**Self-Assessment 9**

1. Which of the following scenarios best describes Forecasting?

a. A meteorological study of the local environment

b. How consistent machines produce the same product

c. A prediction of future events used for planning purposes

d. Randomly guessing the future

**Solution: C**

**Explanation: A and B are applications of Forecasting, and thus are incorrect answers. D is also incorrect since randomly guessing is not Forecasting. Option C accurately describes Forecasting.**

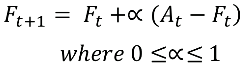
2. In Exponential Smoothing, for high α, there is a lot of reaction to differences.

a. True

b. False

**Solution: True**

**Explanation:**

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**If α is too low, there is little reaction to difference and Ft+1 is close to Ft. Conversely, if α is too high, there is a lot of reaction to differences.**

3. Forecasts are almost always wrong?

a. True

b. False

**Solution: True**

**Explanation: A statistical forecast is stated as a number followed by a plus and minus range (Confidence Interval). That would mean that the**[**statistical model**](http://en.wikipedia.org/wiki/Statistical_model)**employed can predict with reasonable certainty that a future quantity would fall in the range between Confidence Intervals. However, to be useful for planning production or other actions, that range really needs to be narrowed to a single number. The problem is that the number we forecast is almost always going to be wrong—we just don’t know by *how much* it’s going to be wrong.**

4. Data can exhibit multiple patterns.

a. True

b. False

**Solution: True**

**Explanation: The Data can exhibit different patterns such as trends, seasonality, cyclical patterns, autocorrelation and random variation.**

**Question 5-7 - Details**

**Use the following for Questions 5-7.**  
  
Bobby Dodd works at Football Inc., a seller of high-quality footballs. He is interested in forecasting demand for his footballs that are sold weekly to Ga Tech using exponential smoothing. Assume an initial forecast of 175 and the demand data below:

|  |  |  |
| --- | --- | --- |
| **Week** | **Demand** | **Forecast** |
| **1** | 180 | 175 |
| **2** | 168 |  |
| **3** | 159 |  |
| **4** | 175 |  |

5. Using Exponential Smoothing and α=.7, what would be the demand forecast for week 4?

a. 178.5

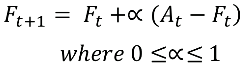
b. 167.51

c. 162.65

d. 175.35

**Solution: C**

**Explanation:**

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**Using above equation and α=.7 we get:**

|  |  |  |
| --- | --- | --- |
| **Week** | **A** | **F** |
| 1 | 180 | 175 |
| 2 | 168 | 178.5 |
| 3 | 159 | 171.15 |
| 4 | 175 | 162.645 |

6. Using Exponential Smoothing and α=.3, what would be the demand forecast for week 4?

a. 178.53

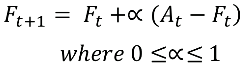
b. 169.47

c. 167.51

d. 162.65

**Solution: B**

**Explanation:**

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**Using above equation and α=.3 we get:**

|  |  |  |
| --- | --- | --- |
| **Week** | **A** | **F** |
| 1 | 180 | 175 |
| 2 | 168 | 176.5 |
| 3 | 159 | 173.95 |
| 4 | 175 | 169.465 |

7. Using Mean Absolute Deviation (MAD) as your sole evaluation measurement, which model would you pick and why?

a. Pick α=.3 model. It has a lower MAD

b. Pick α=.3 model. It has a higher MAD

c. Pick α=.7 model. It has a lower MAD

d. Pick α=.7 model. It has a higher MAD

**Solution:A**

**Explanation:**

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|  |  |  |
| --- | --- | --- |
| **Week** | **MAD (alpha = 0.7)** | **MAD (alpha = 0.3)** |
| 1 | 5 | 5 |
| 2 | 10.5 | 8.5 |
| 3 | 12.15 | 14.95 |
| 4 | 12.355 | 5.535 |
| **Total** | **10.00125** | **8.49625** |

**Higher MAD implies worse performance.**

**Use the following for Questions 8-9**:

Quickest Trippy is a local gas station. They want to predict demand for gasoline and have the following historical data.

|  |  |  |
| --- | --- | --- |
| **Month** | **Demand (in thousands of gallons)** | **Forecast** |
| **April** | 12 |  |
| **May** | 17 |  |
| **June** | 20 |  |
| **July** | 19 |  |
| **August** | 24 |  |

8. Using α=.2 and δ=.4 as well as F1=11,000 and T1=2,000 what would be the Trend Component predicted for week 2 (T2)?

a. 1.92

b. 12.8

c. 2.10

d. 15.18

**Solution: A**

9. Using α=.2 and δ=.4 as well as F1=11,000 and T1=2,000 what would be the Forecast Including Trend for week 2 (FIT2)?

a. 15.18

b. 12.80

c. 14.72

d. 17.28

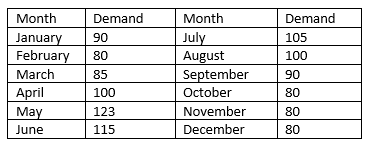
**Solution: C**

**Explanation of 8 & 9:**

**For alpha = 0.2 and delta = 0.4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **A** | **F** | **T** | **FIT** |
| 1 | 12 | 11 | 2 | 13 |
| 2 | 17 | 12.8 | 1.92 | 14.72 |
| 3 | 20 | 15.176 | 2.1024 | 17.2784 |
| 4 | 19 | 17.82272 | 2.320128 | 20.142848 |
| 5 | 24 | 19.9142784 | 2.22870016 | 22.1429786 |

10. Using the following data, what would be the seasonality index for March?



a. 1.170

b. 0.957

c. 0.904

d. 0.851

**Solution: C**

**Explanation:**

|  |  |  |
| --- | --- | --- |
| **Month** | **Demand** | **SI** |
| Jan | 90 | 0.9574 |
| Feb | 80 | 0.8511 |
| Mar | 85 | 0.9043 |
| Apr | 100 | 1.0638 |
| May | 123 | 1.3085 |
| Jun | 115 | 1.2234 |
| Jul | 105 | 1.1170 |
| Aug | 100 | 1.0638 |
| Sep | 90 | 0.9574 |
| Oct | 80 | 0.8511 |
| Nov | 80 | 0.8511 |
| Dec | 80 | 0.8511 |
| **Total** | **1128** |  |
| **Avg** | **94** |  |