1.

$\overline{\mathrm{c}} = 3$

$$\mathrm{s}_{\mathrm{c}}^2 = \frac{1}{9}\sum_{i=1}^{10}(c_i - 3)^2 = \frac{16}{9}$$

$$\text{standard error} = \mathrm{s}_{\mathrm{c}}\sqrt{l} = \frac{16}{9} * \sqrt{9} = \frac{16}{9} * 3 = \frac{16}{3} = 5.333$$

In the video, $\frac{16}{9}$ is stated to equal $\frac{4}{3}$, but this is not true.

2.

$\hat{\mu}_c = 2.25$

$\hat{y}_5 = 12 + 2.25 = 14.25$

$\hat{y}_6 = 15 + 2.25 = 17.25$

$\hat{y}_7 = 21 + 2.25 = 23.25$

$$\mathrm{ME} = \frac{(15 - 14.25) + (21 - 17.25) + (22 - 23.25)}{3} = 1.083$$

$$\mathrm{MSE} = \frac{(15 - 14.25)^2 + (21 - 17.25)^2 + (22 - 23.25)^2}{3} = 5.3958$$

$5.3958 - 1.083 = 4.31$

The answer is B.

3.

For an AR(1) model, it is possible for β_0 to equal 1.

The answer is A, as it is the only false answer.

4.

Since it is a stationary AR(1) model, $|\beta_1| < 1$ is always true.

The answer is E.

5.

$\bar{y} = 4.25$

$$\beta_1 = \frac{\sum_{t=2}^{T}(y_{t-1} - \bar{y})(y_t - \bar{y})}{\sum_{t=2}^{T}(y_t - \bar{y})^2}$$

$\beta_1 = 0.366796$

$\beta_0 = 4.25(1 - 0.366795) = 2.69112$

6.

$\bar{y} = 40$

$$\beta_1 = \frac{\sum_{t=2}^{T}(y_{t-1} - \bar{y})(y_t - \bar{y})}{\sum_{t=2}^{T}(y_t - \bar{y})^2} = \frac{117}{262} = 0.4466$$

$\beta_0 = 40(1 - 0.4466) = 22.1374$

$e_2 = -0.9806$

$e_3 = -0.767$

$e_4 = 2.3398$

$e_5 = 4.5534$

$e_6 = 8.767$

$\bar{e} = 2.7825$

$$s^2 = \frac{\sum_{t=2}^{6}(e_t - \bar{e})^2}{6 - 3} = 21.97 = 22$$

The answer is C.

7.

Calculating up to the five step ahead forecast.

$y_t = 0.6t_{t-1} - 5 + \epsilon$

$y_T = 7$

$y_{T+1} = -5 + (0.6 * 7) = -0.8$

$y_{T+2} = -5 + 0.6(-0.8) = -5.48$

$y_{T+3} = -8.288$

$y_{T+4} = -9.9728$

$y_{T+5} = -10.9837$

8.

$$\hat{s}_5 = \frac{13 + 8}{2} = 10.5$$

$$\hat{y}_{5+1} = \hat{s}_5 = 10.5$$

9.

$$\hat{s}_2 = 0.2(3) + 0.8(1) = 1.4$$

$$\hat{s}_3 = 0.2(5) + 0.8(1.4) = 2.12$$

$$\hat{s}_4 = 0.2(8) + 0.8(2.12) = 3.296$$

$$\hat{s}_5 = 0.2(13) + 0.8(3.296) = 5.2368$$

$$\hat{y}_{5+1} = \hat{s}_5 = 5.2368$$

10.

$$\hat{s}_{100} = \hat{y}_{102} = 0.2(100.2) + 0.8(95.1) = 96.12$$

$$\hat{s}_{99}^{(2)} = 0.2(95.1) + 0.8(89.9) = 90.94$$

$$\hat{s}_{100}^{(2)} = 0.2(96.12) + 0.8(90.94) = 91.976$$

$$\beta_0 = 2(96.12) - 91.976 = 100.264$$

$$\beta_1 = \frac{0.2}{0.8}(96.12 - 91.976) = 1.036$$

$$\hat{y}_{102} = 100.264 + 1.036(2) = 102.336$$

$$103.336 - 91.976 = 6.216$$

The answer is D.