enter.
- Option 2 insert the sign = , click on cell E2 to select it, insert the sign \*, type in 8, insert the sign \*, type in the words POWER(1.03,2). It should look like this =E2\*8\*POWER(1.03,2) and hit Enter. This has used the POWER formula to apply the 3% inflation twice. (NB: You could have used the POWER formula in Step 5 and the formula would have looked like this =D2\*8\*POWER(1.03,1)).
- Option 3 insert the sign =, click on cell E2 to select it, insert the sign \*, type in 8, insert the sign \*, type in 1.03, insert the sign ^, type in 2 to denote 1.03 squared. It should look like this =E2\*8\*1.03^2 and hit Enter.

#### Step 7

Click on cell E4, right click with your mouse and select Copy from the list. Click on cell F4, select Paste Special from the list and check the Formulas box. This will copy the formula from E4 into F4. If you have used Option 1 in Step 6 add in another \*1.03 at the end of the formula in cell F4 to denote 3 years worth of inflation applying. If you have used Option 2 in Step 7, change the 2 in the brackets to a 3. If you have used Option 3 in Step 7, change the 2 after the ^ to a 3. Perform the same exercise for cell G4 remembering that 4 years worth of inflation will apply here.

An alternative option for copying and pasting functionality is to use the buttons<sup>3</sup> in the toolbar.

#### Step 8

Click on cell D4, hold the CTRL key on your keyboard and click on cells E4, F4 and G4 (or drag your mouse over them) to highlight them. Using the directions in Step 5 format the cells. Select the tab Number, insert 0 into the Decimal Places field and check 1000 separator. You also want to be able to indicate negative figures or outflows so to do this select from the list which Negative Style option you want to choose. For the purposes of this exercise lets pick the option (1,234) in which the text remains black rather than changes to red. Click Apply then OK.

#### Step 9

The next three lines are for costs. The first thing we are going to do is format the cells in each row. Click on cell D5, hold the CTRL key on your keyboard and click on cells E5, F5 and G5 (or drag your mouse over them) to highlight them. Using the directions in Step 9 to format the cells. Repeat the same process for rows 6 and 7.



In row 5 for material costs follow the formula approach used for revenue in Steps 6 and 7 but when inserting the formula put in a – sign after the =; for example in cell D5 the formula can either be =-D2\*5\*1.04 or =-D2\*5\*POWER(1.04,1) or =-D2\*5\*1.04^1. Including the – sign in the formula will show these costs in brackets as negative figures/outflows. Remember the material cost per unit is \$5 and the inflation rate that applies to materials is 4%.

Extend the width of columns B to G using the process described in Step 4 to enable all the text to be seen.

Your spreadsheet should now look like this:

	G5 =	-G2*5*PO	WER(1.04,4)									
/	A	в	с	D	E	F	G	Н	1	J	К	
1			0	1	2	3	4		-			
2	Production units			600,000	800,000	1,100,000	700,000					-
3			\$	\$	\$	\$	\$					
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849					
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)					
6	Other variable costs											
7	Fixed costs											
8												
9	Tax (30%)											
10	Investment											
11	Scrap value											
12	Net cash flow											
13	Discount factors at 10%											
14	Present value											
5												
16	Net present value											
10	Decision											

#### Step 11

Repeat Step 11 for other variable costs. The other variable costs are \$1.90 per unit and no inflation applies to these. These will require a simple formula in cell D6 to multiply the production units by \$1.90 which can then be copied and pasted into cells E6 to G6. Remember to insert the – sign after the = sign when creating the formula.

#### Step 12

Populate the following cells with the specific fixed costs to be incurred each year:

- D7 -250000
- E7 -270000
- F7 -290000
- G7 -310000

Your spreadsheet should now look like this:

	G8											
1	A	В	С	D	E	F	G	н	I	J	К	
1			0	1	2	3	4					
2	Production units			600,000	800,000	1,100,000	700,000					
3			\$	\$	\$	\$	\$					
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849					
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)					
6	Other variable costs			(1,140,000)	(1,520,000)	(2,090,000)	(1,330,000)					
7	Fixed costs			(250,000)	(270,000)	(290,000)	(310,000)					
8												
9	Tax (30%)											
10	Investment											
11	Scrap value											
12	Net cash flow											
13	Discount factors at 10%											
14	Present value											
15												
16	Net present value											
17	Decision											

Click on cell D8 in order to total the figures in cells D4 to D7. There is no AutoSum function so to do this enter the = sign, type in SUM, open brackets, click on cell D4, hover over the right hand corner of the cell until the cursor turns into a double ended arrow and drag down to cell D7. Hit Enter.

Alternatively enter the = sign, type in SUM, open brackets, click and hold on cell D4, drag down to cell D7 and release the hold. Hit Enter.

It should look like this:

	D8 =5	SUM(D4:D	7									
1	A	В	С	D	E	F	G	н	I	J	К	
1			0	1	2	3	4					
2	Production units			600,000	800,000	1,100,000	700,000					
3			\$	\$	\$	\$	\$					
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849					
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)					
6	Other variable costs			(1,140,000)	(1,520,000)	(2,090,000)	(1,330,000)					
7	Fixed costs			(250,000)	(270,000)	(290,000)	(310,000)					
8				=SUM(D4:D7								
9	Tax (30%)											
10	Investment											
11	Scrap value											
12	Net cash flow											
13	Discount factors at 10%											
14	Present value											
15												
16	Net present value											
17	Decision											

#### Step 14

Copy and paste the formula from cell D8 into cells E8 to G8. Apply the formatting as directed from Step 9.

Click on cell D8, hold the CTRL key on your keyboard and click on cells E8 to G8 (or drag your mouse over them) to highlight them. Once these are highlighted select 'B' <sup>4</sup> on the toolbar to bold the text. This will indicate that it is a total.

#### Step 15

The next row requires you to insert a formula to deduct 30% for tax purposes. Apply the formatting as directed from Step 9.

In cell D9 enter the = sign, enter in a – sign, click on cell D8, insert the sign \* and insert 0.3. The formula should look like this: =-D8\*0.3

Copy and paste the formula from cell D9 into cells E9 to G9.

#### Step 16

Format cell C10 as in Step 9. Insert -800000 into this cell.

#### Step 17

Format cell G11 as in Step 9. Insert 40000 into this cell.

#### Step 18

Click on cell C12 in order to total the figures in cells C8 to C11. Follow the instructions in Step 14 to do this.



Copy and paste the formula from cell C12 into cells D12 to G12. Apply the formatting as directed from Step 9.

Click on cell C12, hold the CTRL key on your keyboard and click on cells D12 to G12 (or drag your mouse over them) to highlight them. Once these are highlighted select 'B' <sup>5</sup> on the toolbar to bold the text. This will indicate that it is a total.

Your spreadsheet should now look like this:

	F15											
1	A	В	С	D	E	F	G	н	1	J	К	
1			0	1	2	3	4					
2	Production units			600,000	800,000	1,100,000	700,000					
3			\$	\$	\$	\$	\$					
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849					
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)					
6	Other variable costs			(1,140,000)	(1,520,000)	(2,090,000)	(1,330,000)					
7	Fixed costs			(250,000)	(270,000)	(290,000)	(310,000)					
8				434,000	673,360	1,049,246	568,344					
9	Tax (30%)			(130,200)	(202,008)	(314,774)	(170,503)					
10	Investment		(800,000)									
11	Scrap value						40,000					
12	Net cash flow		(800,000)	303,800	471,352	734,472	437,841					
13	Discount factors at 10%											
14	Present value											
15												
16	Net present value											
17	Decision											

#### Step 20

Populate the following cells with the discount factors at 10% to be applied each year:

- C13-1
- D13-0.909
- E13 0.826
- F13 0.751
- G13-0.683

The discount factors should be shown to three decimal places. The spreadsheet should accept this format, however to practise how to apply this formatting; highlight cells D13 to G13, right click with your mouse and select the option to Format Cells. Select the Number tab, select Number from the catergory list and change the number of decimal places to 3. Click Apply, then OK.

#### Step 21

The next row requires you to insert a formula to apply the discount factors to the net cash flows. In cell C14 insert the = sign, click on cell C12, insert \* and click on cell C13. The formula should look like this: =-C12\*C13

Copy and paste the formula from cell C14 into cells D14 to G14.

Apply the formatting as directed from Step 9.



Click on cell B16 to insert a formula to calculate the net present value. The net present value is the total of cells C14 to G14. Follow the instructions in Step 14 to do this except remember you are adding along a row of cells and not down a column of cells.

Apply the formatting as directed from Step 9.

Your spreadsheet should now look like this:

	E16										
7	Α	В	С	D	E	F	G	н	I	J	К
1			0	1	2	3	4				
2	Production units			600,000	800,000	1,100,000	700,000				
3			\$	\$	\$	\$	\$				
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849				
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)				
6	Other variable costs			(1,140,000)	(1,520,000)	(2,090,000)	(1,330,000)				
7	Fixed costs			(250,000)	(270,000)	(290,000)	(310,000)				
8				434,000	673,360	1,049,246	568,344				
9	Tax (30%)			(130,200)	(202,008)	(314,774)	(170,503)				
10	Investment		(800,000)								
11	Scrap value						40,000				
12	Net cash flow		(800,000)	303,800	471,352	734,472	437,841				
13	Discount factors at 10%		1	0.909	0.826	0.751	0.683				
14	Present value		(800,000)	276,154	389,337	551,588	299,045				
15											
	Net present value	716,125				1					

#### Step 23

All investment appraisal questions should conclude with a decision. You could be expected to type a short written answer into a spreadsheet response area.

Click on cell B17 and type – The net present value is positive and therefore the investment should be accepted.

Your final spreadsheet should look like this:

	B17 T	he net preser	nt value is posit	ive and therefor	re the investmer	nt should be acc	cepted.				
1	A	В	С	D	E	F	G	н	1	J	K
1			0	1	2	3	4				
2	Production units			600,000	800,000	1,100,000	700,000				
3			\$	\$	\$	\$	\$				
4	Sales			4,944,000	6,789,760	9,615,998	6,302,849				
5	Materials			(3,120,000)	(4,326,400)	(6,186,752)	(4,094,505)				
6	Other variable costs			(1,140,000)	(1,520,000)	(2,090,000)	(1,330,000)				
7	Fixed costs			(250,000)	(270,000)	(290,000)	(310,000)				
8				434,000	673,360	1,049,246	568,344				
9	Tax (30%)			(130,200)	(202,008)	(314,774)	(170,503)				
10	Investment		(800,000)								
11	Scrap value						40,000				
12	Net cash flow		(800,000)	303,800	471,352	734,472	437,841				
13	Discount factors at 10%		1	0.909	0.826	0.751	0.683				
14	Present value		(800,000)	276,154	389,337	551,588	299,045				
15											
16	Net present value	716,125									

### Further advice

To build your confidence when using the spreadsheet answer spaces, you should take every chance to use them as you prepare for your exams. Please use the ACCA Practice Platform, where you can access both specimens and past exams. You will also find blank workspaces available, where you can practise additional questions from any printed materials you may have. This will help you to become very familiar with the functionality illustrated in this exercise. Going into your exam with the experience of using the tools available to answer questions will build your confidence and you will be able to utilise all this functionality to produce your answers efficiently.

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Think Ahead