

Q1. Standard Costing

ALL FOUR questions are compulsory and MUST be attempted

- 1 Chaff Co processes and sells brown rice. It buys unprocessed rice seeds and then, using a relatively simple process, removes the outer husk of the rice to produce the brown rice. This means that there is substantial loss of weight in the process. The market for the purchase of seeds and the sales of brown rice has been, and is expected to be, stable. Chaff Co uses a variance analysis system to monitor its performance.

There has been some concern about the interpretation of the variances that have been calculated in month 1.

1. The purchasing manager is adamant, despite criticism from the production director, that he has purchased wisely and saved the company thousands of dollars in purchase costs by buying the required quantity of cheaper seeds from a new supplier.
2. The production director is upset at being criticised for increasing the wage rates for month 1; he feels the decision was the right one, considering all the implications of the increase. Morale was poor and he felt he had to do something about it.
3. The maintenance manager feels that saving \$8,000 on fixed overhead has helped the profitability of the business. He argues that the machines' annual maintenance can wait for another month without a problem as the machines have been running well.

The variances for month 1 are as follows:

	\$
Material price	48,000 (Fav)
Material usage	52,000 (Adv)
Labour rate	15,000 (Adv)
Labour efficiency	18,000 (Fav)
Labour idle time	12,000 (Fav)
Variable overhead expenditure	18,000 (Adv)
Variable overhead efficiency	30,000 (Fav)
Fixed overhead expenditure	8,000 (Fav)
Sales price	85,000 (Adv)
Sales volume	21,000 (Adv)

Fav = Favourable, Adv = Adverse

Chaff Co uses labour hours to absorb the variable overhead.

Required:

- (a) Comment on the performance of the purchasing manager, the production director and the maintenance manager using the variances and other information above and reach a conclusion as to whether or not they have each performed well. (9 marks)

Q1 In month 2 the following data applies:

Standard costs for 1 tonne of brown rice

- 1.4 tonnes of rice seeds are needed at a cost of \$60 per tonne
- It takes 2 labour hours of work to produce 1 tonne of brown rice and labour is normally paid \$18 per hour. Idle time is expected to be 10% of hours paid; this is not reflected in the rate of \$18 above.
- 2 hours of variable overhead at a cost of \$30 per hour
- The standard selling price is \$240 per tonne
- The standard contribution per tonne is \$56 per tonne

Budget information for month 2 is

- Fixed costs were budgeted at \$210,000 for the month
- Budgeted production and sales were 8,400 tonnes

The **actual results** for month 2 were as follows:

Actual production and sales were 8,000 tonnes

- 12,000 tonnes of rice seeds were bought and used, costing \$660,000
- 15,800 labour hours were paid for, costing \$303,360
- 15,000 labour hours were worked
- Variable production overhead cost \$480,000
- Fixed costs were \$200,000
- Sales revenue achieved was \$1,800,000

Required:

- (b) Calculate the variances for month 2 in as much detail as the information allows and reconcile the budget profit to the actual profit using marginal costing principles. You are not required to comment on the performance of the business or its managers for their performance in month 2. (16 marks)

(25 marks)

1 Chaff Co

- (a) When assessing variances it is important to consider the whole picture and the interrelationships that exist. In Chaff there appears to be doubt about the wisdom of some of the decisions that have been made. Favourable variances have been applauded and adverse variances criticised and the managers in charge dispute the challenge to their actions.

Purchasing manager. The purchasing manager has clearly bought a cheaper product, saving \$48,000. The cause of this is not specified and it could be due to good buying or negotiation, reductions in quality or changes in overall market conditions. We are told the market for buying seeds is stable, so there is more likely to be an internal reason for the problem. The material usage variance is significantly adverse, indicating much more waste than is normal has occurred in month 1. This suggests that the quality of the seed bought was poor and as a result a \$52,000 excess-loss has occurred. It is possible that the waste was caused by the labour force working poorly or too quickly and this has to be considered.

The sales price achieved is also well down on standard with the sales price variance showing an \$85,000 loss of revenue and (therefore) profit. We are told that the market for sales of brown rice is stable and so it is reasonable to presume that the fall in sales price achieved is as a result of internal quality issues rather than general price falls. The purchasing manager of the only ingredient may well be responsible for this fall in quality. This may have also led to a fall in the volume of sales, another \$21,000 of adverse variance.

In conclusion the purchasing manager appears mainly responsible for a loss of \$110,000* taking the four variances above together.

$$* (\$85,000 + \$52,000 + \$21,000 - \$48,000)$$

Production director. The production director has increased wage rates and this has cost an extra \$15,000 in month 1. However one could argue that this wage increase has had a motivational effect on the labour force. The labour efficiency variance is \$18,000 favourable; and so it is possible that a wage rise has encouraged the labour force to work harder. Academic evidence suggests that this effect might only be temporary as workers get used to the new level of wages.

Equally the amount of idle time has reduced considerably, with a favourable variance of \$12,000 resulting. Again it is possible that the better motivated labour force has been more willing to work than before. Idle time can have many causes, including, material shortages or machine breakdowns. However, we are told the machines are running well and the buyer has bought enough rice seeds.

In conclusion the increase in the wage rate did cost more money but it may have improved morale and enhanced productivity. The total of the three variances above is \$15,000* Fav. *(\$18,000 + \$12,000 - \$15,000)

Maintenance manager. The maintenance manager has decided to delay the annual maintenance of the machines and this has saved \$8,000. This will increase profits in the short term but could have disastrous consequences later. In this case only time will tell. If the machines breakdown before the next maintenance then lost production and sales could result.

The maintenance manager has only *delayed* the spend and not prevented it altogether. A saving of \$8,000 as suggested by the variance has not been made. It is also possible that the adverse variable overhead expenditure variance has been at least partly caused by poor machine maintenance.

The variance calculated is not the saving made as it represents a timing difference only. The calculation also ignores the risks involved.

- (b) The standard contribution is given, but could be calculated as follows (not required by the question but shown as a proof):

	\$	\$
Sales price		240
Less:		
Rice seed (1.4 Tonnes x \$60/tonne)	84	
Labour (2 hours x \$20/hr)	40	
Variable overhead (2 hours x \$30/hr)	60	
Marginal costs of production		184
Standard contribution		56

The standard labour charge needs to be adjusted to reflect the cost to the business of the idle time. It is possible to adjust the time spent per unit or the rate per hour. In both cases the adjustment would be to multiply by 10/9 – a 10% adjustment. In the case above the rate per hour has been adjusted to \$18 x 10/9 = \$20/hr. (Both approaches would gain full marks.)

In order to reconcile the budget profit to the actual profit, both these profits need to be calculated and an operating statement prepared.

Budget profit statement for month 2

	\$	\$
Sales (8400u x \$240/u)		2,016,000
Less:		
Rice seed (1.4 tonnes x \$60/tonne x 8,400 tonnes)	705,600	
Labour (2 hours x \$20/hr x 8,400 tonnes)	336,000	
Variable overhead (2 hours x \$30/hr x 8,400 tonnes)	504,000	
Marginal costs of production		<u>1,545,600</u>
Contribution		470,400
Less Fixed costs		<u>210,000</u>
Budget profit		<u>260,400</u>

Actual profit for month 2.

	\$	\$
Sales		1,800,000
Less:		
Rice seed	660,000	
Labour	303,360	
Variable overhead	480,000	
Marginal costs of production		<u>1,443,360</u>
Contribution		356,640
Less Fixed costs		<u>200,000</u>
Actual profit		<u>156,640</u>

Operating statement for month 2

	\$	\$	\$
Budget contribution			470,400
Variances:	Adverse	Favourable	
Sales price	120,000		
Sales volume	<u>22,400</u>		
			<u>142,400</u>
			328,000
Material price		60,000	
Material usage	48,000		
Labour rate	18,960		
Labour efficiency		20,000	
Idle time		15,600	
Variable overhead efficiency		30,000	
Variable overhead expenditure	<u>30,000</u>		
	96,960	<u>125,600</u>	<u>28,640</u>
Actual contribution			356,640
Budget fixed cost		210,000	
Less: Fixed cost expenditure variance		<u>10,000</u>	
Actual fixed cost			<u>200,000</u>
Actual profit			<u>156,640</u>

Workings for the variances in month 2

- Sales price: $(225 - 240)8,000 = 120,000$ Adv
- Sales volume: $(8,000 - 8,400)56 = 22,400$ Adv
- Material price: $\left(\frac{660,000}{12,000} - 60\right)12,000 = 60,000$ Fav
- Material usage: $(12,000 - 11,200)60 = 48,000$ Adv
 $*(8,000 \times 1.4 = 11,200)$
- Labour rate: $(19.20 - 18)15,800 = 18,960$ Adv
- Labour efficiency: $(15,000 - 16,000)20 = 20,000$ Fav
- Idle time: $(800 - 1,580)20 = 15,600$ Fav
 $*10\% \text{ of } 15,800$

8. Variable overhead expenditure: $\left(\frac{480,000}{15,000} - 30\right)15,000 = 30,000 \text{ Adv}$

9. Variable overhead efficiency variance: $(15,000 - 16,000)30 = 30,000 \text{ Fav}$

Alternative calculations if standard hours adjusted for expected idle time and not the rate.

Standard cost $(2 \text{ hours} \times 10/9) \times \$18 = \$40 \text{ per tonne}$

Or $2.222 \text{ hours} \times \$18 = \$40 \text{ per tonne}$

Rate variance as above = $18,960 \text{ Adv}$

Idle time: $(800 - 1,580)18 = 14,040 \text{ Fav}$

Efficiency variance: $(15,000 - 16,197.777777)18 = 21,560 \text{ Fav}$

* (standard time allowed less standard idle time)

Standard time is $8,000 \text{ tonnes} \times 2.222 \text{ hours} = 17,777.777 \text{ hours}$

Standard idle time is $10\% \text{ of } 15,800 = 1,580 \text{ hours}$

Therefore expected working hours is $17,777.777 - 1,580 = 16,197.777 \text{ hours}$

(Note - there are many alternative methods of dealing with this issue, any reasonable attempt was accepted.)

2 Higgins Co

(a) Contribution per cue

	Pool cue	Snooker cue
	\$	\$
Selling price	41.00	69.00
Material cost at \$40/kg	(10.80)	(10.80)
Craftsmen cost at \$18/hr	(9.00)	(13.50)
Other Variable cost	(1.20)	(4.70)
Contribution per cue	20.00	40.00

(b) Formulation of the linear programming problem

Variables

Let P and S be the number of pool and snooker cues made and sold in any three month period.

Let C represent the contribution earned in any three month period

Constraints:

Craftsmen: $0.5P + 0.75S \leq 12,000$

Ash: $0.27P + 0.27S \leq 5,400$

Demand levels - Pool cues $P \leq 15,000$

- Snooker cues $S \leq 12,000$

Non negativity: $P, S \geq 0$

Objective: Higgins seeks to maximise contribution in a three month period, subject to:

$$20P + 40S = C$$

See diagram on next page

The feasible region is identified as the area inside OABCDE.

The contribution line is identified as the dotted line. Pushing the contribution line outward increases the contribution gained (theory of iso-contribution). The contribution line last leaves the feasible region at point D which is the intersect of the skilled labour line and the maximum demand line for S .

Solving at point D:

$$\text{Maximum demand } S = 12,000 \quad (1)$$

$$\text{Craftsmen } 0.5P + 0.75S = 12,000 \quad (2)$$

Substituting $S = 12,000$ in equation (2)

$$0.5P + (0.75 \times 12,000) = 12,000$$

$$0.5P + 9,000 = 12,000$$

$$0.5P = 12,000 - 9,000$$

$$0.5P = 3,000$$

$$P = 6,000$$

Therefore the maximum contribution is earned when 6,000 pool cues and 12,000 snooker cues are made and sold in a three month period.

The contribution earned is

$$C = (20 \times 6,000) + (40 \times 12,000)$$

$$C = 120,000 + 480,000$$

$$C = \$600,000$$

LEARNING CURVE

Henry Company (HC) provides skilled labour to the building trade. They have recently been asked by a builder to bid for a kitchen fitting contract for a new development of 600 identical apartments. HC has not worked for this builder before. Cost information for the new contract is as follows:

Labour for the contract is available. HC expects that the first kitchen will take 24 man-hours to fit but thereafter the time taken will be subject to a 95% learning rate. After 200 kitchens are fitted the learning rate will stop and the time taken for the 200th kitchen will be the time taken for all the remaining kitchens. Labour costs \$15 per hour.

Overheads are absorbed on a labour hour basis. HC has collected overhead information for the last four months and this is shown below:

	Hours worked	Overhead cost \$
Month 1	9,300	115,000
Month 2	9,200	113,600
Month 3	9,400	116,000
Month 4	9,600	116,800

HC normally works around 120,000 labour hours in a year.

HC uses the high low method to analyse overheads.

The learning curve equation is $y = ax^b$, where $b = \frac{\text{LogLR}}{\text{Log2}} = -0.074$

Required:

- Describe FIVE factors, other than the cost of labour and overheads mentioned above, that HC should take into consideration in calculating its bid. (10 marks)
- Calculate the total cost including all overheads for HC that it can use as a basis of the bid for the new apartment contract. (13 marks)
- If the second kitchen alone is expected to take 21.6 man-hours to fit demonstrate how the learning rate of 95% has been calculated. (2 marks)

(25 marks)

Workings

	W1	W2	W3	W4	W5	W6
Sales	1,000	1,000	1,200	1,500	1,200	1,900
VC	(400)	(400)	(480)	(600)	(480)	(760)
Goodwill	(100)	(100)		(100)		
VC adjustment			48		48	76
Depreciation	(200)	(200)	(300)	(300)	(400)	(400)
Profit	300	300	468	500	368	816

(c) Which type of van to buy?

This depends on the risk attitude of the investor. If they are optimistic about the future then the maximax criteria would suggest that they choose the large van as this has the potentially greatest profit.

If they are more pessimistic, then they would focus on the minimum expected returns and choose the medium van as the worst possible result is \$468, which is better than the other options. We are also told that the business managers are becoming more cautious and so a maximin criterion may be preferred by them.

Expected values could be calculated thus:

Small van	\$300
Medium van ($\$468 \times 0.4$) + ($\$500 \times 0.6$) =	\$487
Large van ($\$368 \times 0.4$) + ($\$816 \times 0.6$) =	\$637

Given SH is considering replacing a number of vans you could argue that an EV approach has merit (not being a one-off decision – assuming individual booking sizes are independent of each other).

The final decision lies with the managers, but, given what we know about their cautiousness, a medium sized van would seem the logical choice. The small van could never be the correct choice.

(d) Methods of uncertainty reduction:

- **Market research.** This can be desk-based (secondary) or field-based (primary). Desk-based is cheap but can lack focus. Field-based research is better in that you can target your customers and your product area, but can be time consuming and expensive. The internet is bringing down the cost and speeding up this type of research, email is being used to gather information quickly on the promise of free gifts etc.
- **Simulation.** Computer models can be built to simulate real life scenarios. The model will predict what range of returns an investor could expect from a given decision without having risked any actual cash. The models use random number tables to generate possible values for the uncertainty the business is subject to. Again, computer technology is assisting in bringing down the cost of such risk analysis.
- **Sensitivity analysis.** This can be used to assess the range of values that would still give the investor a positive return. The uncertainty may still be there, but the affect that it has on the investor's returns will be better understood. Sensitivity calculates the % change required in individual values before a change of decision results. If only a (say) 2% change is required in selling price before losses result an investor may think twice before proceeding. Risk is therefore better understood.
- **Calculation of worst and best case figures.** An investor will often be interested in range. It enables a better understanding of risk. An accountant could calculate the worst case scenario, including poor demand and high costs whilst being sensible about it. He could also calculate best case scenarios including good sales and minimum running costs. This analysis can often reassure an investor. The production of a probability distribution to show an investor the range of possible results is also useful to explain risks involved. A calculation of standard deviation is also possible.

(a) There are various issues that HC should consider in making the bid: (Only five are required for two marks each.)

Contingency allowance. HC should consider the extent to which its estimates are accurate and hence the degree of uncertainty it is subjected to. It may be sensible to allow for these uncertainties by adding a contingency to the bid.

Competition. HC must consider which other businesses are likely to bid and recognise that the builder may be able to choose between suppliers. Moreover, HC has not worked for this builder before, and so they will probably find the competition stiff and the lack of reputation a problem.

Inclusion of fixed overhead. In the long run fixed overhead must be covered by sales revenue in order to make a profit. In the short run it is often correctly argued that the level of fixed cost in a business may not be affected by a new contract and therefore could be ignored in bid calculation. HC needs to consider to what extent the fixed costs of its business will change if it wins this new contract. It is these incremental fixed costs that are relevant to a bid calculation.

Materials and loose tools. No allowance has been made for the use of tools and the various fixings (screws etc) that will be needed to assemble and fit the kitchens. It is possible that most fixings would be provided with the kitchen units, but HC should at least consider this.

Supervision of labour. The time given in the question is 24 hours to 'fit' the first kitchen. There seems no allowance for supervision of the labour force. It could, of course, be included within the overhead figures but no detail is shown.

Idle time. It is common for building works to be delayed by lack of materials for example. The labour time figure needs to reflect this.

Likelihood of repeat business. Some businesses consider it worthwhile to accept a low price for a new contract if it establishes a reputation with a new buyer. HC could offer to do this work cheaper in the hope of more profitable work later on.

The risk of non-payment. HC may decide not to bid at all if it feels that the builder may struggle to pay.

Opportunity costs of alternate work.

Possibility of working in overtime.

(b) Bid calculations for HC to use as a basis for the apartment contract.

Cost	Hours	Rate per hour	Total \$
Labour	9,247 (W1)	\$15	138,705
Variable Overhead	9,247	\$ 8 (W2)	73,976
Fixed Overhead	9,247	\$ 4 (W2)	36,988
Total Cost			<u>249,669</u>

(W1)

Need to calculate the time for the 200th kitchen by taking the total time for the 199 kitchens from the total time for 200 kitchens.

For the 199 Kitchens

Using

$$y = ax^b$$

$$y = 24 \times 199^{-0.074}$$

$$y = 16.22169061 \text{ hours}$$

$$\text{Total time} = 16.22169061 \times 199$$

$$\text{Total time} = 3,228.12 \text{ hours}$$

OR

$$y = ax^b$$

$$y = (24 \times 15) \times 199^{-0.074}$$

$$y = 243.32536$$

$$\text{Total cost} = \$48,421.75$$

For the 200 Kitchens

$$y = ax^b$$

$$y = 24 \times 200^{-0.074}$$

$$y = 16.21567465 \text{ hours}$$

$$\text{Total time} = 16.21567465 \times 200$$

$$\text{Total time} = 3,243.13 \text{ hours}$$

OR

$$y = ax^b$$

$$y = (24 \times 15) \times 200^{-0.074}$$

$$y = 243.2351198$$

$$\text{Total cost} = \$48,647.02$$

$$\text{200th cost} = \$225.27$$

The 200th Kitchen took $3,243.13 - 3,228.12 = 15.01$ hours

Total time is therefore:

For first 200

3,243.13 hours

For next 400 (15.01 hours x 400)

6,004.00 hours

Total

9,247.13 hours (9,247 hours)

(W2)

The overheads need to be analysed between variable and fixed cost elements.

Taking the highest and lowest figures from the information given:

	Hours	Cost \$
Highest	9,600	116,800
Lowest	9,200	113,600
Difference	400	3,200

Variable cost per hours is $\$3,200/400 \text{ hours} = \$8$ per hour

Total cost = variable cost + fixed cost

$$116,800 = 9,600 \times 8 + \text{fixed cost}$$

Fixed cost = \$40,000 per month

Annual fixed cost = $\$40,000 \times 12 = \$480,000$

Fixed absorption rate is $\$480,000/120,000 \text{ hours} = \$4$ per hour

12
8

- 12
- (c) A table is useful to show how the learning rate has been calculated.

Number of Kitchens	Time for Kitchen (hours)	Cumulative time (hours)	Average time (hours)
1	24:00	24:00	24:00
2	21:60	45:60	22:80

The learning rate is calculated by measuring the reduction in the average time per kitchen as cumulative production doubles (in this case from 1 to 2).

The learning rate is therefore $22:80/24:00$ or 95%

- 4 (a) Lifecycle costing is a concept which traces all costs to a product over its complete lifecycle, from design through to cessation. It recognises that for many products there are significant costs to be incurred in the early stages of its lifecycle. This is probably very true for Wargrin Limited. The design and development of software is a long and complicated process and it is likely that the costs involved would be very significant.

The profitability of a product can then be assessed taking all costs into consideration.

It is also likely that adopting lifecycle costing would improve decision-making and cost control. The early development costs would have to be seen in the context of the expected trading results, therefore preventing a serious over spend at this stage or under pricing at the launch point.

(b) Budgeted results for game

	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Total (\$)
Sales	240,000	480,000	120,000	840,000
Variable cost (W1)	40,000	80,000	20,000	140,000
Fixed cost (W1)	80,000	120,000	80,000	280,000
Marketing cost	60,000	40,000		100,000
Profit	60,000	240,000	20,000	320,000

On the face of it the game will generate profits in each of its three years of life. Games only have a short lifecycle as the game players are likely to become bored of the game and move on to something new.

The pattern of sales follows a classic product lifecycle with poor levels of sales towards the end of the life of the game.

The Stealth product has generated \$320,000 of profit over its three year life measured on a traditional basis. This represents 40% of turnover – ahead of its target. Indeed it shows a positive net profit in each of its years on existence.

The contribution level is steady at around 83% indicating reasonable control and reliability of the production processes. This figure is better than the stated target.

Considering traditional performance management concepts, Wargrin Limited is likely to be relatively happy with the game's performance.

However, the initial design and development costs were incurred and were significant at \$300,000 and are ignored in the annual profit calculations. Taking these into consideration, the game only just broke even, making a small \$20,000 profit. Whether this is enough is debatable. It represents only 2.4% of sales for example. In order to properly assess the performance of a product the whole lifecycle needs to be considered.

Workings

W1 Split of variable and fixed cost for Stealth

	Volume	Cost \$
High	14,000 units	150,000
Low	10,000 units	130,000
Difference	4,000 units	20,000

Variable cost per unit = $\$20,000/4,000$ unit = \$5 per unit

Total cost = fixed cost + variable cost

\$150,000 = fixed cost + (14,000 x \$5)

\$150,000 = fixed cost + \$70,000

Fixed cost = \$80,000 (and \$120,000 if volume exceeds 15,000 units in a year.)

- (c) Incremental budgeting is a process whereby this year's budget is set by reference to last year's actual results after an adjustment for inflation and other incremental factors. It is commonly used because:

- It is quick to do and a relatively simple process.
- The information is readily available, so very limited quantitative analysis is needed.
- It is appropriate in some circumstances. For example, in a stable business, the amount of stationery spent in one year is unlikely to be significantly different in the next year, so taking the actual spend in year one and adding a little for inflation should be a reasonable target for the spend in the next year.

ALL FIVE questions are compulsory and MUST be attempted

ABC Costing

Q3 & Brick by Brick (BBB) is a building business that provides a range of building services to the public. Recently they have been asked to quote for garage conversions (GC) and extensions to properties (EX) and have found that they are winning fewer GC contracts than expected.

BBB has a policy to price all jobs at budgeted total cost plus 50%. Overheads are currently absorbed on a labour hour basis. BBB thinks that a switch to activity based costing (ABC) to absorb overheads would reduce the cost associated to GC and hence make them more competitive.

You are provided with the following data:

Overhead category	Annual overheads \$	Activity driver	Total number of activities per year
Supervisors	90,000	Site visits	500
Planners	70,000	Planning documents	250
Property related	240,000	Labour hours	40,000
Total	400,000		

A typical GC costs \$3,500 in materials and takes 300 labour hours to complete. A GC requires only one site visit by a supervisor and needs only one planning document to be raised. The typical EX costs \$8,000 in materials and takes 500 hours to complete. An EX requires six site visits and five planning documents. In all cases labour is paid \$15 per hour.

Required:

- Calculate the cost and quoted price of a GC and of an EX using labour hours to absorb the overheads. (5 marks)
- Calculate the cost and the quoted price of a GC and of an EX using ABC to absorb the overheads. (5 marks)
- Assuming that the cost of a GC falls by nearly 7% and the price of an EX rises by about 2% as a result of the change to ABC, suggest possible pricing strategies for the two products that BBB sells and suggest two reasons other than high prices for the current poor sales of the GC. (6 marks)
- One BBB manager has suggested that only marginal cost should be included in budget cost calculations as this would avoid the need for arbitrary overhead allocations to products. Briefly discuss this point of view and comment on the implication for the amount of mark-up that would be applied to budget costs when producing quotes for jobs. (4 marks)

(20 marks)

2

10

- ✓ (a) Costs and quoted prices for the GC and the EX using labour hours to absorb overheads:

		GC \$	EX \$
Materials		3,500	8,000
Labour	300hrs x \$15/hr	4,500	
	500hrs x \$15/hr		7,500
Overheads	300hrs x \$10/hr (W1)	3,000	
	500hrs x \$10/hr		5,000
Total cost		<u>11,000</u>	<u>20,500</u>
Quoted price		<u>16,500</u>	<u>30,750</u>

(W1). Overhead absorption rate is calculated as $\$400,000/40,000\text{hrs} = \$10/\text{hr}$

- (b) Costs and quoted prices for the GC and the EX using ABC to absorb overheads:

		GC \$	EX \$
Materials		3,500	8,000
Labour	300hrs x \$15/hr	4,500	
	500hrs x \$15/hr		7,500
Overheads			
– Supervisor	(W2)/(W3)	180	1,080
– Planners	(W2)/(W3)	280	1,400
– Property	(W2)/(W3)	1,800	3,000
Total cost		<u>10,260</u>	<u>20,980</u>
Quoted price		<u>15,390</u>	<u>31,470</u>

(W2)

	Costs	Number of drivers	Cost per driver
Supervisor	90,000	500	180
Planners	70,000	250	280
Property	240,000	40,000	6

(W3)

	Supervisor	Planner	Property
Cost per driver (W2)	\$180	\$280	\$6
GC	$180 \times 1 = 180$	$280 \times 1 = 280$	$6 \times 300 = 1,800$
EX	$180 \times 6 = 1,080$	$280 \times 5 = 1,400$	$6 \times 500 = 3,000$

- (c) The pricing policy is a matter for BBB to decide. They could elect to maintain the current 50% mark-up on cost and if they did the price of the GC would fall by around 7% in line with the costs. This should make them more competitive in the market.

They could also reduce the prices by a little less than 7% (say 5%) in order to increase internal margins a little.

It is possible that the issue lies elsewhere. If the quality of the work or the reputation and reliability of the builder is questionable then reducing prices is unlikely to improve sales. It is conceivable that BBB has a good reputation for EX but not for GC, but more likely that a poor reputation would affect all products. Equally poor service levels or lack of flexibility in meeting customer needs may be causing the poor sales performance. These too will not be 'corrected' by merely reducing prices.

It is also possible that the way salesmen discuss or sell their products for the GC is not adequate so that in some way customers are being put off placing the work with BBB.

BBB is in competition and it perhaps needs to reflect this in its pricing more (by 'going rate pricing') and not seek to merely add a mark-up to its costs.

BBB could try to penetrate the market by pricing some jobs cheaply to gain a foothold. Once this has been done the completed EX or GC could be used to market the business to new customers.

The price of the EX would also need consideration. There is no indication of problems in the selling of the EX and so BBB could consider pushing up their prices by around 2% in line with the cost increase. On the figures in my answer the price goes up for a typical extension to \$31,470 from \$30,750 a rise of \$720. This does not seem that significant and so might not lose a significant number of sales.

The reliability and reputation of a builder is probably more important than the price that they charge for a job and so it is possible that the success rate on job quotes may not be that price sensitive.

- (d) Marginal costs are those costs that are incurred as a consequence of the job being undertaken. In this case they would include only the materials and the labour. If overheads are included then this is known as total absorption costing.

Overheads are for many businesses fixed by nature and hence do not vary as the number of jobs changes. In a traditional sense any attempt to allocate costs to products (by way of labour hours for example) would be arbitrary with little true meaning being added to the end result. The overhead absorption rate (OAR) is merely an average of these costs (over labour hours) and is essentially meaningless. This switch (to marginal costing) would also avoid the problem of the uncertainty of budget volume. Budget volume is needed in order to calculate the fixed cost absorption rate.

The marginal cost (MC) is more understandable by managers and indeed customers and a switch away from total absorption cost (TAC) could have benefits in this way. Clearly if overheads are going to be excluded for the cost allocations then they would still have to be covered by way of a bigger margin added to the costs. In the end all costs have to be paid for and covered by the sales in order to show a profit.

A more modern viewpoint is that activity causes costs to exist. For example, it is the existence of the need for site visits that gives rise to the need for a supervisor and therefore, for his costs. If the activities that drive costs are identified, more costs can then be directly traced to products, hence eradicating the need for arbitrary apportionment of many overhead costs. This has the benefit of all costs being covered, rather than the potential shortfall that can arise if marginal cost plus pricing is used.

In the long run businesses have to cover all costs including fixed overheads in order to make a profit, whichever pricing strategy is adopted.

- 2 (a) The performance of the production director could be looked at considering each decision in turn.

The new wood supplier: The wood was certainly cheaper than the standard saving \$5,100 on the standard the concern though might be poor quality. The usage variance shows that the waste levels of wood are worse than standard. It is possible that the lower grade labour could have contributed to the waste level but since both decisions rest with the same person the performance consequences are the same. The overall effect of this is an adverse variance of \$2,400, so taking the two variances together it looks like a poor decision. As the new labour is trained it could be that the wood usage improves and so we will have to wait to be sure.

The impact that the new wood might have had on sales cannot be ignored. No one department within a business can be viewed in isolation to another. Sales are down and returns are up. This could easily be due to poor quality wood inputs. If SW operates at the high quality end of the market then sourcing cheaper wood is risky if the quality reduces as a result.

The lower grade of labour used: SW uses traditional manual techniques and this would normally require skilled labour. The labour was certainly paid less, saving the company \$43,600 in wages. However, with adverse efficiency and idle time of a total of \$54,200 they actually cost the business money overall in the first month. The efficiency variance tells us that it took longer to produce the bats than expected. The new labour was being trained in April 2010 and so it is possible that the situation will improve next month. The learning curve principle would probably apply here and so we could expect the average time per bat to be less in May 2010 than it was in April 2010.

- (b) Variance for May 2010:

Material price variance $(\$196,000/40,000 - 5) \times 40,000 = \$4,000 \text{ Fav}$

Material usage variance $(40,000 - (19,200 \times 2)) \times \$5/\text{kg} = \$8,000 \text{ Adv}$

Labour rate variance $(\$694,000/62,000 - 12) \times 62,000 = 50,000 \text{ Fav}$

Labour efficiency variance $(61,500 - 57,600) \times 12 = 46,800 \text{ Adv}$

Labour idle time variance $500 \times 12 = 6,000 \text{ Adv}$

Sales price variance $(68 - 65) \times 18,000 = 54,000 \text{ Adv}$

Sales volume contribution variance $(18,000 - 19,000) \times 22 = 22,000 \text{ Adv}$

- 3 (a) The optimal production mix can be found by solving the two equations given for F and T.

$$7W + 5L = 3,500$$

$$2W + 2L = 1,200$$

Multiplying the second equation by 2.5 produces:

$$7W + 5L = 3,500$$

$$5W + 5L = 3,000$$

$$2W = 500$$

$$W = 250$$

Substituting $W = 250$ in the fabric equation produces:

$$2 \times 250 + 2L = 1,200$$

$$2L = 700$$

$$L = 350$$