**BUS 3700 Practice Questions for exams 3**

Answers for questions 1 to 8

1. From the economic order quantity formula, the amount to order at one time is:

$$Q = \sqrt{\frac{2RA}{Ch}} = \sqrt{\frac{2 \times 540 \times 3.00}{0.25 \times 33}} = 19.8$$

The number of orders per year is

$$\frac{540}{19.8} = 27.3$$

2. (a) log S = 3.4800 + 0.0148 t

$$g = 10^{.0148} = 1.0347$$

According to the regression line, on average the value in year t+1 is found by multiplying 1.0347 times the value in year t. This corresponds to an annual percent growth rate of 100(g-1) = 3.47, or about 3.5 percent.

(b)log S = 3.4800 + 0.0148 t
log S = 3.4800 + 0.0148 * 7
log S = 3.4800 + 0.1036
log S = 3.5836

$$S = 10^{3.5836} = 3,833.5$$

3. (a) Calculate the t statistic for each coefficient. If the t statistic is outside the range $-2$ to 2, then reject the null hypothesis that the true coefficient is zero, indicating that this variable does belong in the regression.

$$X1: \quad t \ \ statistic = \frac{-32.0}{4.0} = -8.00$$

this is far from zero, so reject the null hypothesis (it looks like X1 belongs)

$$X2: \quad t \ \ statistic = \frac{14}{3.0} = 4.67$$

this is far from zero, so reject the null hypothesis (it looks like X2 belongs)

$$X3: \quad tstatistic = \frac{0.06}{0.04} = 1.50$$

This is inside the range of $-2$ to 2, so accept the null hypothesis, and it appears that this variable does not belong.

(b)

$$2,600 - 32 \times 38 + 14 \times 32 + 0.0600 \times 988 = 1,891.2800$$

4. The three examples show r squared values of 0.5, 0.026, and 0.8.

part (a)
SUMMARY OUTPUT

Regression Statistics
Multiple R 0.707443667
R Square 0.500476542
Adjusted R Square 0.478758131
Standard Error 2997.806547
Observations 25

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 7859.55173 | 1270.67629 | 6.18532965 |
| x | 10.30514346 | 2.146723966 | 4.800404532 |

part (b)

SUMMARY OUTPUT

Regression Statistics
Multiple R 0.162437479
R Square 0.026385935
Adjusted R Square -0.015945112
Standard Error 2997.806547
Observations 25

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 7859.55173 | 1270.67629 | 6.18532965 |
| x | -1.694856543 | 2.146723966 | -0.789508372 |

part (c)

SUMMARY OUTPUT

Regression Statistics

Multiple R 0.899575675
R Square 0.809236395
Adjusted R Square 0.800942325
Standard Error 523.6123443
Observations 25

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 1646.990652 | 221.9428708 | 7.42 |
| x | 3.703704583 | 0.374957874 | 9.87 |

5. Using X alone as the independent variable does not produce a good fit. The graph shows that the relationship is not linear. Including X and X squared as independent variables produces a perfect fit.

part (b)

SUMMARY OUTPUT

Regression Statistics
Multiple R 0.203097958
R Square 0.04124878
Adjusted R Square -0.000436055
Standard Error 2059.144973
Observations 25
24 101717518

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 6878.940317 | 783.5170309 | 8.779567062 |
| x | 14.61771788 | 14.69477925 | 0.994755867 |

part (c)

SUMMARY OUTPUT

Regression Statistics
Multiple R 1
R Square 1
Adjusted R Square 1
Standard Error 8.77993E-13
Observations 25

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 2100 | 5.40498E-13 | 3.88531E+15 |
| X | 308 | 2.6826E-14 | 1.14814E+16 |
| x squared | -3 | 2.66723E-16 | -1.12476E+16 |

6. X2 and X4 are the two independent variables that seem to belong in this example:

```
SUMMARY OUTPUT

Regression Statistics
Multiple R 0.999999228
R Square 0.999998456
Adjusted R Square 0.999997426
Standard Error 1.680479917
Observations 11


            Coefficients   Standard Error   t Stat
Intercept    55.98797939    3.07988409     18.17859951
x1           -0.035606965   0.026973441    -1.320074982
x2           39.99255265    0.022672056  1763.957952
x3            0.008519159   0.022774457     0.37406639
x4          -20.04953931    0.030941881  -647.9741691
```

7. None of the independent variables seem to belong in this example.

```
SUMMARY OUTPUT

Regression Statistics
Multiple R 0.409329131
R Square 0.167550337
Adjusted R Square -0.387416105
Standard Error 45.01145548
Observations 11
```

| | Coefficients | Standard Error | t Stat |
|---|---|---|---|
| Intercept | 16.34762207 | 68.01047685 | 0.240369173 |
| x1 | 0.395626344 | 0.694966308 | 0.569274135 |
| x2 | 0.486632795 | 0.591807438 | 0.822282323 |
| x3 | -0.594952213 | 0.629178142 | -0.945602165 |
| x4 | 0.161100527 | 0.458245532 | 0.351559405 |

8.

Regression Statistics
Multiple R 0.946735167
R Square 0.896307477
Adjusted R Square 0.827179128
Standard Error 47.54623738
Observations 11

| | Coefficients | Standard Error | t Stat | P-value |
|---|---|---|---|---|
| Intercept | 11712.47067 | 8757.577113 | 1.337409939 | 0.22955425 |
| x1 | 7749.711534 | 5827.081634 | 1.329947308 | 0.23185661 |
| x2 | -3869.768599 | 2913.603458 | -1.32817271 | 0.23240715 |
| x3 | 4.260389 | 0.790268509 | 5.391065125 | 0.00167799 |
| x4 | 2.642437406 | 0.677735106 | 3.898923609 | 0.0079939 |

Note the very large standard errors; this is because of the multicollinearity problem (since x2 is very close to being equal to 2x1+3). A regression between X1 and X2 gives an r-squared value of 0.999999795.