SOLUTIONS TO END-OF-CHAPTER QUESTIONS CHAPTER 13

RECALL AND REVIEW

Question 13.1

An actual cost is the cost that is actually incurred by a business in producing a product, whereas a standard cost is the expected cost of producing a product. This standard cost of a product is derived from past observations of actual costs over time.

Standard costing starts by gathering information on the components (materials, labour and overheads) that make up the production cost of a product or the delivery cost of a service. The components of production cost are measured and costed and then the standard cost of producing one unit of product will be calculated. The components of standard cost will then be compared with the actual cost to find the causes of any variances.

Question 13.2

Benefits:

- Standard costing compares expected and actual financial performance and highlights variances between expected and actual outcomes.
- In this way, it pinpoints unfavourable variances for investigation.
- Managers can then determine the causes of the variances and develop and implement the strategies required to reduce them.
- Standard costing also indicates any variances that are favourable. Managers can also investigate the causes of these favourable variances and develop and implement strategies to maintain and enhance them.

However, standard costing has its own limitations:

- It is a complicated system which may initially discourage users of the system through its complexity.
- It is a time-consuming system as it requires a large amount of data gathering to set the standards and constantly update them as well as to monitor and evaluate variances.
- It produces a large volume of information which may overwhelm managers.
- Its tendency to be inflexible is not a desirable characteristic in a rapidly changing business environment.

DEVELOP YOUR UNDERSTANDING

Question 13.3

(a) The total expected costs of the orchard for the past year

	£
Fertiliser: 5 doses at £4.00 for 30 trees	600
Labour: 30 trees × 10 hours per tree × £7.50 per hour	2,250
Total expected costs of the orchard for the past year	**2,850**

(b) The actual total costs of the orchard for the past year

	£
Fertiliser: 4 doses at £4.50 for 30 trees	540
Labour: 30 trees × 9 hours per tree × £8.00 per hour	2,160
Total actual costs of the orchard for the past year	**2,700**

(c) Material total variance

	£
Expected cost of fertiliser	600
Actual cost of fertiliser	540
Total material variance (favourable)	**60**

(c) Material price variance

	£
4 doses for 30 trees should have cost: 4 × 30 × £4.00	480
4 doses for 30 trees actually cost: 4 × 30 × £4.50	540
Material price variance (unfavourable)	**(60)**

(c) Material usage variance

	Number
Expected number of doses of fertiliser: 5 × 30	150
Actual number of doses of fertiliser: 4 × 30	120
Material usage variance in number of doses (favourable)	**30**
	£
Material usage variance in £s: 30 × £4.00 (favourable)	**120**

(£60) material price variance (unfavourable) + £120 material usage variance (favourable) = £60 (favourable).

(d) Labour total variance

	£
Expected cost of labour: 30 trees × 10 hours × £7.50 per hour	2,250
Actual cost of labour: 270 hours × £8 per hour	2,160
Total labour variance (favourable)	**90**

(d) Labour rate variance

	£
270 hours of labour should have cost: 270 × £7.50	2,025
270 hours of labour actually cost: 270 × £8.00	2,160
Labour rate variance (unfavourable)	**(135)**

(d) Labour efficiency variance

	Hours
Labour hours for 30 trees should have been: 30 × 10	300
Actual labour hours for 30 trees	270
Efficiency variance in number of hours (favourable)	**30**
	£
Efficiency variance in £s: 30 × £7.50 (favourable)	**225**

(£135) labour rate variance (unfavourable) + £225 labour efficiency variance (favourable) = £90 (favourable).

» Question 13.4

Fred

(a) Sales price variance

- Number of cakes sold: £14,725 ÷ £15.50 = 950.
- Sales price variance: number of cakes sold × (actual selling price per cake – the expected selling price per cake) = 950 × (£15.50 – £15.00) = £475. This variance is favourable as the actual selling price was higher than the expected selling price.

(b) Sales volume variance

- (Number of cakes sold – expected number of cakes to be sold) × the expected contribution per cake.
- (950 – 1,000) × (£15.00 – £6.00) = (£450). This variance is unfavourable as fewer cakes than expected were sold.

Total sales variances: £475 favourable sales price variance – £450 unfavourable sales volume variance = £25 favourable total sales variances.
Proof that £25 favourable is the correct figure for the two sales variances

	Expected: 1,000 cakes	Actual: 950 cakes	Variances
	£	£	£
Sales: 1,000 × £15/actual sales value	15,000	14,725	275 (U)
Variable costs: 1,000 × £6/950 × £6	6,000	5,700	300 (F)
Contribution/total variances	**9,000**	**9,025**	**25 (F)**

Question 13.5

(a) Fixed overhead expenditure variance: £55,000 budgeted fixed overhead – £58,000 actual overhead expenditure = £3,000. This variance is unfavourable as fixed overhead cost more than the budget says it should have done.

(b) The total variable overhead variance

	£	
750 bathtubs should have cost 750 × 9 hours × £8.50 per hour	57,375	
Actual variable overhead	61,900	
Total variable overhead variance	**4,525**	Unfavourable

(c) The variable overhead expenditure variance

	£	
7,300 hours should have cost 7,300 × £8.50	62,050	
Actual variable overhead	61,900	
Variable overhead expenditure variance	**150**	Favourable

(d) The variable overhead efficiency variance

	Hours	
750 bathtubs should have used 750 × 9 hours	6,750	
750 bathtubs actually used	7,300	
Variable overhead efficiency variance in hours	550	
	£	
Variable overhead efficiency variance 550 hours × £8.50 per hour	**4,675**	Unfavourable

Question 13.6

Sales volume variance (Actual sales – budgeted sales) × standard contribution per sofa	**Units**
Actual sofas sold	1,320
Budgeted sales of sofas	1,500
Variance (unfavourable)	**(180)**
	£
Sales volume variance at standard contribution 180 × (£200 – £90 – £40 – £8) (unfavourable)	**(11,160)**
Sales price variance (actual selling price – budgeted selling price) × number of sofas sold	**£**
Actual selling price	220
Budgeted selling price	200
Variance (favourable)	**20**
Sales price variance at actual sales 1,320 × £20 (favourable)	**26,400**
Direct material price variance	
Actual quantity at standard cost v. actual quantity at actual cost	**£**
42,240 (1,320 × 32) kgs of material should have cost (42,240 × £3)	126,720
42,240 (1,320 × 32) kgs of material actually cost (42,240 × £3)	126,720
Direct material price variance (neither favourable nor unfavourable)	Nil
Direct material usage variance	
(Standard quantity – actual quantity) × standard cost	**Kilograms**
1,320 sofas should have used (1,320 × 30 kgs)	39,600
1,320 sofas actually used (1,320 × 32 kgs)	42,240
Direct material usage variance in kilograms (unfavourable)	**(2,640)**
	£
Direct material usage variance in kgs × standard price per kg 2,640 × £3 (unfavourable)	**(7,920)**
Direct material total variance	
Standard quantity at standard cost v. actual quantity at actual cost	**£**
Material for 1,320 sofas should have cost 1,320 × 30 kgs × £3	118,800
Material for 1,320 sofas actually cost	126,720
Direct materials total variance (unfavourable)	**(7,920)**
Direct labour rate variance	
Actual labour hours at standard cost – actual labour hours at actual cost	**£**
4,620 (1,320 × 3.5) labour hours should have cost (4,620 × £10.00)	46,200
4,620 (1,320 × 3.5) labour hours actually cost	55,440
Direct labour rate variance (unfavourable)	**(9,240)**

Direct labour efficiency variance

(Standard hours for actual quantity – actual hours for actual quantity) × standard cost per hour	Hours
1,320 sofas should have used (1,320 × 4) hours	5,280
1,320 sofas actually used (1,320 × 3.5) hours	4,620
Direct labour efficiency variance in hours (favourable)	**660**

	£
Direct labour efficiency variance in hours × standard rate/hour 660 × £10 (favourable)	**6,600**

Direct labour total variance

Standard hours at standard cost v. actual hours at actual cost	£
1,320 sofas should have cost (1,320 × 4 hours × £10 per hour)	52,800
1,320 sofas actually cost	55,440
Direct labour total variance (unfavourable)	**(2,640)**

Variable overhead expenditure variance

Actual hours at standard cost – actual hours at actual cost	£
5,280 (1,320 × 4) overhead hours should have cost (5,280 × £2 per hour)	10,560
5,280 (1,320 × 4) overhead hours actually cost	13,200
Variable overhead expenditure variance (unfavourable)	**(2,640)**

Variable overhead efficiency variance

(Standard hours for actual quantity – actual hours for actual quantity) × standard cost per hour	Hours
1,320 sofas should have used (1,320 × 4) hours	5,280
1,320 sofas actually used (1,320 × 4) hours	5,280
Variable overhead efficiency variance in hours (neither favourable nor unfavourable)	Nil

	£
Variable overhead efficiency variance in hours × standard rate/hour Nil × £2 (neither favourable nor unfavourable)	Nil

Variable overhead total variance

Standard hours at standard cost v. actual hours at actual cost	£
1,320 sofas should have cost (1,320 × 4 hours × £2 per hour)	10,560
1,320 sofas actually cost	13,200
Variable overhead total variance (unfavourable)	**(2,640)**

Fixed overhead expenditure variance

Budgeted fixed overhead expenditure – actual fixed overhead expenditure	£
Budgeted fixed overhead expenditure	40,000
Actual fixed overhead expenditure	50,000
Fixed overhead expenditure variance (unfavourable)	**(10,000)**

Question 13.7

(a) Alton plc: statement reconciling budgeted profit to actual profit for the year ended 31 December 2021

	£ Unfavourable	£ Favourable	£
Budgeted profit			53,000
Sales volume variance	(11,160)		
Sales price variance		26,400	
Direct material price variance	—	—	
Direct material usage variance	(7,920)		
Direct labour rate variance	(9,240)		
Direct labour efficiency variance		6,600	
Variable overhead expenditure variance	(2,640)		
Variable overhead efficiency variance	—	—	
Fixed overhead variance	(10,000)		
Total variances	**(40,960)**	**33,000**	
Add: favourable variances			33,000
Deduct: unfavourable variances			(40,960)
Actual profit			**45,040**

(b) The following observations can be made on the variances between budgeted and actual results:

- The unit selling price for each sofa was higher than budgeted, resulting in a favourable sales price variance. Market conditions have been sufficiently favourable to allow the company to charge a higher price than budgeted for its sofas.
- However, this favourable sales price variance was partially cancelled out by lower-than-budgeted unit sales reflected in the unfavourable sales volume variance. Lower sales might be the result of the higher prices charged by the company, resulting in some customers buying lower priced sofas from rival producers.
- The price of materials was as expected so there is no material price variance.
- However, the company used 2 kg more material per sofa, which leads to the unfavourable material usage variance. This unfavourable variance might be due to employees using unfamiliar materials or adapting to new ways of working. If this is the case, then additional training might be required to enable the workforce to work to the standard quantities of materials in the future. Faster production to meet deadlines for sales may have contributed to increased material wastage.
- The hourly wage rate was £2 higher per hour than budgeted. This higher rate paid to employees is reflected in the unfavourable direct labour rate variance. A higher grade of labour has been employed in the production of sofas and this has enabled the company to reduce the time taken to produce each sofa, a reduction indicated by the favourable direct labour efficiency variance. This favourable variance may be due to the higher level of skills

inherent in the higher grade of direct labour employed enabling employees to work more quickly in the production of sofas.

- The company also presents unfavourable variances for both variable and fixed overhead which seems to be due to changes in prices. Fixed overheads, due to their high degree of predictability, should have been much closer to the actual fixed overheads incurred, so investigations into the causes of this unfavourable variance should be undertaken.
- The high levels of unfavourable variances across the whole range of inputs suggest that the standard might require revision to give more accurate, up-to-date costs for sofas.

»» TAKE IT FURTHER

»» Question 13.8

Sanguinary Services

(a) The profit that the centre expected to make in April, based on the original forecast of 3,000 blood tests in the month:

	£	£
Sales: 3,000 blood tests at £15		45,000
Chemicals used in blood tests: 3,000 × £5	15,000	
Laboratory workers 3,000 × £4	12,000	
Fixed overheads £72,000 ÷ 12 months	6,000	
Total costs		33,000
Expected profit for April		**12,000**

(b) Variances

Sales volume variance (Actual blood tests – standard blood tests) × standard contribution per blood test	**Units**
Actual blood tests undertaken	3,600
Budgeted blood tests	3,000
Variance (favourable)	**600**
	£
Sales volume variance at standard contribution 600 × £(15 – 5 – 4) (favourable)	**3,600**

Remember that the fixed costs are not variable but fixed and so do not form part of the calculation of contribution from each blood test undertaken. Only the costs that vary with the level of activity are deducted from the selling price to give the contribution per unit of sales.

Sales price variance (actual selling price – budgeted selling price) × number of blood tests performed	**£**
Actual selling price	15.50
Standard selling price	15.00
Variance (favourable)	**0.50**
Sales price variance at actual sales 3,600 × £0.50 (favourable)	**1,800.00**

Direct material total variance

Standard quantity at standard cost v. actual quantity at actual cost	**£**
Chemicals for 3,600 blood tests should have cost 3,600 × £5	18,000
Chemicals for 3,600 blood tests actually cost	16,200
Direct material total variance (favourable)	**1,800**

Direct material price variance

Actual quantity at standard cost v. actual quantity at actual cost	**£**
33,750 millilitres should have cost (33,750 × £0.50)	16,875
33,750 millilitres actually cost (33,750 × £0.48)	16,200
Direct material price variance (favourable)	**675**

Direct material usage variance

(Standard quantity – actual quantity) × standard cost	**Millilitres**
3,600 blood tests should have used 10 millilitres × 3,600	36,000
3,600 blood tests actually used	33,750
Direct material usage variance in millilitres (favourable)	**2,250**
Direct material usage variance in millilitres × standard price per ml 2,250 × £0.50 (favourable)	**£1,125**

Labour total variance

Standard hours at standard cost v. actual hours at actual cost	**£**
3,600 blood tests should have cost (900 hours × £16 per hour)	14,400
3,600 blood tests actually cost	14,985
Direct labour total variance (unfavourable)	**(585)**

Labour rate variance

Actual labour hours at standard cost – actual labour hours at actual cost	**£**
925 labour hours should have cost (925 × £16.00)	14,800
925 labour hours actually cost	14,985
Direct labour rate variance (unfavourable)	**(185)**

Labour usage variance

You should calculate the standard number of hours needed to complete 3,600 blood tests. Each blood test should take 15 minutes, making 4 tests per hour. Therefore, 3,600 blood tests should take 900 hours (3,600 ÷ 4)

(Standard hours for actual quantity – actual hours for actual quantity) × standard cost per hour	**Hours**
3,600 blood tests should have used 900 hours	900
3,600 blood tests actually used	925
Direct labour efficiency variance in hours (unfavourable)	**(25)**
Direct labour efficiency variance in hours × standard rate/hour 25 × £16.00 (unfavourable)	**£(400)**

Fixed overhead expenditure variance

Standard fixed overhead expenditure – actual fixed overhead expenditure	**£**
Standard fixed overhead expenditure (3,000 × £2) or (72,000 ÷ 12 months)	6,000
Actual fixed overhead expenditure	7,500
Fixed overhead expenditure variance (unfavourable)	**(1,500)**

(c) Statement reconciling the expected profit to the actual profit for April

	(Unfavourable) £	**Favourable £**	**Profit £**
Expected profit (part (a))			12,000
Sales price variance		1,800	
Sales volume variance		3,600	
Direct material price variance		1,125	
Direct material usage variance		675	
Direct labour rate variance	(185)		
Direct labour efficiency variance	(400)		
Fixed overhead expenditure variance	(1,500)		
Total variances	**(2,085)**	**7,200**	
Add: favourable variances			7,200
Deduct: unfavourable variances			(2,085)
Actual profit for April			**17,115**

»» Question 13.9

Smashers Tennis Club

(a) Calculation of the original expected surplus from the coaching course

	£
Revenue: 12 juniors × £70 each	840
Costs: balls: 12 × £10	120
Coach: 10 hrs × £30	300
Expected surplus	**420**

(b) Calculation of the expected surplus from the coaching course for 16 juniors:

	£
Revenue: 16 juniors × £70 each	1,120
Costs: balls: 16 × £10	160
Coach: 10 hrs × £30	300
Expected surplus	**660**

(c) Calculation of the actual surplus from the coaching course:

	£
Revenue: 16 juniors × (£70 × 90%) each	1,008
Costs: balls: 400 balls × 60p	240
Coach: 10 hrs × £33	330
Actual surplus	**438**

d) Variances

(i) Sales price variance: (£63 – £70) × 16 = £112 (unfavourable) as the price is lower than expected

(ii) Sales volume variance: additional participants: 16 – 12 = 4

Contribution per participant: £70 (price for one junior participant) – £10 (variable cost of balls for each junior member: remember that the cost of the coach is a fixed cost) = £60

Sales volume variance: £60 contribution × 4 participants = £240 (favourable) as more juniors participated than expected

(iii) Direct material total variance: this relates to the tennis balls:

	£	
Expected cost of balls for 16 participants: 16 × £10	160	
Actual cost of balls for 16 participants 400 × 60 pence	240	
Direct material total variance	**(80)**	Unfavourable

(iv) Direct material price variance (tennis balls):

	£	
400 balls at 50 pence each	200	
400 balls at 60 pence each	240	
Direct material price variance	**(40)**	Unfavourable

(v) Direct material usage variance (tennis balls):

	Balls	
16 participants should use 20 balls × 16 participants	320	
16 participants actually used	400	
Direct material usage variance (in tennis balls)	**(80)**	Unfavourable
	£	
Direct material usage variance: 80 balls × 50 pence	**(40)**	Unfavourable

The unfavourable price variance of £40 + the unfavourable usage variance of £40 = the total unfavourable direct material variance of £80.

(vi) Fixed expenditure variance (coaching costs): £300 (expected) – £330 (actual) = £30 unfavourable as more cost has been incurred than expected

Reconciliation of expected surplus to actual surplus:

	Unfavourable	Favourable	Surplus
	£	£	£
Expected surplus (part (a))			420
Sales price variance	(112)		
Sales volume variance		240	
Direct material price variance	(40)		
Direct material usage variance	(40)		
Fixed overhead expenditure variance	(30)		
Total variances	**(222)**	**240**	
Add: favourable variances			240
Deduct: unfavourable variances			(222)
Actual surplus for the 10-week coaching course			**438**

»» Question 13.10

Vijay Manufacturing

	(a) Sales of 2,000 garden gnomes at standard cost	(b) Sales of 1,800 garden gnomes at standard cost	(c) Sales of 1,800 garden gnomes at actual cost	Variance: (b) – (c) favourable (f) or unfavourable (u)
	£	£	£	£
Sales	30,000	27,000	25,200	(1,800) (u)
Material	9,000	8,100	8,750	(650) (u)
Labour	8,000	7,200	7,125	75 (f)
Variable overhead	6,000	5,400	5,500	(100) (u)
Fixed overhead	2,000	2,000	1,600	400 (f)
Net profit	**5,000**	**4,300**	**2,225**	**(2,075) (u)**

Sales price variance

(Actual selling price – budgeted selling price) × number of gnomes sold	£
Actual selling price	14.00
Standard selling price	15.00
Variance (unfavourable)	(1.00)
Sales price variance of actual sales 1,800 × £1.00 (unfavourable)	(1,800.00)

Sales volume variance

Contribution per garden gnome sold: £15 (selling price) – £4.50 (direct materials) – £4.00 (direct labour) – £3.00 (variable overhead) = £3.50. Remember that fixed overheads are fixed and do not form part of the variable cost of production and so are not part of the contribution calculation.

Actual sales units v. standard sales units	**Units**
Actual units sold	1,800
Budgeted sales units	2,000
Variance (unfavourable)	**(200)**
Sales volume variance at standard contribution 200 × £3.50 (unfavourable)	**£(700)**

Direct material total variance

Standard quantity at standard cost v. actual quantity at actual cost	**£**
Material for 1,800 gnomes should have cost (1,800 × £2.25 × 2)	8,100
Material for 1,800 gnomes did cost (3,500 × £2.50)	8,750
Direct material total variance (unfavourable)	**(650)**

Direct material price variance

Actual quantity at standard cost v. actual quantity at actual cost	**£**
3,500 kg of material should have cost (3,500 × £2.25)	7,875
3,500 kg actually cost (3,500 × £2.50)	8,750
Direct material price variance (unfavourable)	**(875)**

Direct material usage variance

(Standard quantity – actual quantity) × standard cost	kg
1,800 gnomes should have used (1,800 × 2 kg)	3,600
1,800 gnomes actually used	3,500
Direct material usage variance in kg (favourable)	100
Direct material usage variance in kg × standard price per kg 100 × £2.25 (favourable)	**£225**

Direct labour total variance

Standard hours at standard cost v. actual hours at actual cost	**£**
1,800 gnomes should have cost (1,800 × £4.00)	7,200
1,800 gnomes actually cost	7,125
Direct labour total variance (favourable)	**75**

Direct labour rate variance

Actual labour hours at standard cost – actual labour hours at actual cost	**£**
950 labour hours should have cost (950 × £8.00)	7,600
950 labour hours actually cost (950 × £7.50)	7,125
Direct labour rate variance (favourable)	**475**

Direct labour efficiency variance

(Standard hours for actual quantity – actual hours for actual quantity) × standard cost per hour	**Hours**
1,800 gnomes should have used 1,800 × 0.5 hours	900
1,800 gnomes actually used	950
Direct labour efficiency variance in hours (unfavourable)	(50)
Direct labour efficiency variance in hours × standard rate/hour 50 × £8 (unfavourable)	**£(400)**

Variable overhead total variance	**£**
1,800 gnomes should have cost (1,800 × £3.00)	5,400
1,800 gnomes actually cost	5,500
Variable overhead total variance (unfavourable)	**(100)**

Variable overhead expenditure variance	
Actual labour hours at standard cost – actual labour hours at actual cost	**£**
7,000 machine hours should have cost (7,000 × £0.75)	5,250
7,000 machine hours actually cost	5,500
Variable overhead rate variance (unfavourable)	**(250)**

Variable overhead efficiency variance	
(Standard hours for actual quantity – actual hours for actual quantity) × standard cost per hour	**Hours**
1,800 gnomes should have used (1,800 × 4 hours)	7,200
1,800 gnomes actually used	7,000
Variable overhead efficiency variance in hours (favourable)	**200**
Variable overhead efficiency variance in hours × standard rate/hour 200 × £0.75 (favourable)	**£150**

Fixed overhead expenditure variance	
Standard fixed overhead – actual fixed overhead	**£**
Standard fixed overhead expenditure	2,000
Actual fixed overhead expenditure	1,600
Fixed overhead expenditure variance (favourable)	**400**

Statement reconciling the expected profit to the actual profit for June

	(Unfavourable)	**Favourable**	**Profit**
	£	**£**	**£**
Expected profit (part (a))			5,000
Sales price variance	(1,800)		
Sales volume variance	(700)		
Direct material price variance	(875)		
Direct material usage variance		225	
Direct labour rate variance		475	
Direct labour efficiency variance	(400)		
Variable overhead expenditure variance	(250)		
Variable overhead efficiency variance		150	
Fixed overhead expenditure variance		400	
Total variances	**(4,025)**	**1,250**	
Add: favourable variances			1,250
Deduct: unfavourable variances			(4,025)
Actual profit for June			**2,225**