MSW 3.1.

The following information was received from Sheltie Manufacturing.

|  |  |
| --- | --- |
| Warranty claims | $170,000 |
| Product liability lawsuits | 200,000 |
| Rework costs | 600,000 |
| Quality training | 355,000 |
| Inspection of incoming material | 900,000 |
| Statistical process control | 650,000 |
| Waste | 390,000 |
| Product quality audits | 485,000 |
|  |  |
| Total sales | $50,000,000 |

REQUIRED:

|  |  |
| --- | --- |
| a. | Compute the total prevention costs. |
| b. | Compute the total appraisal costs. |
| c. | Compute the total internal failure costs. |
| d. | Compute the total external failure costs. |

MSW 3-3

**Quality improvement.** Trimline Frames makes bicycle frames in two processes, tubing and welding. The tubing process has a capacity of 50,000 units per year; welding has a capacity of 75,000 units per year. Cost information follows:

|  |  |
| --- | --- |
| Design of product and process costs | $100,000 |
| Inspection and testing costs | 42,500 |
| Scrap costs (all in the tubing dept.) | 175,000 |

The company enjoys high demand for its products. Trimline Frames can sell whatever output it can produce for the market price of $60 per frame. Trimline Frames can start only 50,000 units into production in the tubing department because of capacity constraints on the tubing machines. The company scraps all defective units produced in the tubing department. Of the 50,000 units started in the tubing operation, 5,000 units (10 percent) are scrapped at the end of the production process. Scrap costs, based on total (fixed and variable) manufacturing costs incurred in the tubing operation, equal $38 per unit as follows:

|  |  |
| --- | --- |
| Direct materials (variable) | $19 |
| Direct manufacturing, setup, and materials handling labor (variable) | 9 |
| Depreciation, rent, and other overhead (fixed) | 10 |
|  | $38 |

The “$10 fixed cost” is the portion of the total fixed costs of $500,000 allocated to each unit, whether good or defective. The good units from the tubing department are sent to the welding department. Variable manufacturing costs in the welding department are $3.00 per unit. There is no scrap in the welding department. Therefore, Trimline Frames’ total sales quantity equals the tubing department’s output. Trimline Frames incurs no other variable costs. Trimline Frames’ designers have discovered that using a different type of material in the tubing operation would reduce scrap to zero, but it would increase the variable costs per unit in the tubing department by $1.50. Recall that only 50,000 units can be started each year.

**Required:**

**a.** What is the additional direct materials cost of implementing the new method?

**b.** What is the additional benefit to Trimline Frames from using the new material and improving quality?

**c.** Should Trimline Frames use the new materials?

MSW 3.4

**Learning curve.** Falcon Co. makes technical products for magicians. To make Product J24, the company recently recorded the following costs, which decline subject to an 85 percent cumulative learning curve.

|  |  |
| --- | --- |
| **Cumulative Number**  **of Units Produced** | **Average Labor**  **Costs per Unit** |
| **1** | **$5,000** |
| **2** |  |
| **4** |  |
| **8** |  |
| **16** |  |

**Required:**

Complete the chart by filling in the cost amounts for volumes of 4, 8, and 16 units and show your calculations.