



5

Standard Costing and  
Variance Analysis

# Standard Costing and Variance Analysis

# 5

## LEARNING OUTCOMES

After completing this chapter, you should be able to:

- ▶ explain the difference between ascertaining costs after the event and planning by establishing standard costs in advance;
- ▶ explain why planned standard costs, prices and volumes are useful in setting a benchmark for comparison and so allowing managers' attention to be directed to areas of the business that are performing below or above expectation;
- ▶ calculate standard costs for the material, labour and variable overhead elements of cost of a product or service;
- ▶ calculate variances for materials, labour, variable overhead, sales prices and sales volumes.

## 5.1 Introduction

In this chapter, we will be looking at standard costs: how they are set and how they are used as the basis of variance analysis to monitor and control an organisation's performance.



The CIMA *Terminology* defines standard costing as a 'control technique that reports variances by comparing actual costs to pre-set standards facilitating action through management by exception'.

The pre-set standards require managers to plan in advance the amount and price of each resource that will be used in providing a service or manufacturing a product. These pre-set standards, for selling prices and sales volumes as well as for costs, provide a basis for planning, a target for achievement and a benchmark against which the actual costs and revenues can be compared.

The actual costs and revenues recorded after the event are then compared with the pre-set standards and the differences are recorded as variances. If resource price or usage is

above standard, or if sales volume or selling price is below standard, an adverse variance will result. If resource price or usage is below standard, or if sales volume or selling price is above standard, a favourable variance will result.

Careful analysis of the variances and their presentation to management can help to direct managers' attention to areas of the business that are performing below or above expectation.

If certain variances are large or significant then managers can concentrate their attention on these activities where any corrective action is likely to be most worthwhile. If other variances are small or not significant then managers can ignore these activities, knowing that they appear to be conforming to expectations. This is the principle of management by exception that is mentioned in CIMA's definition of standard costing.

## 5.2 What is a standard cost?

A standard cost is a carefully predetermined unit cost which is prepared for each cost unit. It contains details of the standard amount and price of each resource that will be utilised in providing the service or manufacturing the product.

In order to be able to apply standard costing it must be possible to identify a measurable cost unit. This can be a unit of product or service but it must be capable of standardising, for example, standardised tasks must be involved in its creation. The cost units themselves do not necessarily have to be identical. For example, standard costing can be applied in situations such as costing plumbing jobs for customers where every cost unit is unique. However, the plumbing jobs must include standardised tasks for which a standard time and cost can be determined for monitoring purposes.



It can be difficult to apply standard costing in some types of service organisation, where cost units may not be standardised and they are more difficult to measure.

The standard cost may be stored on a standard cost card like the one shown below but nowadays it is more likely to be stored on a computer, perhaps in a database. Alternatively it may be stored as part of a spreadsheet so that it can be used in the calculation of variances.

A standard cost card showing the variable elements of production cost might look like this.

### Standard cost card: product 176

	<i>£ per unit</i>
Direct materials: 30 kg @ £4.30	129.00
Direct wages: 12 hours @ £11.80	<u>141.60</u>
Prime cost	270.60
Variable production overhead:	
12 hours @ £0.75	<u>9.00</u>
Variable production cost	<u>279.60</u>

For every variable cost the standard amount of resource to be used is stated, as well as the standard price of the resource. This standard data provides the information for a detailed variance analysis, as long as the actual data is collected in the same level of detail.

Standard costs and standard prices provide the basic unit information which is needed for valuing budgets and for determining total expenditures and revenues.



### Exercise 5.1

From the information given below, prepare a standard cost card extract for one unit and enter on the standard cost card the costs to show subtotals for:

- (a) prime cost;
- (b) variable production cost.

The following data is given for the standard details for one unit:

Direct materials: 40 square metres @ £6.48/sq m

Direct wages:

Bonding department—48 hours @ £12.50/hour

Finishing department—30 hours @ £11.90/hour

*Budgeted costs and labour*

<i>hours per annum:</i>	£	<i>hours</i>
Variable production overhead:		
Bonding department	375,000	500,000
Finishing department	150,000	300,000



### Solution

#### Standard cost card extract

	£ per unit
Direct materials: 40 sq m @ £6.48	259.20
Direct wages:	
Bonding – 48 hours @ £12.50	600.00
Finishing – 30 hours @ £11.90	<u>357.00</u>
Prime cost	1,216.20
Variable production overhead:	
Bonding – 48 hours @ £0.75	36.00
Finishing – 30 hours @ £0.50	<u>15.00</u>
Variable production cost	<u>1,267.20</u>

## 5.3 Performance levels

### 5.3.1 A standard



CIMA's *Terminology* defines a standard as a 'benchmark measurement of resource usage or revenue or profit generation, set in defined conditions'.

The definition goes on to describe a number of bases which can be used to set the standard. These bases include:

- a prior period level of performance by the same organisation;
- the level of performance achieved by comparable organisations;
- the level of performance required to meet organisational objectives.

Use of the first basis indicates that management feels that performance levels in a prior period have been acceptable. They will then use this performance level as a target and control level for the forthcoming period.

When using the second basis management is being more outward looking, perhaps attempting to monitor their organisation's performance against 'the best of the rest'.

The third basis sets a performance level which will be sufficient to achieve the objectives which the organisation has set for itself.

### 5.3.2 Ideal standard

Standards may be set at ideal levels, which make no allowance for inefficiencies such as losses, waste and machine downtime. This type of ideal standard is achievable only under the most favourable conditions and can be used if managers wish to highlight and monitor the full cost of factors such as waste, etc. However, this type of standard will almost always result in adverse variances since a certain amount of waste, etc., is usually unavoidable. This can be very demotivating for individuals who feel that an adverse variance suggests that they have performed badly.

### 5.3.3 Attainable standard

Standards may also be set at attainable levels which assume efficient levels of operation, but which include allowances for factors such as losses, waste and machine downtime. This type of standard does not have the negative motivational impact that can arise with an ideal standard because it makes some allowance for unavoidable inefficiencies. Adverse variances will reveal whether inefficiencies have exceeded this unavoidable amount.

### 5.3.4 Current standard

Standards based on current performance levels (current wastage, current inefficiencies) are known as current standards. Their disadvantage is that they do not encourage any attempt to improve on current levels of efficiency.

## 5.4 Setting standard costs

You have already seen that each element of a unit's standard cost has details of the price and quantity of the resources to be used. In this section of the chapter, we will list some of the sources of information which may be used in setting the standard costs.

### 5.4.1 Standard material price

Sources of information include:

- (a) quotations and estimates received from potential suppliers;
- (b) trend information obtained from past data on material prices;
- (c) details of any bulk discounts which may be available;
- (d) information on any charges which will be made for packaging and carriage inwards;
- (e) the quality of material to be used: this may affect the price to be paid;
- (f) for internally manufactured components, the predetermined standard cost for the component will be used as the standard price.

### 5.4.2 Standard material usage

Sources of information include:

- (a) the basis to be used for the level of performance (see Section 5.3);
- (b) if an attainable standard is to be used, the allowance to be made for losses, wastage, etc. (work study techniques may be used to determine this);
- (c) technical specifications of the material to be used.

### 5.4.3 Standard labour rate

Sources of information include:

- (a) the personnel department, for the wage rates for employees of the required grades with the required skills;
- (b) forecasts of the likely outcome of any trades union negotiations currently in progress;
- (c) details of any bonus schemes in operation. For example, employees may be paid a bonus if higher levels of output are achieved.

### 5.4.4 Standard labour times

Sources of information include:

- (a) the basis to be used for the level of performance (see Section 5.3);
- (b) if an attainable standard is to be used, the allowance to be made for downtime, etc.;
- (c) technical specifications of the tasks required to manufacture the product or provide the service;
- (d) the results of work study exercises which are set up to determine the standard time to perform the required tasks and the grades of labour to be employed.

### 5.4.5 Variable production overhead costs

In Chapter 3, you learned how predetermined hourly rates were derived for production overhead. These overhead absorption rates represent the standard hourly rates for overhead in each cost centre. They can be applied to the standard labour hours or machine hours for each cost unit.

The overheads will be analysed into their fixed and variable components so that a separate rate is available for fixed production overhead and for variable production overhead. This is necessary to achieve adequate control over the variable and fixed elements. Your *Fundamentals of Management Accounting* syllabus requires you to deal only with standard variable overhead costs.

## 5.5 Updating standards

The main purpose of standard costs is to provide a yardstick or benchmark against which actual performance can be monitored. If the comparison between actual and standard cost is to be meaningful, then the standard must be valid and relevant.

It follows that the standard cost should be kept as up to date as possible. This may necessitate frequent updating of standards to ensure that they fairly represent the

latest methods and operations, and the latest prices which must be paid for the resources being used.

The standards may not be updated for *every* small change: however, any significant changes should be adjusted as soon as possible.

## 5.6 Standard costing in the modern business environment

There has recently been some criticism of the appropriateness of standard costing in the modern business environment. The main criticisms include the following:

- (a) Standard costing was developed when the business environment was more stable and operating conditions were less prone to change. In the present dynamic environment, such stable conditions cannot be assumed.  
If conditions are not stable, then it is difficult to set a standard cost which can be used to control costs over a period of time.
- (b) Performance to standard used to be judged as satisfactory, but in today's climate constant improvement must be aimed for in order to remain competitive.
- (c) The emphasis on labour variances is no longer appropriate with the increasing use of automated production methods.

An organisation's decision to use standard costing depends on its effectiveness in helping managers to make the correct decisions. It can be used in areas of most organisations, whether they are involved with manufacturing, or with services such as hospitals or insurance. For example, a predetermined standard could be set for the labour time to process an insurance claim. This would help in planning and controlling the cost of processing insurance claims.

Standard costing may still be useful even where the final product or service is not standardised. It may be possible to identify a number of standard components and activities for which standards may be set and used effectively for planning and control purposes. In addition, the use of demanding performance levels in standard costs may help to encourage continuous improvement.

## 5.7 What is variance analysis?

You already know that a variance is the difference between the expected standard cost and the actual cost incurred. You also know that a unit standard cost contains detail concerning both the usage of resources and the price to be paid for the resources.

Variance analysis involves breaking down the total variance to explain how much of it is caused by the usage of resources being different from the standard, and how much of it is caused by the price of resources being different from the standard. These variances can be combined to reconcile the total cost difference revealed by the comparison of the actual and standard cost.

## 5.8 Variable cost variances

We will use a simple example to demonstrate how the variances are calculated for direct material, direct labour and variable overhead.

**Example**

A company manufactures a single product for which the standard variable cost is:

	<i>£ per unit</i>
Direct material: 81 kg × £7 per kg	567
Direct labour: 97 hours × £8 per hour	776
Variable overhead: 97 hours × £3 per hour	291
	<u>1,634</u>

During January, 530 units were produced and the costs incurred were as follows:

Direct material:	42,845 kg purchased and used; cost £308,484
Direct labour:	51,380 hours worked; cost £400,764
Variable overhead:	cost £156,709

You are *required* to calculate the variable cost variances for January.

**5.8.1 Direct material cost variances**

**(a) Direct material total variance**

	<i>£</i>	
530 units should cost (×£567)	300,510	
But did cost	<u>308,484</u>	
Total direct material cost variance	<u>7,974</u>	adverse

 You should always remember to indicate whether a variance is adverse or favourable.

This direct material total variance can now be analysed into its ‘price’ and ‘quantity’ elements.

**(b) Direct material price variance**

The direct material price variance reveals how much of the direct material total variance was caused by paying a different price for the materials used.

	<i>£</i>	
42,845 kg purchased should have cost (×£7)	299,915	
But did cost	<u>308,484</u>	
Direct material price variance	<u>8,569</u>	adverse

The adverse price variance indicates that expenditure was £8,569 more than standard because a higher than standard price was paid for each kilogram of material.

**(c) Direct material usage variance**

The direct material usage variance reveals how much of the direct material total variance was caused by using a different quantity of material, compared with the standard allowance for the production achieved.

	kg	
530 units produced should have used ( $\times 81$ kg)	42,930	
But did use	<u>42,845</u>	
Variance in kg	<u>85</u>	favourable
$\times$ standard price per kg (£7):		
Direct material usage variance	<u>£595</u>	favourable

The favourable usage variance of £595 is the saving in material cost (at standard prices) resulting from using a lower amount of material than the standard expected for this level of output.

*Check:* £8,569 adverse + £595 favourable = £7,974 adverse (the correct total variance).



All of the 'quantity' variances are always valued at the standard price. Later in this example you will see that the 'quantity' variances for labour and for variable overhead – the efficiency variances – are valued at the standard rate per hour.

### 5.8.2 The direct material price variance and inventory valuation

One slight complication sometimes arises with the calculation of the direct material price variance. In this example, the problem did not arise because the amount of material purchased was equal to the amount used.

However, when the two amounts are not equal then the direct material price variance could be based either on the material purchased or on the material used. In the example we used the following method – we will call it method A:

#### Method A Direct material price variance

	£
Material purchased should have cost	X
But did cost	<u>X</u>
Direct material price variance	<u>X</u>

Alternatively, we could have calculated the variance as follows – we will call it method B.

#### Method B Direct material price variance

	£
Material used should have cost	X
But did cost	<u>X</u>
Direct material price variance	<u>X</u>

Obviously, if the purchase quantity is different from the usage quantity, then the two methods will give different results.

So how do you know which method to use? The answer lies in the inventory valuation method.

If inventory is valued at standard cost, then method A is used. This will ensure that all of the variance is eliminated as soon as purchases are made and the inventory will be held at standard cost.

If inventory is valued at actual cost, then method B is used. This means that the variance is calculated and eliminated on each bit of inventory as it is used up. The remainder of the inventory will then be held at actual price, with its price variance still ‘attached’, until it is used and the price variance is calculated.

If this seems confusing you might find it easier to return and consider the reasoning after you have studied standard cost bookkeeping in chapter 7, when you will learn which method is generally preferred.

### 5.8.3 Direct labour cost variances

#### (a) Direct labour total variance

	£	
530 units should cost (×£776)	411,280	
But did cost	<u>400,764</u>	
Total direct labour cost variance	<u>10,516</u>	favourable

This variance can now be analysed into its ‘price’ and ‘quantity’ elements. The ‘price’ part is called the labour rate variance and the ‘quantity’ part is called the labour efficiency variance.

#### (b) Direct labour rate variance

The direct labour rate variance reveals how much of the direct labour total variance was caused by paying a different rate per hour for the labour hours worked.

	£	
51,380 hours should have cost (×£8)	411,040	
But did cost	<u>400,764</u>	
Direct labour rate variance	<u>10,276</u>	favourable

The favourable rate variance indicates that expenditure was £10,276 less than standard because a lower than standard rate was paid for each hour of labour.



Notice the similarity between the method used to calculate the labour rate variance and the method used to calculate the material price variance.

**(c) Direct labour efficiency variance**

The direct labour efficiency variance reveals how much of the direct labour total variance was caused by using a different number of hours of labour, compared with the standard allowance for the production achieved.

	<i>Hours</i>	
530 units produced should take (×97 hours)	51,410	
But did take	51,380	
Variance in hours	<u>30</u>	favourable
× standard labour rate per hour (£8)		
Direct labour efficiency variance	<u>£240</u>	favourable

The favourable efficiency variance of £240 is the saving in labour cost (at standard rates) resulting from using fewer labour hours than the standard expected for this level of output.

*Check:* £10,276 favourable + £240 favourable = £10,516 favourable (the correct total variance).



In the next chapter you will see that a further analysis of the efficiency variance can be carried out when idle time occurs.

**5.8.4 Variable overhead cost variances****(a) Variable overhead total variance**

	<i>£</i>	
530 units should cost (×£291)	154,230	
But did cost	156,709	
Total variable overhead cost variance	<u>2,479</u>	adverse

This variance can now be analysed into its 'price' and 'quantity' elements. The 'price' part is called the variable overhead expenditure variance and the 'quantity' part is called the variable overhead efficiency variance.

**(b) Variable overhead expenditure variance**

The variable overhead expenditure variance reveals how much of the variable overhead total variance was caused by paying a different hourly rate of overhead for the hours worked.

	<i>£</i>	
51,380 hours of variable overhead should cost (×£3)	154,140	
But did cost	156,709	
Variable overhead expenditure variance	<u>2,569</u>	adverse

The adverse expenditure variance indicates that expenditure was £2,569 more than standard because a higher than standard hourly rate was paid for variable overhead.

**(c) Variable overhead efficiency variance**

The variable overhead efficiency variance reveals how much of the variable overhead total variance was caused by using a different number of hours of labour, compared with the standard allowance for the production achieved. Its calculation is very similar to the calculation of the labour efficiency variance.

Variance in hours (from labour efficiency variance)	<u>30 hours</u>	favourable
× standard variable overhead rate per hour (£3)		
Variable overhead efficiency variance	<u>£90</u>	favourable

The favourable efficiency variance of £90 is the saving in variable overhead cost (at standard rates) resulting from using fewer labour hours than the standard expected for this level of output.

*Check:* £2,569 adverse + £90 favourable = £2,479 adverse (the correct total variance)



Notice that the method used to calculate the variable overhead variances is identical to the method used to calculate the direct labour variances. In the next chapter you will see that the calculation of the variable overhead efficiency variance may be affected by idle time.

**5.9 Sales variances**

Now that we have seen how to analyse the variable cost variances we will turn our attention to sales variances. Your syllabus requires you to be able to calculate two variances for sales: the sales price variance and the sales volume contribution variance. We will demonstrate the calculation of these variances using the following data.

<i>Budget</i>	Sales and production volume	81,600 units
	Standard selling price	£59 per unit
	Standard variable cost	£24 per unit
<i>Actual results</i>	Sales and production volume	82,400 units
	Actual selling price	£57 per unit
	Actual variable cost	£23 per unit

**5.9.1 Sales price variance**

The sales price variance reveals the difference in total revenue caused by charging a different selling price from standard.

	£	
82,400 units should sell for (×£59)	4,861,600	
But did sell for (82,400 units ×£57)	<u>4,696,800</u>	
Sales price variance	<u>164,800</u>	adverse

The adverse sales price variance indicates that the 82,400 units were sold for a lower price than standard, which we can see from the basic data.

## 5.9.2 Sales volume contribution variance

The sales volume contribution variance reveals the contribution difference which is caused by selling a different quantity from that budgeted.



Since the analysis of variable cost variances explains all of the variations caused by differences between actual costs and standard costs, the calculation of the sales volume variance is based on the standard contribution not on the actual contribution.

Actual sales volume	32,400	units
Budget sales volume	81,600	units
Sales volume variance in units	<u>800</u>	favourable
× standard contribution per unit £(59 – 24)	×£35	
Sales volume contribution variance	<u>£28,000</u>	favourable

## 5.10 Summary

Having read this chapter the main points that you should understand are as follows:

1. A standard cost is a carefully predetermined unit cost. It is established in advance to provide a basis for planning, a target for achievement and a benchmark against which the actual costs and revenues can be compared.
2. The difference between the standard cost and the actual result is called a variance.
3. The analysis of variances facilitates action through management by exception, whereby managers concentrate on those areas of the business that are performing below or above expectations and ignore those that appear to be conforming to expectations.
4. A number of different performance levels can be used in setting standards. The most common are ideal, attainable and current.
5. The direct material total variance can be analysed between the direct material price variance and the direct material usage variance.
6. If inventories are valued at standard cost then the material price variance should be based on the quantity purchased. If inventories are valued at actual cost the material price variance should be based on the quantity used during the period.
7. The direct labour total variance can be analysed between the direct labour rate variance and the direct labour efficiency variance.
8. The variable overhead total variance can be analysed between the variable overhead expenditure variance and the variable overhead efficiency variance.
9. The sales price variance reveals the difference in total revenue caused by charging a different selling price from standard.
10. The sales volume contribution variance reveals the contribution difference which is caused by selling a different quantity from that budgeted. The calculation of the variance is based on the standard contribution not on the actual contribution.

# Revision Questions

# 5

## **?** Question 1 Multiple choice

1.1 A standard cost is:

- (A) the planned unit cost of a product, component or service in a period.
- (B) the budgeted cost ascribed to the level of activity achieved in a budget centre in a control period.
- (C) the budgeted production cost ascribed to the level of activity in a budget period.
- (D) the budgeted non-production cost for a product, component or service in a period.

### **Data for questions 1.2–1.7**

Budgeted production of product V is 650 units each period. The standard cost card for product V contains the following information.

		<i>£ per unit</i>
Ingredients	12 litres @ £4 per litre	48
Direct labour	3 hours @ £9 per hour	27
Variable production overhead	3 hours @ £2 per hour	6

During the latest period 670 units of product V were produced. The actual results recorded were as follows:

Ingredients purchased and used	8,015 litres	£33,663
Direct labour	2,090 hours	£17,765
Variable production overhead		£5,434

1.2 The ingredients price variance is:

- (A) £1,503 favourable
- (B) £1,503 adverse
- (C) £1,603 favourable
- (D) £1,603 adverse

1.3 The ingredients usage variance is:

- (A) £100 favourable
- (B) £100 adverse
- (C) £105 favourable
- (D) £860 adverse

- 1.4** The labour rate variance is
- (A) £325 favourable  
 (B) £325 adverse  
 (C) £1,045 favourable  
 (D) £1,045 adverse
- 1.5** The labour efficiency variance is
- (A) £680 adverse  
 (B) £720 adverse  
 (C) £720 favourable  
 (D) £1,260 adverse
- 1.6** The variable overhead expenditure variance is:
- (A) £1,254 favourable  
 (B) £1,254 adverse  
 (C) £1,534 favourable  
 (D) £1,534 adverse
- 1.7** The variable overhead efficiency variance is:
- (A) £151 adverse  
 (B) £160 adverse  
 (C) £160 favourable  
 (D) £280 adverse
- 1.8** ABC Ltd uses standard costing. It purchases a small component for which the following data are available:

Actual purchase quantity	6,800 units
Standard allowance for actual production	5,440 units
Standard price	85p per unit
Purchase price variance (adverse)	(£544)

What was the actual purchase price per unit?

- (A) 75p  
 (B) 77p  
 (C) 93p  
 (D) 95p.
- 1.9** During a period 17,500 labour hours were worked at a standard cost of £6.50 per hour. The labour efficiency variance was £7,800 favourable. The number of standard labour hours expected for the output achieved was:
- (A) 1,200  
 (B) 16,300  
 (C) 17,500  
 (D) 18,700.
- 1.10** XYZ Ltd uses standard costing. It makes an assembly for which the following standard data are available:

Standard labour hours per assembly	24
Standard labour cost per hour	£8

During a period 850 assemblies were made, there was a nil rate variance and an adverse efficiency variance of £4,400.

How many actual labour hours were worked?

- (A) 19,850
- (B) 20,400
- (C) 20,950
- (D) 35,200.

**Data for questions 1.11 and 1.12**

The standard cost of providing a meal in a fast food restaurant is as follows.

	£
Ingredient cost	1.80
Direct labour cost	0.30
Variable overhead cost	0.20

The standard price of the meal is £4.50 and the budgeted sales volume is 4,650 meals each period.

During period 9 a total of 4,720 meals were sold for £20,768. The actual total variable cost per meal was £2.30.

**1.11** The sales price variance for period 9 was:

- (A) £465 favourable
- (B) £465 adverse
- (C) £472 favourable
- (D) £472 adverse

**1.12** The sales volume contribution variance for period 9 was:

- (A) £147 favourable
- (B) £147 adverse
- (C) £154 favourable
- (D) £154 adverse



**Question 2** Short objective-test questions

**2.1** Tick the correct box.

A standard which assumes efficient levels of operation, but which includes allowances for factors such as waste and machine downtime, is known as an:

- attainable standard
- ideal standard

**2.2** The standard cost card for product F shows that each unit requires 3 kg of material at a standard price of £9 per kilogram. Last period, 200 units of F were produced and £5,518 was paid for 620 kg of material that was bought and used. Calculate the following variances and tick the correct box to indicate whether each variance is adverse or favourable.

- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | <i>Adverse</i>           | <i>Favourable</i>        |
| (a) the direct material price variance is £ <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) the direct material usage variance is £ <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**2.3** The standard cost card for product K shows that each unit requires four hours of direct labour at a standard rate of £8 per hour. Last period, 420 units were produced and the direct labour cost amounted to £15,300. The direct labour efficiency variance was £160 adverse.

The actual rate paid per direct labour hour is £ .

**2.4** Is the following statement *true* or *false*?  
 Standard costing cannot be applied in an organisation that manufactures specialist furniture to customers' specifications because every cost unit is unique.  
 True   
 False

**2.5** The following extract is taken from the standard cost card of product H.

		<i>£ per unit</i>
Direct labour	4 hours @ £12 per hour	48
Variable production overhead		8

During the latest period the number of direct labour hours worked to produce 490 units of product H was 1,930. The variable production overhead cost incurred was £3,281.

The variable production overhead variances for the period are:

- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | <i>Adverse</i>           | <i>Favourable</i>        |
| (a) Variable production overhead expenditure variance £ <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Variable production overhead efficiency variance £ <input type="text"/>  | <input type="checkbox"/> | <input type="checkbox"/> |

**2.6** The following data relate to product R for the latest period.

Budgeted sales revenue	£250,000
Standard selling price per unit	£12.50
Standard contribution per unit	£5.00
Actual sales volume (units)	19,500
Actual sales revenue	£257,400

The sales variances for the period are:

- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | <i>Adverse</i>           | <i>Favourable</i>        |
| (a) Sales price variance                      £ <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Sales volume contribution variance £ <input type="text"/>        | <input type="checkbox"/> | <input type="checkbox"/> |

**2.7** The budgeted sales of product Y are 230 units per period at a standard sales price of £43 per unit. Last period the sales volume contribution variance was £1,100 favourable and all units were actually sold for £46 per unit. The sales price variance was £840 favourable.

The standard variable cost per unit of product Y is £ .

**?** **Question 3** Direct cost variances

XYZ Ltd is planning to make 120,000 units per period of a new product. The following standards have been set:

	<i>Per unit</i>
Direct material A	1.2 kg at £11 per kg
Direct material B	4.7 kg at £6 per kg
Direct labour:	
Operation 1	42 minutes
Operation 2	37 minutes
Operation 3	11 minutes

All direct operatives are paid at the rate of £8 per hour. Attainable work hours are less than clock hours, so the 500 direct operatives have been budgeted for 400 hours each in the period.

Actual results for the period were:

Production	126,000 units
Direct labour	cost £1.7 m for 215,000 clock hours
Material A	cost £1.65 m for 150,000 kg
Material B	cost £3.6 m for 590,000 kg

**Requirements**

(a) (i) A realistic labour efficiency variance for the period is £

adverse   
 favourable

(ii) The labour rate variance for the period is £

adverse   
 favourable

(b) (i) The material price variances for the period are

Material A	£ <input type="text"/>	Material B	£ <input type="text"/>
adverse	<input type="checkbox"/>	adverse	<input type="checkbox"/>
favourable	<input type="checkbox"/>	favourable	<input type="checkbox"/>

(ii) The material usage variances for the period are:

Material A	£ <input type="text"/>	Material B	£ <input type="text"/>
adverse	<input type="checkbox"/>	adverse	<input type="checkbox"/>
favourable	<input type="checkbox"/>	favourable	<input type="checkbox"/>

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# Solutions to Revision Questions

# 5

## Solution 1

- Select your answer carefully from the available options. You may in haste select an option that has the correct absolute value for the variance but is adverse when you should have selected favourable, or vice versa.
- In some of the questions you will need to 'work backwards' from variance information to determine the actual results. This will enable you to test yourself to see if you really understand how the variances are calculated!
- The second question asks for an ingredients price variance. This is calculated in exactly the same way as a direct material price variance.

### 1.1 Answer: (A)

A standard cost is a carefully predetermined unit cost which is prepared for each cost unit.

### 1.2 Answer: (D)

	£	
8,015 litres should cost ( $\times \pounds 4$ )	32,060	
But did cost	<u>33,663</u>	
Ingredients price variance	<u>1,603</u>	adverse

### 1.3 Answer: (A)

	Litres	
670 units produced should use ( $\times 12$ )	8,040	
But did use	<u>8,015</u>	
Variance in litres	<u>25</u>	favourable
$\times$ standard price per litre ( $\pounds 4$ )		
Ingredients usage variance	<u>£100</u>	favourable

### 1.4 Answer: (C)

	£	
2,090 hours should cost ( $\times \pounds 9$ )	18,810	
But did cost	<u>17,765</u>	
Labour rate variance	<u>1,045</u>	favourable

**1.5** Answer: (B)

	<i>Hours</i>	
670 units produced should take (×3)	2,010	
But did take	<u>2,090</u>	
Variance in hours	80	adverse
× standard labour rate per hour (£9)		
Labour efficiency variance	<u>£720</u>	adverse

**1.6** Answer: (B)

	£	
2,090 hours should cost (×£2)	4,180	
But did cost	<u>5,434</u>	
Variable overhead expenditure variance	<u>1,254</u>	adverse

**1.7** Answer: (B)

Variance in hours (from labour efficiency variance)	<u>80 hours</u>	adverse
× standard variable overhead rate per hour (£2)		
Variable overhead efficiency variance		£160 adverse

**1.8** Answer: (C)

Purchase price variance per unit purchased =  $\frac{£544}{6,800} = 8\text{p}$  adverse per unit.  
 Actual purchase price = 85p standard + 8p = 93p per unit.

**1.9** Answer: (D)

Number of hours saved compared with standard =  $\frac{£7,800}{£6.50} = 1,200$ .  
 Number of standard labour hours expected = 17,500 + 1,200 = 18,700.

**1.10** Answer: (C)

Standard labour cost = 24 hours × 850 × £8 = £163,200  
 Actual cost = £163,200 + £4,400 = £167,600  
 @£8/hour = 20,950 hours

**1.11** Answer: (D)

	£	
4,720 meals should sell for(×£4.50)	21,240	
But did sell for	<u>20,768</u>	
Sales price variance	<u>472</u>	adverse

1.12 Answer: (C)

Actual sales volume	4,720	meals
Budget sales volume	<u>4,650</u>	meals
Sales volume variance in meals	70	favourable
× standard contribution per meal	×£2.20	
£(4.50 – 1.80 – 0.30 – 0.20)		
Sales volume contribution variance	<u>£154</u>	favourable



**Solution 2**

2.1 A standard which assumes efficient levels of operation, but which includes allowances for factors such as waste and machine downtime is known as an *attainable* standard.

	£	
620 kg should have cost (×£9)	5,580	
But did cost	<u>5,518</u>	
Direct material price variance	<u>62</u>	favourable

	Kg	
200 units produced should have used (×3 kg)	600	
But did use	<u>620</u>	
Variance in kg	<u>(20)</u>	adverse
× standard price per kg (£9)		
Direct material usage variance	<u>(£180)</u>	adverse

2.3 Efficiency variance in hours = £160/£8 = 20 hours adverse  
 Actual hours worked = 20 + 1,680 standard hours (420 × 4) = 1,700  
 Actual rate paid per hour = £15,300/1,700 = £9 per hour

2.4 *False*. Even though each cost unit is unique, each could involve standardised tasks for which a standard time and/or cost can be determined for control purposes.

	£	
1,930 hours should cost (×£8/4)	3,860	
But did cost	<u>3,281</u>	
Variable production overhead expenditure variance	<u>579</u>	favourable
	Hours	
490 units should take (×4)	1,960	
But did take	<u>1,930</u>	
Efficiency variance in hours	30	favourable
× standard variable overhead rate per hour (×£8/4)		
Variable production overhead efficiency variance	<u>£60</u>	favourable

## 2.6

	£	
19,500 units should sell for (£12.50)	243,750	
But did sell for	<u>257,400</u>	
Sales price variance	<u>13,650</u>	favourable
Actual sales volume	19,500	
Budget sales volume (£250,000/£12.50)	<u>20,000</u>	
Sales volume variance in units	500	adverse
× standard contribution per unit	×£5	
Sales volume contribution variance	<u>£2,500</u>	adverse

## 2.7 The standard variable cost per unit of product Y is £21.

Sales price variance per unit sold = £46 actual price – £43 std. price = £3 favourable

Number of units sold = £840 sales price variance/£3 = 280 units

Sales volume variance in units = 280 actual sales – 230 budget sales  
= 50 units favourable

Standard contribution per unit = £1,100 volume variance/50 = £22

Standard variable cost per unit = £43 standard price – £22 standard contribution = £21



### Solution 3

- There is an unusual request in part (a): for a *realistic* labour efficiency variance. This means that you need to take account of the difference between attainable work hours and actual clock hours. A realistic efficiency variance should be based on attainable hours rather than on clock hours.
  - The question gives you a hint about the difference between attainable hours and clock hours: the clock hours budgeted for 120,000 units are more than the standard time allowance of 1.5 hours per unit. The difference is the lost time or idle time, for which an allowance should be made when the efficiency variance is calculated.
  - Do not forget to indicate whether your calculated variances are adverse or favourable.
- (a) (i) £36,000 adverse  
(ii) £20,000 favourable

*Workings:*

Standard labour hours per unit = (42 + 37 + 11)/60 = 1.5 hours

Budgeted attainable work hours for the period = 120,000 units × 1.5 hours  
= 180,000 hours

Budgeted clock hours for the period = 500 operatives × 400 hours = 200,000 hours

Attainable hours = 90 per cent of clock hours

*Labour efficiency variance*

	<i>Hours</i>	
126,000 units should have taken (×1.5 hours)	189,000	
But did take (215,000 × 90%)	<u>193,500</u>	
Variance in hours	4,500	adverse
× standard labour rate per hour (£8)		
Labour efficiency variance	<u>£36,000</u>	adverse

*Labour rate variance*

	£	
215,000 hours paid for should have cost (×£8)	1,720,000	
But did cost	<u>1,700,000</u>	
Labour rate variance	20,000	favourable

	<i>Material A</i>		<i>Material B</i>	
(b) (i)	£0		£60,000	adverse
(ii)	£13,200	favourable	£13,200	favourable

*Workings:*

*Direct material price variance*

<i>Material A</i>		£	
150,000 kg should have cost (×£11)		1,650,000	
And did cost		<u>1,650,000</u>	
Direct material price variance		—	
<i>Material B</i>		£	
590,000 kg should have cost (×£6)		3,540,000	
But did cost		<u>3,600,000</u>	
Direct material price variance		<u>60,000</u>	adverse

*Direct material usage variance*

<i>Material A</i>		Kg	
126,000 units produced should have used (×1.2 kg)		151,200	
But did use		<u>150,000</u>	
Variance in kg		1,200	favourable
× standard price per kg (£11)			
Direct material usage variance		<u>£13,200</u>	favourable
<i>Material B</i>		Kg	
126,000 units produced should have used (×4.7 kg)		592,200	
But did use		<u>590,000</u>	
Variance in kg		2,200	favourable
× standard price per kg (£6)			
Direct material usage variance		<u>£13,200</u>	favourable