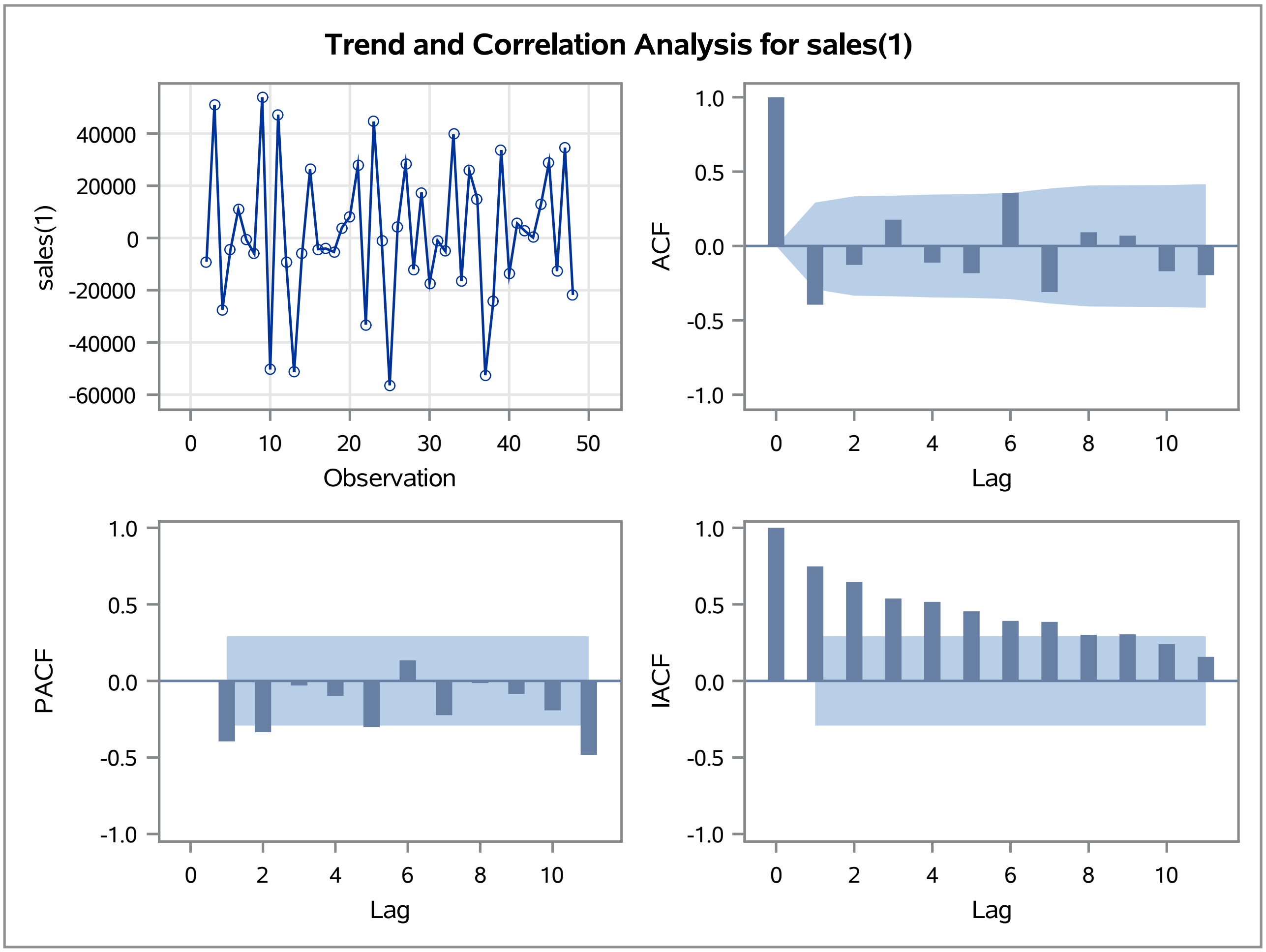
| Name of Variable = sales | |
|---|---|
| **Period(s) of Differencing** | 1 |
| **Mean of Working Series** | 1628.263 |
| **Standard Deviation** | 26754.34 |
| **Number of Observations** | 47 |
| **Observation(s) eliminated by differencing** | 1 |

| Autocorrelation Check for White Noise | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **To Lag** | **Chi-Square** | **DF** | **Pr > ChiSq** | **Autocorrelations** | | | | | |
| **6** | 19.93 | 6 | 0.0029 | -0.395 | -0.127 | 0.177 | -0.112 | -0.183 | 0.357 |




**Warning:** The model defined by the new estimates is unstable. The iteration process has been terminated.

**Warning:** Estimates may not have converged.

| ARIMA Estimation Optimization Summary | |
|---|---|
| **Estimation Method** | Maximum Likelihood |
| **Parameters Estimated** | 4 |
| **Termination Criteria** | Maximum Relative Change in Estimates |
| **Iteration Stopping Value** | 0.001 |
| **Criteria Value** | 131.3297 |

| ARIMA Estimation Optimization Summary | |
|---|---|
| **Maximum Absolute Value of Gradient** | 1.417E10 |
| **R-Square Change from Last Iteration** | 0.692336 |
| **Objective Function** | Log Gaussian Likelihood |
| **Objective Function Value** | -541.454 |
| **Marquardt's Lambda Coefficient** | 0.00001 |
| **Numerical Derivative Perturbation Delta** | 0.001 |
| **Iterations** | 3 |
| **Warning Message** | Estimates may not have converged. |

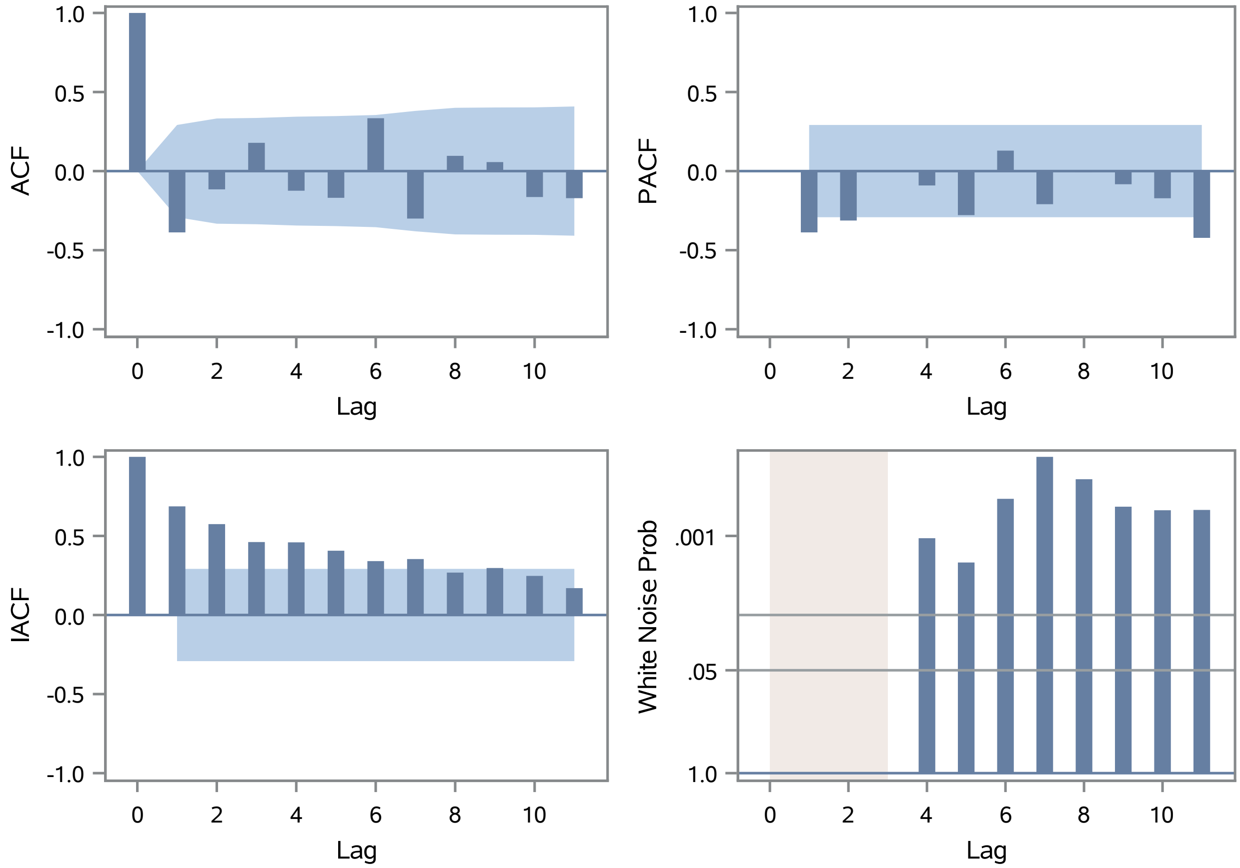
| Maximum Likelihood Estimation | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Estimate** | **Standard Error** | **t Value** | **Approx Pr > \|t\|** | **Lag** |
| **MU** | 1272.1 | 1971.5 | 0.65 | 0.5188 | 0 |
| **MA1,1** | 0.99991 | 198.95468 | 0.01 | 0.9960 | 1 |
| **MA2,1** | -0.09044 | 0.19150 | -0.47 | 0.6367 | 12 |
| **AR1,1** | 0.87735 | 0.53679 | 1.63 | 0.1022 | 1 |

| | |
|---|---|
| **Constant Estimate** | 156.0267 |
| **Variance Estimate** | 6.3049E8 |
| **Std Error Estimate** | 25109.61 |
| **AIC** | 1090.908 |
| **SBC** | 1098.308 |
| **Number of Residuals** | 47 |

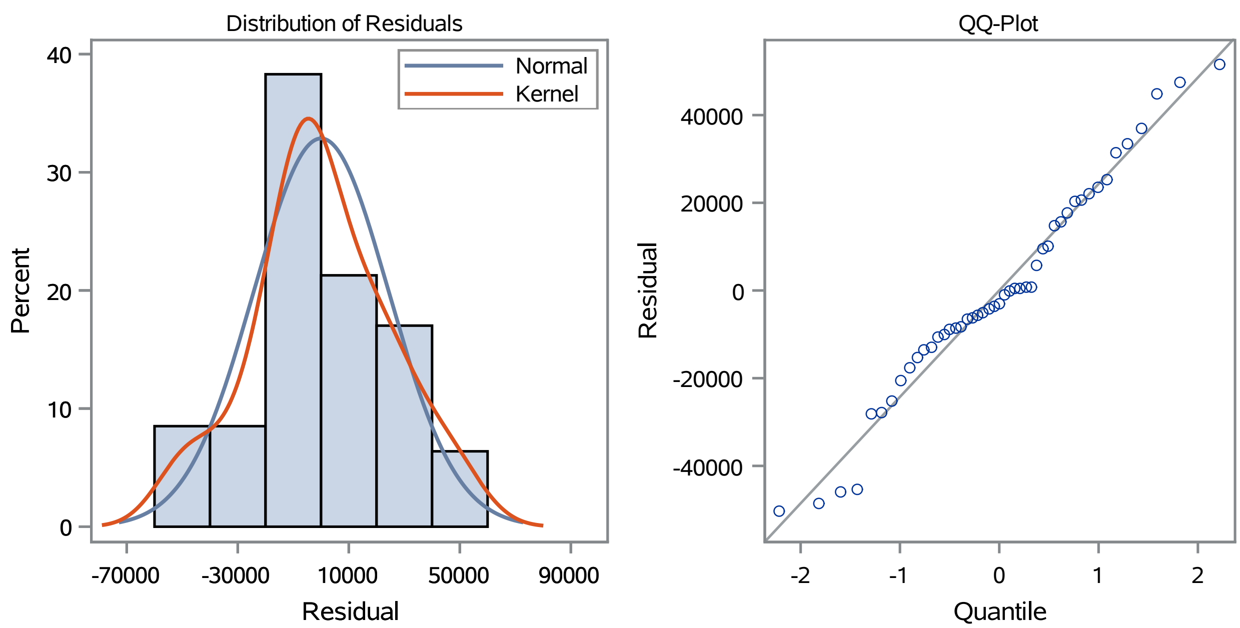
| Correlations of Parameter Estimates | | | | |
|---|---|---|---|---|
| **Parameter** | **MU** | **MA1,1** | **MA2,1** | **AR1,1** |
| **MU** | 1.000 | -0.627 | -0.028 | -0.506 |
| **MA1,1** | -0.627 | 1.000 | -0.003 | 0.923 |
| **MA2,1** | -0.028 | -0.003 | 1.000 | -0.139 |
| **AR1,1** | -0.506 | 0.923 | -0.139 | 1.000 |

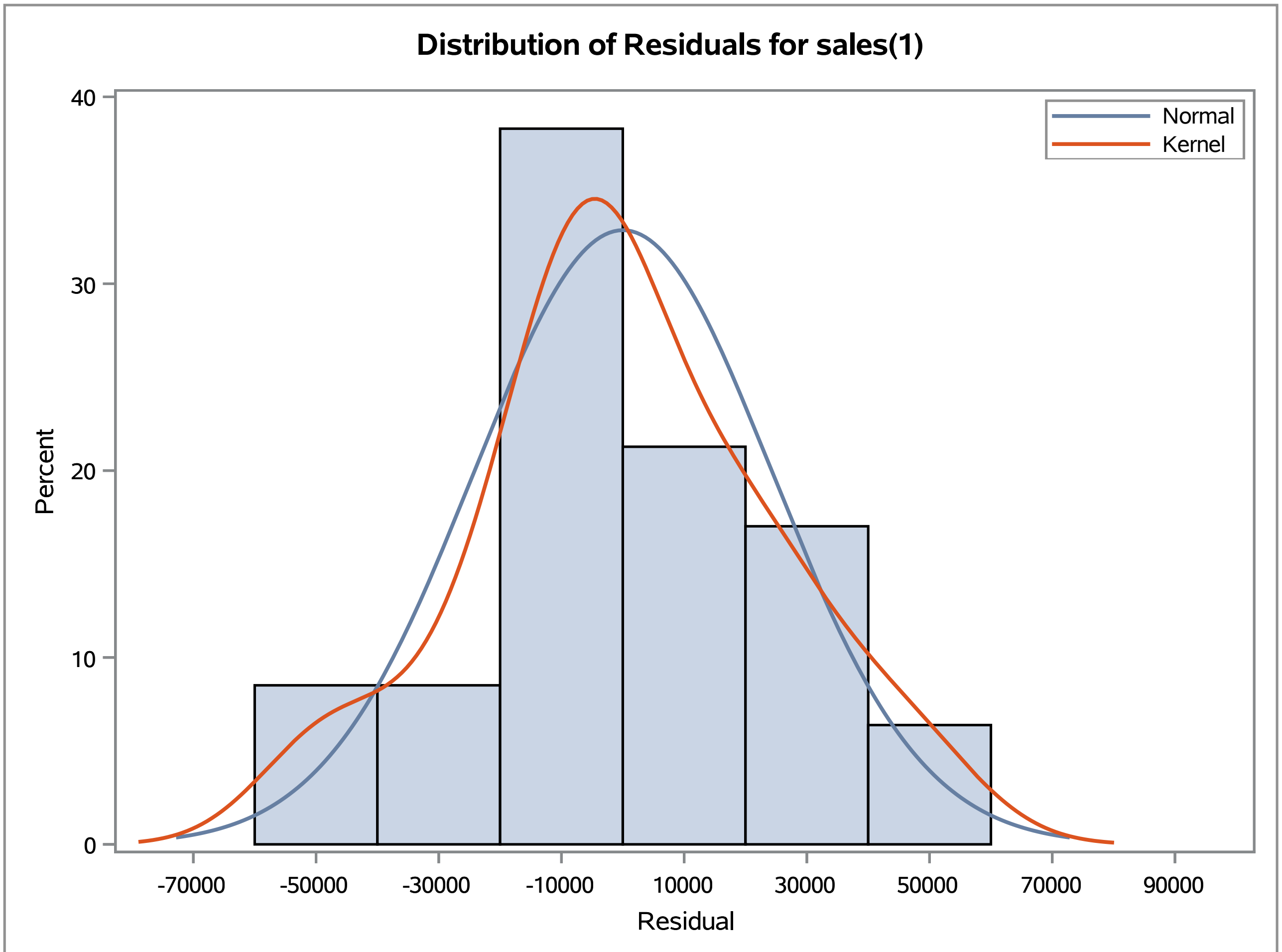
| Autocorrelation Check of Residuals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **To Lag** | **Chi-Square** | **DF** | **Pr > ChiSq** | **Autocorrelations** | | | | | |
| **6** | 18.54 | 3 | 0.0003 | -0.388 | -0.115 | 0.179 | -0.124 | -0.169 | 0.334 |
| **12** | 45.23 | 9 | <.0001 | -0.300 | 0.096 | 0.057 | -0.164 | -0.171 | 0.511 |
| **18** | 54.55 | 15 | <.0001 | -0.144 | -0.099 | 0.078 | -0.051 | -0.126 | 0.260 |
| **24** | 75.34 | 21 | <.0001 | -0.247 | 0.098 | 0.044 | -0.136 | -0.118 | 0.343 |

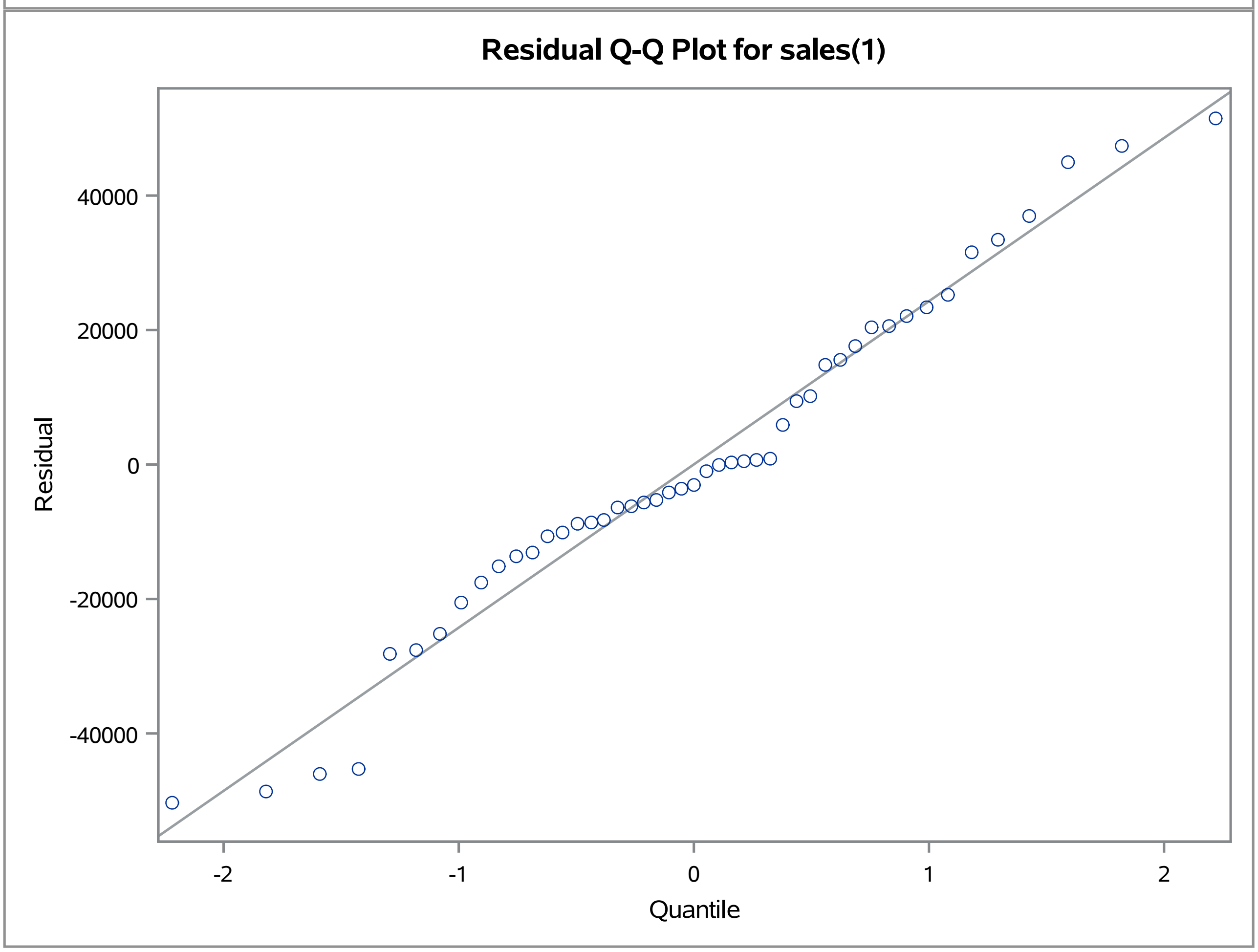
## Residual Correlation Diagnostics for sales(1)




## Residual Normality Diagnostics for sales(1)




Distribution of Residuals for sales(1)
Normal
Kernel
Percent
40
30
20
10
0
-70000
-50000
-30000
-10000
10000
30000
50000
70000
90000
Residual


Residual Q-Q Plot for sales(1)
Residual
40000
20000
0
-20000
-40000
-2
-1
0
1
2
Quantile

| Model for variable sales | |
|---|---|
| **Estimated Mean** | 1272.099 |
| **Period(s) of Differencing** | 1 |

| Autoregressive Factors | |
|---|---|
| **Factor 1:** | 1 - 0.87735 B**(1) |

| Moving Average Factors | |
|---|---|
| **Factor 1:** | 1 - 0.99991 B**(1) |
| **Factor 2:** | 1 + 0.09044 B**(12) |

**Warning:** The ID value for observation 3 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 5 according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 6 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 8 according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 9 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 10 according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 12 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 13 according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 15 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 16 according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 18 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** There are gaps in the interval for observation 19 according to ID variable ORDER_DATE.

**Note:** Further warnings will not be printed.

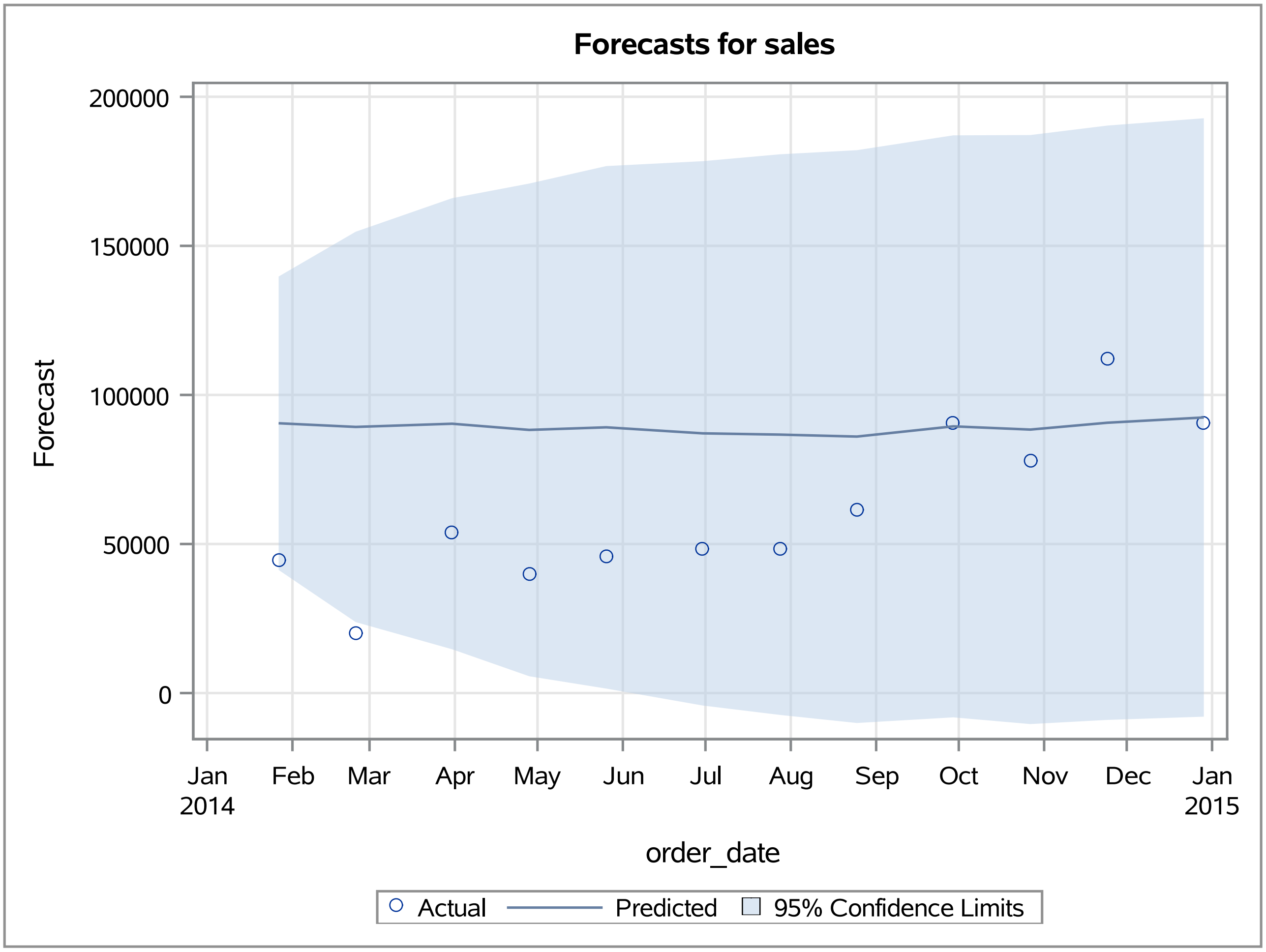
**Warning:** The ID value for observation 21 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 27 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Warning:** The ID value for observation 30 is the same as the ID value for the last observation according to ID variable ORDER_DATE.

**Forecasts for variable sales**

| Obs | Forecast | Std Error | 95% Confidence Limits | | Actual | Residual |
|---|---|---|---|---|---|---|
| **37** | 90499.7481 | 25109.607 | 41285.8228 | 139713.6733 | 44703.1420 | -45796.6061 |
| **38** | 89272.3203 | 33405.192 | 23799.3472 | 154745.2934 | 20283.5134 | -68988.8069 |
| **39** | 90342.1802 | 38595.817 | 14695.7694 | 165988.5911 | 53908.9620 | -36433.2182 |
| **40** | 88267.6732 | 42159.090 | 5637.3753 | 170897.9710 | 40112.4209 | -48155.2523 |
| **41** | 89132.2875 | 44709.622 | 1503.0386 | 176761.5364 | 45651.2362 | -43481.0513 |
| **42** | 87114.2886 | 46578.473 | -4177.8418 | 178406.4190 | 48259.7487 | -38854.5399 |
| **43** | 86688.7404 | 47967.977 | -7326.7669 | 180704.2476 | 48428.3650 | -38260.3754 |
| **44** | 86026.8875 | 49011.175 | -10033.2495 | 182087.0246 | 61516.0860 | -24510.8015 |
| **45** | 89460.5452 | 49799.686 | -8145.0455 | 187066.1360 | 90488.7220 | 1028.1768 |
| **46** | 88381.8424 | 50398.582 | -10397.5627 | 187161.2476 | 77793.7552 | -10588.0872 |
| **47** | 90674.7443 | 50855.076 | -8999.3735 | 190348.8622 | 112326.4710 | 21651.7267 |
| **48** | 92440.0256 | 51203.951 | -7917.8751 | 192797.9264 | 90474.6008 | -1965.4248 |




| Outlier Detection Summary | |
|---|---|
| **Maximum number searched** | 1 |
| **Number found** | 1 |
| **Significance used** | 0.05 |

**Outlier Details**

| Obs | Type | Estimate | Chi-Square | Approx Prob>ChiSq |
|---|---|---|---|---|
| **9** | Additive | 49575.0 | 8.83 | 0.0030 |

| Obs | rmse | mae | mape |
|---|---|---|---|
| 1 | 17456.05 | 13456.32 | 44.9624 |