Exercise 10-5 (20 minutes)

1. If the total labor spending variance is $330 unfavorable, and if the labor rate variance is $150 favorable, then the labor efficiency variance must be $480 unfavorable, because the labor rate and labor efficiency variances taken together equal the total labor spending variance.

   Knowing that the labor efficiency variance is $480 unfavorable, one approach to the solution would be:

   Labor efficiency variance = SR (AH – SH)
   $12 per hour (AH – 210 hours*) = $480 U
   $12 per hour × AH – $2,520 = $480**
   $12 per hour × AH = $3,000
   AH = 250 hours

   * 168 batches × 1.25 hours per batch = 210 hours
   ** When used with the formula, unfavorable variances are positive and favorable variances are negative.

2. Knowing that 250 hours of labor time were used during the week, the actual rate of pay per hour can be computed as follows:

   Labor rate variance = AH (AR – SR)
   250 hours (AR – $12 per hour) = $150 F
   250 hours × AR – $3,000 = -$150*
   250 hours × AR = $2,850
   AR = $11.40 per hour

   * When used with the formula, unfavorable variances are positive and favorable variances are negative.

Exercise 10-5 (continued)

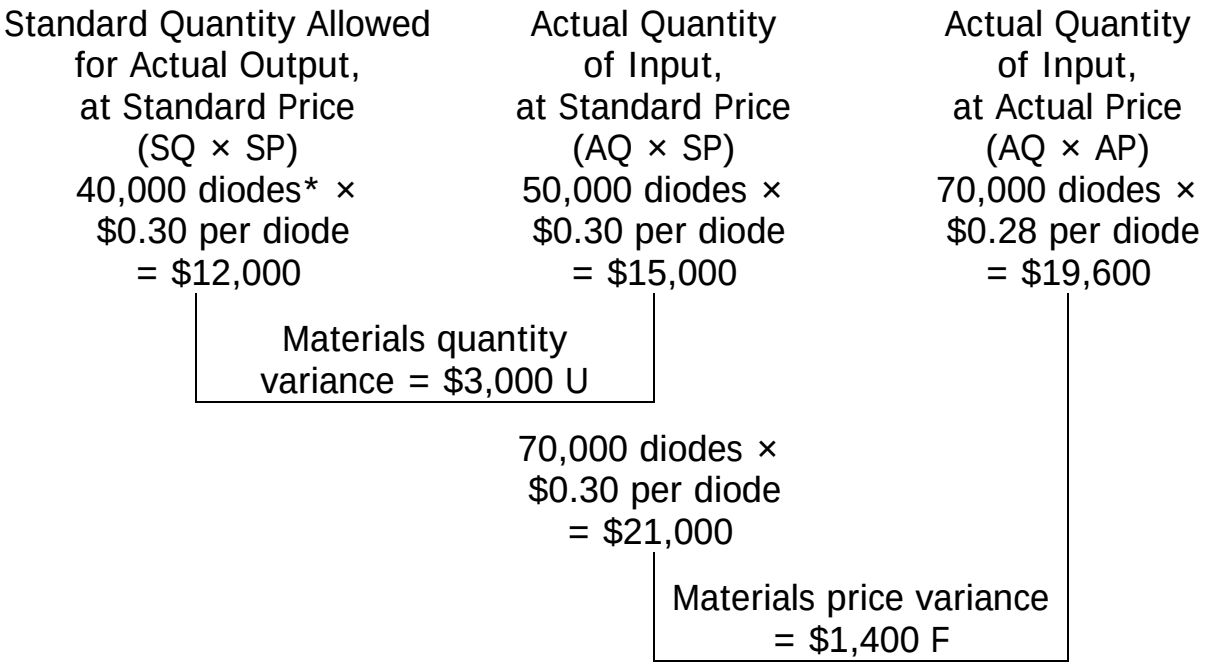
An alternative approach would be to work from known to unknown data in the columnar model for variance analysis:

Standard Hours Allowed for Actual Output, at Standard Rate (SH × SR)	Actual Hours of Input, at Standard Rate (AH × SR)	Actual Hours of Input, at Actual Rate (AH × AR)
210 hours[§] × $12.00 per hour* = $2,520	250 hours × $12.00 per hour* = $3,000	250 hours × $11.40 per hour = $2,850
Labor efficiency variance = $480 U		Labor rate variance = $150 F*
Spending variance = $330 U*		

[§]168 batches × 1.25 hours per batch = 210 hours
*Given

Exercise 10-8 (30 minutes)

1. a. Notice in the solution below that the materials price variance is computed on the entire amount of materials purchased, whereas the materials quantity variance is computed only on the amount of materials used in production.



*5,000 toys × 8 diodes per toy = 40,000 diodes

Alternatively, the variances can be computed using the formulas:

Materials quantity variance = SP (AQ – SQ)
= $0.30 per diode (50,000 diodes – 40,000 diodes)
= $3,000 U

Materials price variance = AQ (AP – SP)
= 70,000 diodes ($0.28 per diode – $0.30 per diode)
= $1,400 F

Exercise 10-8 (continued)

b. Direct labor variances:

Standard Hours Allowed for Actual Output, at Standard Rate (SH × SR)	Actual Hours of Input, at Standard Rate (AH × SR)	Actual Hours of Input, at Actual Rate (AH × AR)
3,000 hours* × $14.00 per hour = $42,000	3,200 hours × $14.00 per hour = $44,800	$48,000
Labor efficiency variance = $2,800 U	Labor rate variance = $3,200 U	
Spending variance = $6,000 U		

*5,000 toys × 0.6 hours per toy = 3,000 hours

Alternatively, the variances can be computed using the formulas:

Labor efficiency variance = SR (AH – SH)
= $14.00 per hour (3,200 hours –3,000 hours)
= $2,800 U

Labor rate variance = AH (AR – SR)
= 3,200 hours ($15.00* per hour – $14.00 per hour)
= $3,200 U
*$48,000 ÷ 3,200 hours = $15.00 per hour

Exercise 10-8 (continued)

2. A variance usually has many possible explanations. In particular, we should always keep in mind that the standards themselves may be incorrect. Some of the other possible explanations for the variances observed at Topper Toys appear below:

   Materials Price Variance Since this variance is favorable, the actual price paid per unit for the material was less than the standard price. This could occur for a variety of reasons including the purchase of a lower grade material at a discount, buying in an unusually large quantity to take advantage of quantity discounts, a change in the market price of the material, and particularly sharp bargaining by the purchasing department.

   Materials Quantity Variance Since this variance is unfavorable, more materials were used to produce the actual output than were called for by the standard. This could also occur for a variety of reasons. Some of the possibilities include poorly trained or supervised workers, improperly adjusted machines, and defective materials.

   Labor Rate Variance Since this variance is unfavorable, the actual average wage rate was higher than the standard wage rate. Some of the possible explanations include an increase in wages that has not been reflected in the standards, unanticipated overtime, and a shift toward more highly paid workers.

   Labor Efficiency Variance Since this variance is unfavorable, the actual number of labor hours was greater than the standard labor hours allowed for the actual output. As with the other variances, this variance could have been caused by any of a number of factors. Some of the possible explanations include poor supervision, poorly trained workers, low-quality materials requiring more labor time to process, and machine breakdowns. In addition, if the direct labor force is essentially fixed, an unfavorable labor efficiency variance could be caused by a reduction in output due to decreased demand for the company's products.

Problem 10-11 (45 minutes)

1. a. In the solution below, the materials price variance is computed on the entire amount of materials purchased, whereas the materials quantity variance is computed only on the amount of materials used in production:

Standard Quantity Allowed for Actual Output, at Standard Price (SQ × SP)	Actual Quantity of Input, at Standard Price (AQ × SP)	Actual Quantity of Input, at Actual Price (AQ × AP)
4,500 pounds* × $6.00 per pound = $27,000	6,000 pounds × $6.00 per pound = $36,000	$46,000
Materials quantity variance = $9,000 U		
	8,000 pounds × $6.00 per pound = $48,000	
		Materials price variance = $2,000 F

*3,000 units × 1.5 pounds per unit = 4,500 pounds

Alternatively, the variances can be computed using the formulas:

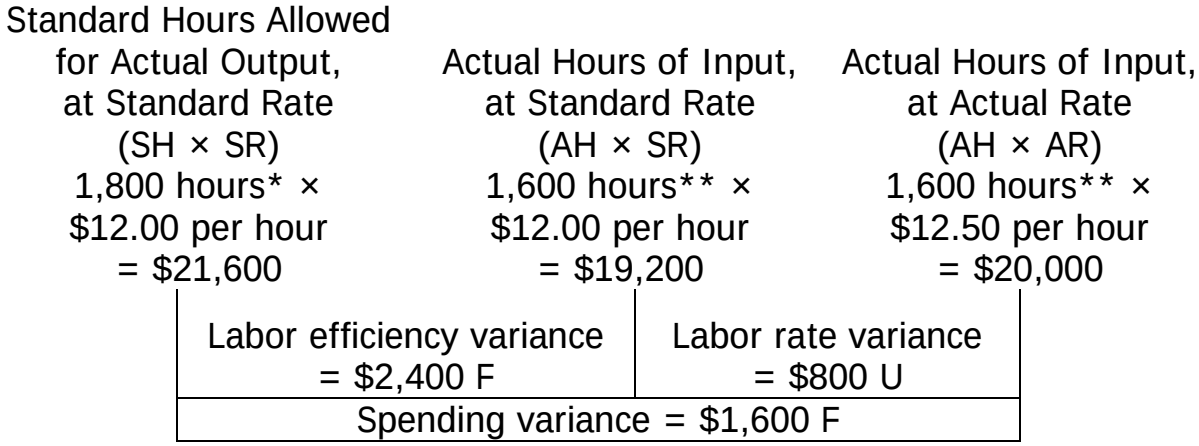
Materials quantity variance = SP (AQ – SQ)
= $6 per pound (6,000 pounds – 4,500 pounds) = $9,000 U

Materials price variance = AQ (AP – SP)
= 8,000 pounds ($5.75 per pound* – $6.00 per pound) = $2,000 F
*$46,000 ÷ 8,000 pounds = $5.75 per pound

b. No, the contract should probably not be signed. Although the new supplier is offering the material at only $5.75 per pound, the large materials quantity variance indicates a problem using these materials is production. The company still has 2,000 pounds of unused material in the warehouse; if these materials do as poorly in production as the 6,000 pounds already used, the total quantity variance on the 8,000 pounds of materials purchased will be very large.

Problem 10-11 (continued)

2. a.



* 3,000 units × 0.6 hours per unit = 1,800 hours
** 10 workers × 160 hours per worker = 1,600 hours

Alternatively, the variances can be computed using the formulas:

Labor efficiency variance = SR (AH – SH)
= $12.00 per hour (1,600 hours – 1,800 hours)
= $2,400 F

Labor rate variance = AH (AR – SR)
= 1,600 hours ($12.50 per hour – $12.00 per hour)
= $800 U

b. Yes, the new labor mix should probably be continued. Although it increases the average hourly labor cost from $12.00 to $12.50, resulting in an $800 unfavorable labor rate variance, this is more than offset by greater efficiency of labor time. Notice that the labor efficiency variance is $2,400 favorable. Thus, the new labor mix reduces overall labor costs.

Problem 10-11 (continued)

3.

Standard Hours Allowed for Actual Output, at Standard Rate (SH × SR)	Actual Hours of Input, at Standard Rate (AH × SR)	Actual Hours of Input, at Actual Rate (AH × AR)
1,800 hours × $2.50 per hour = $4,500	1,600 hours × $2.50 per hour = $4,000	$3,600
Variable overhead efficiency variance = $500 F	Variable overhead rate variance = $400 F	
Spending variance = $900 F		

Alternatively, the variances can be computed using the formulas:

Variable overhead efficiency variance = SR (AH – SH)
= $2.50 per hour (1,600 hours – 1,800 hours)
= $500 F

Variable overhead rate variance = AH (AR – SR)
= 1,600 hours ($2.25 per hour* – $2.50 per hour)
= $400 F
*$3,600 ÷ 1,600 hours = $2.25 per hour

Both the labor efficiency variance and the variable overhead efficiency variance are computed by comparing actual labor-hours to standard labor-hours. Thus, if the labor efficiency variance is favorable, then the variable overhead efficiency variance will be favorable as well.