

# Statistics: practice problems solutions

[Business](#), [Management](#)



If needed, additional workspace is provided on the next sheet. Doug Moodie is the president of Garden Products Limited. Over the last 5 years, his vice president of marketing has been providing the sales forecast using his special “focus” forecasting technique. The actual sales for the past ten years and the forecasts from the vice president of marketing are given below. Doug wonders if perhaps a weighted moving average or an exponential smoothing approach to forecasting might be better than having the vice president of marketing prepare the forecast. Doug wants to evaluate a two-period weighted moving average with weights of 0.7 and 0.3 for the most recent and next most recent periods. He also wants to evaluate the exponential smoothing with an  $\alpha = 0.3$  and a starting forecast for period 6 of 168,000 units.

Which of the three methods (weighted moving average, exponential smoothing and VP/Marketing) provides the best forecasting method if you were to evaluate these methods for their forecasting accuracy for Years 8 through 10. Use one of the evaluation methods we have discussed. See next page

In part a) we identified which is the best method of those three methods.

However, would you recommend using this method for forecasting sales for Year 11? Why or Why not? See next page c) What would be the forecast for Year 11 using both the weighted moving average and the exponential smoothing methods? See next page [pic] 2. (23 points) Lake Charles Seafood makes 500 wooden packing boxes for fresh seafood per day, working in two 10-hour shifts. The marketing department has advised that demand has

increased so that 650 wooden boxes for fresh seafood are required daily. Due to higher demand, plant managers are considering operating three 8-hour shifts instead. Productivity is measured in terms of boxes produced per hour worked. Calculate the productivity of the operation for the two-shift operation producing 500 boxes.  $500/20 = 25$  boxes per hour Calculate the productivity of the operation for the three-shift operation producing 650 boxes.  $650/24 = 27.08$

Using the two-shift operation as the base, calculate the percentage difference between the two-shift operation and the three-shift operation as described in parts a) and b). Now suppose that the plant managers want to be able to produce the 650 boxes but only use two 10-hour shifts. What must the productivity be to achieve this production output?  $650/20 = 32.50$  boxes per hour ) If the company believes that to be competitive if it is to produce 650 wooden boxes, the company must reach a productivity measure of 40 boxes per hour. What are the maximum hours a day the company can work?  $650/x = 40$   $X = 16.25$  hours 3. (19 points) Additional workspace is provided on the next page. Students in ascienceclass have just received their grades on the first test. The instructor has provided information about the first test grades in some previous classes as well as the final average for the same students. You are also provided the results from several different linear regression relationships for the above data. These provide different regression relationships looking at different combination of independent and dependent variables.

- Develop a linear regression model that can be used to predict the final course average based on the first test grade.

- Predict the final average of a student who made an 83 on the first test.
- Would you recommend using this relationship for forecasting the final averages? Why? Also, explain how strong the relationship is between these two variables.
- Suppose a student scored a 38 on the first test. Predict the final average of a student who had this score?

**What cautions would you recommend about using the linear regression relationship for predicting a final average?**

(18 points) David Upton is president of Upton manufacturing, a producer of Go-Kart tires. Upton makes 1, 000 tires per day with the following resources: Labor: 400 hours at \$12. 50 per hour Raw Material: 20, 000 pounds per day at \$1. 00 per pound Energy:\$5, 000 per day Capital:\$10, 000 per day a) What is the labor productivity for these tires at Upton Manufacturing expressed per labor hour? Labor productivity =  $1000 \text{ tires} / 400 \text{ hours} = 2.5 \text{ tires/hour}$ . b) What is the multi-factor (total factor) productivity expressed per dollar? Original Multifactor productivity is  $1000 \text{ tires} / (400 \times \$12.50 + 20,000 \times \$1 + \$5,000 + \$10,000) = 1,000 \text{ tires} / \$40,000 = 0.025 \text{ tires/dollar}$ . c) What is the percent change in the total factor productivity if Upton can reduce the energy bill by \$1, 000 without cutting production or changing any other inputs? Original Multifactor productivity is  $1000 \text{ tires} / (400 \times \$12.50 + 20,000 \times \$1 + \$5,000 + \$10,000) = 1,000 \text{ tires} / \$40,000 = 0.025 \text{ tires/dollar}$ . Revised Multifactor productivity changes from  $1,000 / 40,000$  to  $1,000 / 39,000$ , or from 0.025 to 0.02564 The ratio is 1.0256, so the change is a 2.56 percent increase.

Briefly discuss two ways that operations management can provide a company with a competitive advantage.

Supports the other functions, delivers what is promised to the customer; provides a competitive advantage; provides a low cost option; plan and execute the production and delivery of the firm's goods and services; Ops Mgt is defined as the design, operation, and improvement of the systems that create and deliver the firm's primary products and services.

Briefly discuss two of the major issues that are facing operations management staff in the current business environment. Global challenge, automation and technology, commoditization of the supplier, coordinating the relationships between mutually supportive but separate organizations, optimizing global supplier, production, and distribution networks, increased co-production of goods and services, managing customer touch points, raising senior management awareness of operations as a significant competitive weapon.