**Esercizio n.1**

1. Under the traditional direct labor-hour based costing system, manufacturing overhead is applied to products using the predetermined overhead rate computed as follows:



\*25,000 units of Xactive @ 1.4 DLH per unit + 75,000 units of the Pathbreaker @ 1.0 DLH per unit = 35,000 DLHs + 75,000 DLHs = 110,000 DLHs

Consequently, the product margins using the traditional approach would be computed as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Xactive* | *Pathbreaker* | *Total* |
| Sales | $3,175,000 | $6,675,000 | $9,850,000 |
| Direct materials | 1,620,000 | 3,825,000 | 5,445,000 |
| Direct labor | 455,000 | 975,000 | 1,430,000 |
| Manufacturing overhead applied @ $20.00 per direct labor-hour | 700,000 | 1,500,000 | 2,200,000 |
| Total manufacturing cost | 2,775,000 | 6,300,000 | 9,075,000 |
| Product margin | $  400,000 | $  375,000 | $  775,000 |

Note that all of the manufacturing overhead cost is applied to the products under the company’s traditional costing system.

2. The first step is to determine the activity rates:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | (a) Total Cost | (b) Total Activity | | (a) ÷ (b) Activity Rate | |
|  | Supporting direct labor | $797,500 | 110,000 | DLHs | $7.25 | per DLH |
|  | Batch setups | $680,000 | 400 | setups | $1,700 | per setup |
|  | Product sustaining | $650,000 | 2 | products | $325,000 | per product |

\*The Other activity cost pool is not shown above because it includes organization-sustaining and idle capacity costs that should not be assigned to products.

Under the activity-based costing system, the product margins would be computed as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Xactive | Pathbreaker | Total |
| Sales | $3,175,000 | $6,675,000 | $9,850,000 |
| Direct materials | 1,620,000 | 3,825,000 | 5,445,000 |
| Direct labor | 455,000 | 975,000 | 1,430,000 |
| Supporting direct labor | 253,750 | 543,750 | 797,500 |
| Batch setups | 425,000 | 255,000 | 680,000 |
| Product sustaining | 325,000 | 325,000 | 650,000 |
| Total cost | 3,078,750 | 5,923,750 | 9,002,500 |
| Product margin | $   96,250 | $  751,250 | $  847,500 |

**Problem 7-18** (continued)

3. The quantitative comparison is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Xactive | | Pathbreaker | | Total |
| Traditional Cost System | (a) Amount | (a) ÷ (c) % | (b) Amount | (b) ÷ (c) % | (c) Amount |
| Direct materials | $1,620,000 | 29.8% | $3,825,000 | 70.2% | $5,445,000 |
| Direct labor | 455,000 | 31.8% | 975,000 | 68.2% | 1,430,000 |
| Manufacturing overhead | 700,000 | 31.8% | 1,500,000 | 68.2% | 2,200,000 |
| Total cost assigned to products | $2,775,000 |  | $6,300,000 |  | $9,075,000 |
|  |  |  |  |  |  |
| *Activity-Based Costing System* |  |  |  |  |  |
| Direct costs: |  |  |  |  |  |
| Direct materials | $1,620,000 | 29.8% | $3,825,000 | 70.2% | $5,445,000 |
| Direct labor | 455,000 | 31.8% | 975,000 | 68.2% | 1,430,000 |
| Indirect costs: |  |  |  |  |  |
| Supporting direct labor | 253,750 | 31.8% | 543,750 | 68.2% | 797,500 |
| Batch setups | 425,000 | 62.5% | 255,000 | 37.5% | 680,000 |
| Product sustaining | 325,000 | 50.0% | 325,000 | 50.0% | 650,000 |
| Total cost assigned to products | $3,078,750 |  | $5,923,750 |  | 9,002,500 |
| Costs not assigned to products: |  |  |  |  |  |
| Other |  |  |  |  | 72,500 |
| Total cost |  |  |  |  | $9,075,000 |

The traditional and activity-based cost assignments differ for two reasons. First, the traditional system assigns all $2,200,000 of manufacturing overhead to products. The ABC system assigns only $2,127,500 of manufacturing overhead to products. The ABC system does not assign the $72,500 of Other activity costs to products because they represent organization-sustaining and idle capacity costs. Second, the traditional system uses one unit-level activity measure, direct labor hours, to assign 31.8% of all overhead to the Xactive product line and 68.2% of all overhead to the Pathbreaker product line. The ABC system assigns 62.5% of Batch setup costs (a batch-level activity) to the Xactive product line and 37.5% to the Pathbreaker product line. The ABC system assigns 50% of Product sustaining costs (a product-level activity) to each product line.

**Esercizio n.2**

1. a. The unit product cost under absorption costing is:

|  |  |
| --- | --- |
| Direct materials | $15 |
| Direct labor | 7 |
| Variable manufacturing overhead | 2 |
| Fixed manufacturing overhead  (640,000 ÷ 40,000 units) | 16 |
| Absorption costing unit product cost | $40 |
|  |  |

b. The absorption costing income statement is:

|  |  |  |
| --- | --- | --- |
|  | Sales (35,000 units × $60 per unit) | $2,100,000 |
|  | Cost of goods sold (35,000 units × $40 per unit) | 1,400,000 |
|  | Gross margin | 700,000 |
|  | Selling and administrative expenses  (35,000 units × $2 per unit) + $560,000 | 630,000 |
|  | Net operating income | $    70,000 |
|  |  |  |

2. a. The unit product cost under variable costing is:

|  |  |
| --- | --- |
| Direct materials | $15 |
| Direct labor | 7 |
| Variable manufacturing overhead | 2 |
| Variable costing unit product cost | $24 |
|  |  |

b. The variable costing income statement is:

|  |  |  |
| --- | --- | --- |
| Sales (35,000 units × $60 per unit) |  | $2,100,000 |
| Variable expenses: |  |  |
| Variable cost of goods sold  ($35,000 × $24 per unit) | $840,000 |  |
| Variable selling expense  (35,000 units × $2 per unit) | 70,000 | 910,000 |
| Contribution margin |  | 1,190,000 |
| Fixed expenses: |  |  |
| Fixed manufacturing overhead | 640,000 |  |
| Fixed selling and administrative expense | 560,000 | 1,200,000 |
| Net operating loss |  | $   (10,000) |
|  |  |  |

3. The difference in the ending inventory relates to a difference in the handling of fixed manufacturing overhead costs. Under variable costing, these costs have been expensed in full as period costs. Under absorption costing, these costs have been added to units of product at the rate of $16 per unit ($640,000 ÷ 40,000 units produced = $16 per unit). Thus, under absorption costing a portion of the $640,000 fixed manufacturing overhead cost of the month has been added to the inventory account rather than expensed on the income statement:

|  |  |
| --- | --- |
| Added to the ending inventory  (5,000 units × $16 per unit) | $ 80,000 |
| Expensed as part of cost of goods sold  (35,000 units × $16 per unit) | 560,000 |
| Total fixed manufacturing overhead cost for the month | $640,000 |
|  |  |

Because $80,000 of fixed manufacturing overhead cost has been deferred in inventory under absorption costing, the net operating income reported under that costing method is $80,000 higher than the net operating income under variable costing, as shown in parts (1) and (2) above.

Si può vedere anche così:

Il variable spesa tutti i 640000 di costi fissi di produzione, il full solo quelli relativi al venduto: 35000\*16. La differenze è incorporata e rinviata con le rimanenze (5000\*16=80000)

**Esercizio n.3**

1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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) | |
| 5,600 yards\*\* ×  $6.50 per yard\* = $36,400 | | 6,000 yards ×  $6.50 per yard\* = $39,000 | | $36,000 | |
|  |  |  |  |  |  |
|  | Materials quantity variance = $2,600 U | | Materials price variance = $3,000 F | |  |
|  | Spending variance = $400 F | | | |  |

|  |  |
| --- | --- |
| \* | $18.20 ÷ 2.8 yards = $6.50 per yard. |
| \*\* | 2,000 units × 2.8 yards per unit = 5,600 yards |

Alternatively, the variances can be computed using the formulas:

Materials quantity variance = SP (AQ – SQ)

= $6.50 per yard (6,000 yards – 5,600 yards)

= $2,600 U

Materials price variance = AQ (AP – SP)

= 6,000 yards ($6.00 per yard\* – $6.50 per yard)

= $3,000 F

\*$36,000 ÷ 6,000 yards = $6.00 per yard

2. Many students will miss parts 2 and 3 because they will try to use *product* costs as if they were *hourly* costs. Pay particular attention to the computation of the standard direct labor time per unit and the standard direct labor rate per hour.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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) | |
| 800 hours\*\* ×  $9 per hour\* = $7,200 | | 760 hours ×  $9 per hour\* = $6,840 | | $7,600 | |
|  |  |  |  |  |  |
|  | Labor efficiency variance  = $360 F | | Labor rate variance  $760 U | |  |
|  | Spending variance = $400 U | | | |  |

|  |  |
| --- | --- |
| \* | 780 standard hours ÷ 1,950 robes = 0.4 standard hour per robe qstandard |
|  | $3.60 standard cost per robe ÷ 0.4 standard hours = $9 standard rate per hour |
| \*\* | 2,000 robes × 0.4 standard hour per robe = 800 standard hours |

Alternatively, the variances can be computed using the formulas:

Labor efficiency variance = SR (AH – SH)

= $9 per hour (760 hours – 800 hours)

= $360 F

q effettiva è 760h/2000unità=0,38h/unità invece che 0,4

Labor rate variance = AH (AR – SR)

= 760 hours ($10 per hour\* – $9 per hour)

= $760 U

\*$7,600 ÷ 760 hours = $10 per hour

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) | |
| 800 hours ×  $3.00 per hour\* = $2,400 | | 760 hours ×  $3.00 per hour\* = $2,280 | | $3,800 | |
|  |  |  |  |  |  |
|  | Variable overhead efficiency variance  = $120 F | | Variable overhead rate variance  = $1,520 U | |  |
|  | Spending variance = $1,400 U | | | |  |

|  |  |
| --- | --- |
| \* | $1.20 standard cost per robe ÷ 0.4 standard hours = $3.00 standard rate per hour oppure 2340$/780H |

Alternatively, the variances can be computed using the formulas:

Variable overhead efficiency variance = SR (AH – SH)

= $3.00 per hour (760 hours – 800 hours)

= $120 F

Variable overhead rate variance = AH (AR – SR)

= 760 hours ($5.00 per hour\* – $3.00 per hour)

= $1,520 U

\*$3,800 ÷ 760 hours = $5.00 per hour oppure 1,90/0,38

**Esercizio n.4**

1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Total* | *Geographic Market* | | |
|  | *Company* | *South* | *Central* | *North* |
| Sales | $1,500,000 | $400,000 | $600,000 | $500,000 |
| Variable expenses | 588,000 | 208,000 | 180,000 | 200,000 |
| Contribution margin | 912,000 | 192,000 | 420,000 | 300,000 |
| Traceable fixed expenses | 770,000 | 240,000 | 330,000 | 200,000 |
| Geographic market segment margin | 142,000 | $(48,000) | $ 90,000 | $100,000 |
| Common fixed expenses not traceable to geographic markets\* | 175,000 |  |  |  |
| Net operating income (loss) | $  (33,000) |  |  |  |
|  |  |  |  |  |

\*$945,000 – $770,000 = $175,000.

|  |  |  |
| --- | --- | --- |
| 2. | Incremental sales ($600,000 × 15%) | $90,000 |
|  | Contribution margin ratio ($420,000 ÷ $600,000) | ×  70% |
|  | Incremental contribution margin | 63,000 |
|  | Less incremental advertising expense | 25,000 |
|  | Incremental net operating income | $38,000 |
|  |  |  |

Yes, the advertising program should be initiated.