Answers

1 (a) Performance statistics

	2005	2006	2007	2008
ROI	13%	17·5%	16·7%	20%
Bonus paid?	No	Yes	Yes	Yes
Sales Growth	–	0%	–10%	–5·6%
Gross margin	40%	35%	35%	30%
Overheads	$67,000	$56,000	$53,000	$43,000
Net profit % on Sales	6·5%	7%	5·6%	4·7%

The performance of store W can be assessed in various ways:

Sales Growth

Sales revenue growth is most unimpressive. We are told that the market in which PC operates is steadily growing and yet store W has shrunk in terms of sales over the last four years. This could be poor volumes or poor prices achieved. Given the reducing gross margin (see below), then a reducing sales price is likely. It is possible that W is subject to higher than normal levels of competition.

Gross Margin

The gross margins have also shrunk. Reducing margins can result from sales price pressure or increases in the cost of sales levels being incurred. Suppliers might have increased prices or labour could have got more expensive. The level of margin has only reached the normal level once in the last four years. Clearly W is under performing.

Overhead Control

The one area that is impressive is the apparent ability of the business to reduce overheads as sales and margin have shrunk. This is often difficult to do. It is possible that reducing these overheads could have contributed to the poor sales performance, if (for example) quality has been affected, or one could say it reflects flexible management.

Net Margin

The net margin has also fallen, primarily due to falling gross margins as overheads have reduced. Clearly a disappointing performance.

ROI

The ROI has improved in most years and has exceeded the 15% target in all but one year (year 1). This is simply due to the reducing asset base as the stores assets have gradually been depreciated. Net profit levels have fallen overall and yet ROI has increased.

It is hard to argue that the ROI figures properly reflect the performance of the store. The ROI will tend to increase as assets get older and this will distort the financial performance picture. In a period of falling sales and weaker margins the manager of W has been awarded bonuses in three out of four years. This is hard to justify.

(b) The unethical manager would have needed to move profits out of 2006 and in to 2005. One immediate problem here is having the information in good time to respond. The manager would have to be able to anticipate the 2005 poor result and the improvement in 2006. It is likely that such a manager would have to gamble at the end of 2005 and make an adjustment in the hope of a better year in 2006.

The manager need only move $2,000 of profit from 2006 to 2005 to achieve a 15% return in both years.

Possible methods of adjustment include:

Accelerate revenue: Sales made early in 2006 could be wrongly included in 2005. He could, for example, raise an invoice before is normal, perhaps on the receipt of an order and before actual delivery. The invoice itself would not have to be sent to the customer, merely filed until the second year had begun and delivery made.

Delay the recording of 2005 cost: A supplier's invoice could be left unrecorded at the end of 2005, including it in 2006 expenses instead.

Understate a provision or accrual in 2005: This has the effect of moving cost from 2005 to 2006 (assuming that by the end of 2006 the provision is correctly stated).

Manipulate accounting policy: Inventory values (for example) are easy targets for the unethical manager. If inventory in 2005 could be overstated this would have the effect of increasing 2005 profits at the expense 2006 profits.

(c) The forecast for store S is as follows:

		2009 ($)	2010 ($)	2011 ($)	2012 ($)
Sales	W1	216,000	237,600	248,292	235,877
Gross Profit	W2	86,400	95,040	91,476	79,061
Overheads		70,000	70,000	80,000	80,000
Net Profit		16,400	25,040	11,476	(939)
Investment		100,000	75,000	50,000	25,000
ROI		16·4%	33·39%	22·95%	–3·8%

W1

	2009	2010	2011	2012
Sales Volume (units)	18,000	19,800[a]	21,780[b]	21,780
Sales Price ($)	12·00	12·00	11·40[c]	10·83[d]
Revenue ($) (Volume x Price)	216,000	237,600	248,292	235,877

[a:] 18,000 (1·1) = 19,800
[b:] 19,800 (1·1) = 21,780
[c:] 12.00 (0·95) = 11.40
[d:] 11.40 (0·95) = 10.83

W2

Gross Profit

2009 40% (given). Total gross profit = $216,000 x 0·4 = $86,400
2010 40% (given). Total gross profit = $237,600 x 0·4 = $95,040
2011 (40 – 5)/100(0·95) = 36·8421052%
Total gross profit = $248,292 x 0·368421052 = $91,476
2012 (40 – 5 – 4·75)/(100(0·95)(0·95)) = 33·5180055%
Total gross profit = $235,877 x 0·335180055 = $79,061

Alternatively, given that variable costs are said to be constant over the four years, could calculate the variable cost in year one and hold for the four years. Gross profit is then simply sales revenue less variable costs.

Variable costs in 2005:

$216,000 – 18,000 x VC = $86,400
VC per unit = $7·20
So year two gross profit will be:

$237,600 – 19,800 x 7·2 = $95,040

(d) In order for a bonus to be paid in 2012 an ROI of 15% is needed. This implies a net profit of $25,000 x 15% = $3,750.

Adding overheads of $80,000 to this net profit means that $83,750 of gross profit is needed. At a gross profit % of 33·518% this implies sales of $249,866.

At a price of $10·83 this suggests sales volume of 23,072 units.

2 (a) Maximax stands for maximising the maximum return an investor might expect. An investor that subscribes to the maximax philosophy would generally select the strategy that could give him the best possible return. He will ignore all other possible returns and only focus on the biggest, hence this type of investor is often accused of being an optimist or a risk-taker.

Maximin stands for maximising the minimum return an investor might expect. This type of investor will focus only on the potential minimum returns and seek to select the strategy that will give the best worst case result. This type of investor could be said to be being cautious or pessimistic in his outlook and a risk-avoider.

Expected value averages all possible returns in a weighted average calculation.

For example if an investor could expect $100 with a 0·3 probability and $300 with a 0·7 probability then on average the return would be:

(0·3 x $100) + (0·7 x $300) = $240

This figure would then be used as a basis of the investment decision. The principle here is that if this decision was repeated again and again, then the investor would get the EV as a return. Its use is more questionable for use on one-off decisions. (*Note: you were not asked for a critique of this method.*)

(b) Profit calculations

	Small Van	Medium Van	Large Van
Capacity	100	150	200
Low Demand (120)	300 [w1]	468 [w3]	368 [w5]
High Demand (190)	300 [w2]	500 [w4]	816 [w6]

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 x 0·4) + ($500 x 0·6) =	$487
Large van ($368 x 0·4) + ($816 x 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.

3 (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					249,669

(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

$y = ax^b$
$y = 24x199^{-0.074}$
$y = 16{\cdot}22169061hours$
$Totaltime = 16{\cdot}22169061x199$
$Totaltime = 3{,}228{\cdot}12hours$

OR

$y = ax^b$
$y = (24 \times 15) \times 199^{-0.074}$
$y = 243{\cdot}32536$
Total cost = $48,421·75

For the 200 Kitchens

$y = ax^b$
$y = 24x200^{-0.074}$
$y = 16{\cdot}21567465hours$
$Totaltime = 16{\cdot}21567465x200$
$Totaltime = 3{,}243{\cdot}13hours$

OR

$y = ax^b$
$y = (24 \times 15) \times 200^{-0.074}$
$y = 243{\cdot}2351198$
Total cost = $48,647·02
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 $3,200/400hours = $8 per hour

Total cost = variable cost + fixed cost

116,800 = 9,600 x 8 + fixed cost

Fixed cost = $40,000 per month

Annual fixed cost = $40,000 x 12 = $480,000

Fixed absorption rate is $480,000/120,000 hours = $4 per hour

(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.

There are problems involved with incremental budgeting:

- It builds on wasteful spending. If the actual figures for this year include overspends caused by some form of error then the budget for the next year would potentially include this overspend again.
- It encourages organisations to spend up to the maximum allowed in the knowledge that if they don't do this then they will not have as much to spend in the following year's budget.
- Assessing the amount of the increment can be difficult.
- It is not appropriate in a rapidly changing business.
- Can ignore the true (activity based) drivers of a cost leading to poor budgeting.

(d) **Design and development costs:** Setting a standard cost for this classification of cost would be very difficult. Presumably each game would be different and present the program writers with different challenges and hence take a varying amount of time.

Variable production cost: A game will be produced on a CD or DVD in a fairly standard format. Each CD/DVD will be identical and as a result setting a standard cost would be possible. Allowance might need to be made for waste or faulty CDs produced. Some machine time will be likely and again this should be the same for all items and therefore setting a standard would be valid.

Fixed production cost: The standard fixed production cost of a game will be the product of the time taken to produce the game and the standard fixed overhead absorption rate for the business. This brings into question whether this is 'meaningful'. Allocating fixed costs to products in a standard way may not provide meaningful data. It can sometimes imply a variability (cost per unit) that is not the case and can therefore confuse non-accountants, causing poor decisions. The time per unit will be fairly standard.

Marketing costs: Games may have different target audiences and therefore require different marketing strategies. As such setting a standard may be difficult to do. It may be possible to set standards for each marketing media chosen. For example the rates for a page advert in a magazine could be set as a standard.

			Marks	
1	**(a)**	Calculations of performance statistics ($^1/_2$ each max $2^1/_2$)	$2^1/_2$	
		Sales comment	1	
		Gross margin comment	1	
		Overheads comment	1	
		Net margin comment	1	
		ROI discussion	3	
		Max		8
	(b)	Timing of decision problem	1	
		Revenue acceleration	1	
		Delay of cost	1	
		Manipulation of accounting policy	1	
				4
	(c)	Sales volume	$1^1/_2$	
		Sales price	$1^1/_2$	
		Gross profit year 1	$^1/_2$	
		Gross profit year 2	$^1/_2$	
		Gross profit year 3	$^1/_2$	
		Gross profit year 4	$^1/_2$	
		Overhead included	1	
		Investment values	2	
		ROI calculations	1	
				9
	(d)	Target net profit	1	
		Target gross profit	1	
		Target sales	1	
		Target volume	1	
				4
	Total			**25**

			Marks	
2	**(a)**	Maximax explanation	1	
		Maximin explanation	1	
		Expected value explanation	2	
				4
	(b)	Profit calculations		
		Small van sales	$^1/_2$	
		Small van VC	$^1/_2$	
		Small van goodwill or VC adjustment	1	
		Small van depreciation	1	
		Medium van – as above for small van	3	
		Large van as above for small van	3	
				9
	(c)	Optimist view	2	
		Pessimist view	2	
		Expected value calculation	1	
		Expected value discussion	1	
				6
	(d)	Market Research	$1^1/_2$	
		Simulation	$1^1/_2$	
		Sensitivity	$1^1/_2$	
		Range	$1^1/_2$	
				6
	Total			**25**
3	**(a)**	For each description	2	
				10
	(b)	Average time for 199th kitchen	1	
		Total time for 199 kitchens	1	
		Average time for 200th kitchen	1	
		Total time for 200 kitchens	1	
		200th kitchen time	1	
		Cost for first 200	1	
		Cost for next 400	1	
		Variable cost per hour	2	
		Fixed cost per month	1	
		Fixed cost per hour	1	
		Cost for variable overhead	1	
		Cost for fixed overhead	1	
				13
	(c)	Average time per unit	1	
		Explanation	1	
				2
	Total			**25**

			Marks	
4	**(a)**	Lifecycle costing principles:		
		Performance assessment over whole life	1	
		Improved decision making/cost control	1	
		Relate to Wargrin	2	
				4
	(b)	Sales	1	
		Variable cost	1	
		Fixed cost	2	
		Marketing cost	1	
		Comments on profit performance (against stated targets)	2	
		Consideration of all lifecycle costs	2	
				9
	(c)	Why incremental budgeting common – per idea (max 3)	1	
		Problems of incremental budgets – per idea (max 3)	1	
				6
	(d)	Discussion of each component	$1^1/_2$	
		Max		6
	Total			**25**