

Relevant costing

Q1. John Robertson, a self employed builder, has been asked to provide a fixed price quotation for some building work required by a customer. Robertson's accountant has compiled the following figures, together with some notes as a basis for a quotation.

£

Direct materials:

Bricks

200,000 at £100 per thousand	20,000	note 1
200,000 at £120 per thousand	24,000	
Other materials	5,000	note 2

Direct labour:

Skilled 3,200 hours at £12 per hour	38,400	note 3
Unskilled 2,000 hours at £6 per hour	12,000	note 4

Other costs:

Scaffolding hire	3,500	note 5
Depreciation of general purpose machinery	2,000	note 6
General overheads 5,200 hours at £1 per hour	5,200	note 7
Plans	<u>2,000</u>	note 8
Total cost	112,100	
Profit	<u>22,420</u>	note 9
Suggested price	<u>£134,520</u>	

Notes

1. The contract requires 400,000 bricks, 200,000 are already in stock and 200,000 will have to be bought in. This is a standard type of brick regularly used by Robertson. The 200,000 in stock were purchased earlier in the year at £100 per 1,000. The current replacement cost of this type of brick is £120 per 1,000. If the bricks in stock are not used on this job John is confident that he will be able to use them later in the year.

2. Other materials will be bought in as required; this figure represents the purchase price.

3. Robertson will need to be on site whilst the building work is performed. He therefore intends to do 800 hours of the skilled work himself. The remainder will be hired on an hourly basis. The current cost of skilled workers is £12 per hour. If John Robertson does not undertake the building work for this customer he can either work as a skilled worker for other builders at a rate of £12 per hour or spend the 800 hours completing urgently needed repairs to his own house. He has recently had a quotation of £12,000 for labour to repair his home.

4. John employs four unskilled workers on contracts guaranteeing them a 40 hour week at £6 per hour. These unskilled labourers are currently idle and would have sufficient spare time to complete the proposal under consideration.

5. This is the estimated cost of hiring scaffolding.

6. John estimates that the project will take 20 weeks to complete. This represents 20 weeks' straight line depreciation on equipment used. If the equipment is not used on this job it will stand idle for the 20 week period. In either case its value at the end of the 20 week period will be identical.

7. This represents the rental cost of John's storage yard. If he does not undertake the above job he can rent his yard out to a competitor who will pay him rent of £500 per week for the 20 week period.

8. This is the cost of the plans that John has already had drawn for the project.

9. John attempts to earn a mark up of 20% on cost on all work undertaken.

John is surprised at the suggested price and considers it rather high. He knows that there will be a lot of competition for the work.

Required:

Using relevant costing principles, calculate the lowest price that John could quote for the customer's building work. Explain your treatment of each item in the accountant's estimate.

TRY IT AT YOUR OWN

Q2. The Telephone Co (T Co) is a company specialising in the provision of telephone systems for commercial clients. There are two parts to the business:

- installing telephone systems in businesses, either first time installations or replacement installations;
- supporting the telephone systems with annually renewable maintenance contracts.

T Co has been approached by a potential customer, Push Co, who wants to install a telephone system in new offices it is opening. Whilst the job is not a particularly large one, T Co is hopeful of future business in the form of replacement systems and support contracts for Push Co. T Co is therefore keen to quote a competitive price for the job. The following information should be considered:

1. One of the company's salesmen has already been to visit Push Co, to give them a demonstration of the new system, together with a complimentary lunch, the costs of which totalled \$400.

2. The installation is expected to take one week to complete and would require three engineers, each of whom is paid a monthly salary of \$4,000. The engineers have just had their annually renewable contract renewed with T Co. One of the three engineers has spare capacity to complete the work, but the other two would have to be moved from contract X in order to complete this one. Contract X generates a contribution of \$5 per engineer hour. There are no other engineers available to continue with Contract X if these two engineers are taken off the job.

It would mean that T Co would miss its contractual completion deadline on Contract X by one week. As a result, T Co would have to pay a one-off penalty of \$500. Since there is no other work scheduled for their engineers in one week's time, it will not be a problem for them to complete Contract X at this point.

3. T Co's technical advisor would also need to dedicate eight hours of his time to the job. He is working at full capacity, so he would have to work overtime in order to do this. He is paid an hourly rate of \$40 and is paid for all overtime at a premium of 50% above his usual hourly rate.

4. Two visits would need to be made by the site inspector to approve the completed work. He is an independent contractor who is not employed by T Co, and charges Push Co directly for the work. His cost is \$200 for each visit made.

5. T Co's system trainer would need to spend one day at Push Co delivering training. He is paid a monthly salary of \$1,500 but also receives commission of \$125 for each day spent delivering training at a client's site.

6. 120 telephone handsets would need to be supplied to Push Co. The current cost of these is \$18.20 each, although T Co already has 80 handsets in inventory. These were bought at a price of \$16.80 each. The handsets are the most popular model on the market and frequently requested by T Co's customers.

7. Push Co would also need a computerised control system called 'Swipe 2'. The current market price of Swipe 2 is \$10,800, although T Co has an older version of the system, 'Swipe 1', in inventory, which could be modified at a cost of \$4,600. T Co paid \$5,400 for Swipe 1 when it ordered it in error two months ago and has no other use for it. The current market price of Swipe 1 is \$5,450, although if T Co tried to sell the one they have, it would be deemed to be 'used' and therefore only worth \$3,000.

8. 1,000 metres of cable would be required to wire up the system. The cable is used frequently by T Co and it has 200 metres in inventory, which cost \$1.20 per metre. The current market price for the cable is \$1.30 per metre.

9. You should assume that there are four weeks in each month and that the standard working week is 40 hours long.

Required:

(a) Prepare a cost statement, using relevant costing principles, showing the minimum cost that T Co should charge for the contract. Make DETAILED notes showing how each cost has been arrived at and EXPLAINING why each of the costs above has been included or excluded from your cost statement. (14 marks)

(b) Explain the relevant costing principles used in part (a) and explain the implications of the minimum price that has been calculated in relation to the final price agreed with Push Co.

(6 marks)

(20 marks)

Q3. A company manufactures and sells a wide range of products. The products are manufactured in various locations and sold in a number of quite separate markets. The company's operations are organised into five divisions which may supply each other as well as selling on the open market. The following financial information is available concerning the company for the year just ended:

	(£000)
Sales	8,600
Production cost of sales	5,332
Gross profit	3,268
Other expenses	<u>2,532</u>
Net profit	<u>736</u>

An offer to purchase Division 5, which has been performing poorly, has been received by the company. The gross profit percentage of sales, earned by Division 5 in the year, was half that earned by the company as whole. Division 5 sales were 10% of total company sales. Of the production expenses incurred by Division 5, fixed costs were £316,000. Other expenses (i.e. other than production expenses) incurred by the division totalled £156,000, all of which can be regarded as fixed. These include £38,000 apportionment of general company expenses which would not be affected by the decision concerning the possible sale of Division 5.

In the year ahead, if Division 5 is not sold, fixed costs of the division would be expected to increase by 5% and variable costs to remain at the same percentage of sales. Sales would be expected to increase by 10%.

If the division is sold, it is expected that some sales of other divisions would be lost. These would provide a contribution to profits of £20 000 in the year ahead. Also, if the division is sold, the capital sum received could be invested so as to yield a return of £75,000 in the year ahead.

Required:

(a) Calculate whether it would be in the best interests of the company, based upon the expected situation in the year ahead, to sell Division 5. (13 marks)

(b) Discuss other factors that you feel should influence the decision. (7 marks)

(c) Calculate the **percentage increase** in Division 5 sales required in the year ahead (compared with the current year) for the financial viability of the two alternatives to be the same. (You are to assume that all other factors in the above situation will remain as forecast for the year ahead.) (5 marks)

Q4. Bits and Pieces (B&P) operates a retail store selling spares and accessories for the car market. The store has previously only opened for six days per week for the 50 working weeks in the year, but B&P is now considering also opening on Sundays.

The sales of the business on Monday through to Saturday averages at \$10,000 per day with average gross profit of 70% earned.

B&P expects that the gross profit % earned on a Sunday will be 20 percentage points lower than the average earned on the other days in the week. This is because they plan to offer substantial discounts and promotions on a Sunday to attract customers. Given the price reduction, Sunday sales revenues are expected to be 60% *more than* the average daily sales revenues for the other days. These Sunday sales estimates are for new customers only, with no allowance being made for those customers that may transfer from other days.

B&P buys all its goods from one supplier. This supplier gives a 5% discount on *all* purchases if annual spend exceeds \$1,000,000.

It has been agreed to pay time and a half to sales assistants that work on Sundays. The normal hourly rate is \$20 per hour. In total five sales assistants will be needed for the six hours that the store will be open on a Sunday. They will also be able to take a half-day off (four hours) during the week.

The staff will have to be supervised by a manager, currently employed by the company and paid an annual salary of \$80,000. If he works on a Sunday he will take the equivalent time off during the week when the assistant manager is available to cover for him at no extra cost to B&P. He will also be paid a bonus of 1% of the extra sales generated on the Sunday project.

The store will have to be lit at a cost of \$30 per hour and heated at a cost of \$45 per hour. The heating will come on two hours before the store opens in the 25 'winter' weeks to make sure it is warm enough for customers to come in at opening time. The store is not heated in the other weeks.

The rent of the store amounts to \$420,000 per annum.

Required:

(a) Calculate whether the Sunday opening incremental revenue exceeds the incremental costs over a year (ignore inventory movements) and on this basis reach a conclusion as to whether Sunday opening is financially justifiable. (12 marks)

(b) Discuss whether the manager's pay deal (time off and bonus) is likely to motivate him. (4 marks)

Q5. Relco plc is a construction company which has been asked to submit a tender to build a new hotel for a well-known national hotels group based in the UK. The special fiction for the hotel is as follows.

Six floors including ground floor reception and meeting rooms. Seventy bedrooms all of similar layout and size.

A team of 100 construction workers are expected to be required to complete the project in the 18 months allowed by the specification of the project.

These workers would be sourced as follows.

Newly recruited: 50 workers, annual wages: £25,000

Currently employed by Relco plc but not being used on any construction projects: 35 workers, annual wages: £28,000 per annum.

Currently employed, by Relco plc on another project building a new shopping centre: 15 workers, annual wages: 30000 per annum. These workers would be transferred to the hotel project but this will delay the completion of shopping centre. Relco plc expects that this delay will cause them to have to suffer a penalty of £1.5 million for going beyond the agreed completion date, as well as additional labour cost of £300,000.

Materials are expected to cost £2.1 million and will be purchased from the company's usual suppliers if the tender is awarded to Relco plc. Suppliers typically offer 10% discount trade discount to Relco plc.

Specialist equipment such as lifting gear, cement mixers and so on will be required.

Some equipment which is already owned by Relco plc and has a net book value of £500,000 would be used. The company's depreciation policy for equipment is 25% on a reducing balance method. This equipment is not expected to be required on other projects throughout the next 18 months and beyond. It could now be sold £600,000. Other equipment will have to be hired at a hire cost of £30,000 per month.

The roof of the hotel included in the specification must be strong enough to support the weight of helicopter as planning permission has already been given for a helipad on top of the building. The materials required for the roof have not been included in the cost set out above. The only viable source material is a company Helimats based in Germany who would charge around €600,000.

The exchange rate between the euro and sterling is currently £1= €1.40

The company adds 35% mark up on relevant cost to arrive at the tender price.

Required: -

Estimate the tender price for the hotel with explanatory notes setting out the reasoning behind numbers used.

Q6. Sniff Co manufactures and sells its standard perfume by blending a secret formula of aromatic oils with diluted alcohol. The oils are produced by another company following a lengthy process and are very expensive. The standard perfume is highly branded and successfully sold at a price of \$39.98 per 100 millilitres (ml).

Sniff Co is considering processing some of the perfume further by adding a hormone to appeal to members of the opposite sex. The hormone to be added will be different for the male and female perfumes. Adding hormones to perfumes is not universally accepted as a good idea as some people have health concerns. On the other hand, market research carried out suggests that a premium could be charged for perfume that can 'promise' the attraction of a suitor. The market research has cost \$3,000.

Data has been prepared for the costs and revenues expected for the following month (a test month) assuming that a part of the company's output will be further processed by adding the hormones.

The output selected for further processing is 1,000 litres, about a tenth of the company's normal monthly output. Of this, 99% is made up of diluted alcohol which costs \$20 per litre. The rest is a blend of aromatic oils costing \$18,000 per litre. The labour required to produce 1,000 litres of the basic perfume before any further processing is 2,000 hours at a cost of \$15 per hour.

Of the output selected for further processing, 200 litres (20%) will be for male customers and 2 litres of hormone costing \$7,750 per litre will then be added. The remaining 800 litres (80%) will be for female customers and 8 litres of hormone will be added, costing \$12,000 per litre. In both cases the adding of the hormone adds to the overall volume of the product as there is no resulting processing loss.

Sniff Co has sufficient existing machinery to carry out the test processing.

The new processes will be supervised by one of the more experienced supervisors currently employed by Sniff Co.

His current annual salary is \$35,000 and it is expected that he will spend 10% of his time working on the hormone adding process during the test month. This will be split evenly between the male and female versions of the product.

Extra labour will be required to further process the perfume, with an extra 500 hours for the male version and 700 extra hours for the female version of the hormone-added product. Labour is currently fully employed, making the standard product. New labour with the required skills will not be available at short notice.

Sniff Co allocates fixed overhead at the rate of \$25 per labour hour to all products for the purposes of reporting profits. The sales prices that could be achieved as a one-off monthly promotion are:

- Male version: \$75.00 per 100 ml
- Female version: \$59.50 per 100 ml

Required:

(a) Outline the financial and other factors that Sniff Co should consider when making a further processing decision. (4 marks)

(b) Evaluate whether Sniff Co should experiment with the hormone adding process using the data provided. Provide a separate assessment and conclusion for the male and the female versions of the product. (15 marks)

(c) Calculate the selling price per 100 ml for the female version of the product that would ensure further processing would break even in the test month. (2 marks)

Q7. Stay Clean manufactures and sells a small range of kitchen equipment. Specifically the product range contains a dishwasher (DW), a washing machine (WM) and a tumble dryer (TD). The TD is of a rather old design and has for some time generated negative contribution. It is widely expected that in one year's time the market for this design of TD will cease, as people switch to a washing machine that can also dry clothes after the washing cycle has completed.

Stay Clean is trying to decide whether or not to cease the production of TD now *or* in 12 months' time when the new combined washing machine/drier will be ready. To help with this decision the following information has been provided:

1. The normal selling prices, annual sales volumes and total variable costs for the three products are as follows:

	DW	WM	TD
Selling price per unit	\$200	\$350	\$80
Material cost per unit	\$70	\$100	\$50
Labour cost per unit	\$50	\$80	\$40
Contribution per unit	\$80	\$170	-\$10
Annual sales	5,000 units	6,000 units	1,200 units

2. It is thought that some of the customers that buy a TD also buy a DW and a WM. It is estimated that 5% of the sales of WM and DW will be lost if the TD ceases to be produced.

3. All the direct labour force currently working on the TD will be made redundant immediately if TD is ceased now. This would cost \$6,000 in redundancy payments. If Stay Clean waited for 12 months the existing labour force would be retained and retrained at a cost of \$3,500 to enable them to produce the new washing/drying product.

Recruitment and training costs of labour in 12 months' time would be \$1,200 in the event that redundancy takes place now.

4. Stay Clean operates a just in time (JIT) policy and so all material cost would be saved on the TD for 12 months if TD production ceased now. Equally, the material costs relating to the lost sales on the WM and the DW would also be saved. However, the material supplier has a volume based discount scheme in place as follows:

Total annual expenditure (\$)	Discount
0-600,000	0%
600,001-800,000	1%
800,001-900,000	2%
900,001-960,000	3%
960,001 and above	5%

Stay Clean uses this supplier for all its materials for all the products it manufactures. The figures given above in the cost per unit table for material cost per unit are net of any discount Stay Clean already qualifies for.

5. The space in the factory currently used for the TD will be sublet for 12 months on a short-term lease contract if production of TD stops now. The income from that contract will be \$12,000.

6. The supervisor (currently classed as an overhead) supervises the production of all three products spending approximately 20% of his time on the TD production. He would continue to be fully employed if the TD ceases to be produced now.

Required:

(a) Calculate whether or not it is worthwhile ceasing to produce the TD now rather than waiting 12 months (ignore any adjustment to allow for the time value of money). (13 marks)

(b) Explain two pricing strategies that could be used to improve the financial position of the business in the next 12 months assuming that the TD continues to be made in that period. (4 marks)

Q8. The Hi Life Co (HL Co) makes sofas. It has recently received a request from a customer to provide a one-off order of sofas, in excess of normal budgeted production. The order would need to be completed within two weeks. The following cost estimate has already been prepared:

Direct materials:		Note	\$
Fabric	200 m ² at \$17 per m ²	1	3,400
Wood	50 m ² at \$8.20 per m ²	2	410
Direct labour:			
Skilled	200 hours at \$16 per hour	3	3,200
Semi-skilled	300 hours at \$12 per hour	4	3,600
Factory overheads	500 hours at \$3 per hour	5	1,500

Total production cost			12,110
Administration overheads at 10% of total production cost		6	1,211

Notes

1 The fabric is regularly used by HL Co. There are currently 300 m² in inventory, which cost \$17 per m². The current purchase price of the fabric is \$17.50 per m².

2 This type of wood is regularly used by HL Co and usually costs \$8.20 per m². However, the company's current supplier's earliest delivery time for the wood is in three weeks' time. An alternative supplier could deliver immediately but they would charge \$8.50 per m². HL Co already has 500 m² in inventory but 480 m² of this is needed to complete other existing orders in the next two weeks. The remaining 20 m² is not going to be needed until four weeks' time.

3 The skilled labour force is employed under permanent contracts of employment under which they must be paid for 40 hours' per week's labour, even if their time is idle due to absence of orders. Their rate of pay is \$16 per hour, although any overtime is paid at time and a half. In the next two weeks, there is spare capacity of 150 labour hours.

4 There is no spare capacity for semi-skilled workers. They are currently paid \$12 per hour or time and a half for overtime. However, a local agency can provide additional semi-skilled workers for \$14 per hour.

5 The \$3 absorption rate is HL Co's standard factory overhead absorption rate; \$1.50 per hour reflects the cost of the factory supervisor's salary and the other \$1.50 per hour reflects general factory costs. The supervisor is paid an annual salary and is also paid \$15 per hour for any overtime he works. He will need to work 20 hours' overtime if this order is accepted.

6 This is an apportionment of the general administration overheads incurred by HL Co.

Required:

Prepare, on a relevant cost basis, the lowest cost estimate which could be used as the basis for the quotation.

Explain briefly your reasons for including or excluding each of the costs in your estimate.

(10 marks)

Q9.

Process Co has two divisions, A and B. Division A produces three types of chemicals: products L, M and S, using a common process. Each of the products can either be sold by Division A to the external market at split-off point (after the common process is complete) or can be transferred to Division B for individual further processing into products LX, MX and SX.

In November 2013, which is a typical month, Division A's output was as follows:

Product	Kg
L	1,200
M	1,400
S	1,800

The market selling prices per kg for the products, both at split-off point and after further processing, are as follows:

	\$		\$
L	5.60	LX	6.70
M	6.50	MX	7.90
S	6.10	SX	6.80

The specific costs for each of the individual further processes are:

\$
Variable cost of \$0.50 per kg of LX
Variable cost of \$0.70 per kg of MX
Variable cost of \$0.80 per kg of SX

Further processing leads to a normal loss of 5% at the beginning of the process for each of the products being processed.

Required:

- (a) Calculate and conclude whether any of the products should be further processed in Division B in order to optimise the profit for the company as a whole. (10 marks)

Q10. DLW is a company that builds innovative, environmentally friendly housing. DLW's houses use high quality materials and the unique patented energy saving technology used in the houses has been the result of the company's own extensive research in the area.

DLW is planning to expand into another country and has been asked by a prominent person in that country for a price quotation to build them a house. The Board of Directors believes that securing the contract will help to launch their houses in the country and have agreed to quote a price for the house that will exactly cover its relevant cost.

The following information has been obtained in relation to the contract:

1. The Chief Executive and Marketing Director recently met with the potential client to discuss the house. The meeting was held at a restaurant and DLW provided food and drinks at a cost of \$375.
2. 1,200 kg of Material Z will be required for the house. DLW currently has 550 kg of Material Z in its inventory purchased at a price of \$58 per kg. Material Z is regularly used by DLW in its houses and has a current replacement cost of \$65 per kg. The resale value of the Material Z in inventory is \$35 per kg.
3. 400 hours of construction worker time are required to build the house. DLW's construction workers are paid an hourly rate of \$22 under a guaranteed wage agreement and currently have spare capacity to build the house.
4. The house will require 90 hours of engineer time. DLW engineers are paid a monthly salary of \$4,750 each and do not have any spare capacity. In order to meet the engineering requirement for the house, DLW can choose one of two options:
 - i. Pay the engineers an overtime rate of \$52 per hour to perform the additional work.
 - ii. Reduce the number of engineers' hours available for their existing job, the building of Product Y. This would result in lost sales of Product Y.

Summary details of the existing job the engineers are working on:

Information for one unit of Product Y

Sales revenue	\$4,860
Variable costs	\$3,365
Engineers' time required per unit	30 hours

5. A specialist machine would be required for 7 weeks for the house build. DLW have 4 weeks remaining on the 15 week specialist machine rental contract that cost \$15,000. The machine is currently not in use. The machine can be rented for an additional 15 weeks at a cost of \$15,250. The specialist machine can only be rented in blocks of 15 weeks.

Alternatively, a machine can be purchased for \$160,000 and sold after the work on the house has been completed for \$140,000.

6. The windows required for the house have recently been developed by DLW and use the latest environmentally friendly insulating material. DLW produced the windows at a cost of \$34,950 and they are currently the only ones of their type. DLW were planning to exhibit the windows at a house building conference. The windows would only be used for display purposes at the conference and would not be for sale to prospective clients.

DLW has had assurances from three separate clients that they would place an order for 25 windows each if they saw the technology demonstrated at the conference. The contribution from each window is \$10,450. If the windows are used for the contract, DLW would not be able to attend the conference. The conference organisers will charge a penalty fee of \$1,500 for non-attendance by DLW. The Chief Executive of DLW can meet the clients directly and still secure the orders for the windows. The meetings would require two days of the Chief Executive's time. The Chief Executive is paid an annual salary of \$414,000 and contracted to work 260 days per year.

7. The house build requires 400kg of other materials. DLW currently has none of these materials in its inventory. The total current purchase price for these other materials is \$6,000.

8. DLW's fixed overhead absorption rate is \$37 per construction worker hour.

9. DLW's normal policy is to add a 12% mark-up to the cost of each house.

Required:

(a) Produce a schedule that shows the minimum price that could be quoted for the contract to build the house.

Your schedule should show the relevant cost of each of the nine items identified above. You should also explain each relevant cost value you have included in your schedule and why any values you have excluded are not relevant.

(17 marks)

(b) Explain TWO reasons why relevant costing may not be a suitable approach to pricing houses in the longer term for DLW.

(4 marks)