```
##
## Call:
## arima(x = huron_level, order = c(2, 0, 1))
##
## Coefficients:
##          ar1     ar2     ma1  intercept
##       0.3388  0.4092  0.6320   176.4821
## s.e.  0.4646  0.4132  0.4262     0.1039
##
## sigma^2 estimated as 0.04479:  log likelihood = 21.42,  aic = -32.84
```

```
##
## Call:
## arima(x = huron_level, order = c(2, 0, 2))
##
## Coefficients:
##           ar1     ar2     ma1     ma2  intercept
##       -0.1223  0.7646  1.1310  0.1310   176.4815
## s.e.   0.0682  0.0550  0.1084  0.1004     0.1004
##
## sigma^2 estimated as 0.04364:  log likelihood = 22.64,  aic = -33.28
```

The R output above uses `stats::arima` to fit ARMA(2,1) and ARMA(2,2) models to the January level (in meters above sea level) of Lake Huron from 1860 to 2024. We aim to choose one of these as a null hypothesis of no trend for later comparison with models including a trend.

Which is the best conclusion from the evidence above:

A: The ARMA(2,2) model has a lower AIC so it should be prefered

B: We cannot reject the null hypothesis of ARMA(2,1) since the ARMA(2,2) model has a likelihood less than 1.92 log units higher than ARMA(2,1). Since there is not sufficient evidence to the contrary, it is better to select the simpler ARMA(2,1) model.

C: Since the comparison of AIC values and the likelihood ratio test come to different conclusions in this case, it is more-or-less equally reasonable to use either model.

D: When the results are borderline, numerical errors in the `stats::arima` optimization may become relevant. We should check using optimization searches from multiple starting points in parameter space, for example, using `arima2::arima`.