Data points:

|  |  |
| --- | --- |
| x | y |
| 0.6 | 5.16 |
| 1.4 | 7.33 |
| 2.5 | 9.24 |
| 3.7 | 11.05 |
| 4.8 | 13.34 |
| 5.6 | 15.66 |

questions:

1. Calculate the residual mean square. (0.1688)

2. Construct a 90% confidence interval for the slope.

3. Test whether the intercept is 0. (At α = 5% level.)

43. Test whether the intercept is 4. (At α = 5% level.) (t0=0.504, p=0.641)

5. In what interval can you find the point of the true regression line at x =3 with 99% probability? (9.33, 10.87)

6. In what interval can you find a new measurement at x = 2 with 90% probability? (7.15, 9.09)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Effect |  | | | | | |
| |  | | --- | | Param. | | |  | | --- | | Std.Err | | |  | | --- | | t | | |  | | --- | | p | | |  | | --- | | -95,00% Cnf.Lmt | | |  | | --- | | +95,00% Cnf.Lmt | |
| |  | | --- | | Intercept | | 4,170 | 0,337 | 12,38 | 0,00025 | 3,23 | 5,11 |
| |  | | --- | | x | | 1,976 | 0,094 | 20,97 | 0,00003 | 1,71 | 2,24 |

Data points:

|  |  |
| --- | --- |
| x | y |
| 1.3 | 13.7 |
| 2.6 | 10.5 |
| 3.3 | 9.9 |
| 4.9 | 7.4 |
| 5.5 | 5.1 |

questions:

1. Calculate the residual mean square. (0.3582)

2. Construct a 99% confidence interval for the intercept. (12.02, 19.88)

3. Can we say that the slope is -2? (At α = 5% level.)

(H0: beta = -2, t0 = 0.67, p = 0.551)

4. In what interval can you find the point of the true regression line at x = 5 with 95% probability? (5.337, 7.716)

5. In what interval can you find a new measurement at x = 2? (At α = 5% level.) (9.94, 14.43)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Effect |  | | | | | |
| |  | | --- | | Param. | | |  | | --- | | Std.Err | | |  | | --- | | t | | |  | | --- | | p | | |  | | --- | | -95,00% Cnf.Lmt | | |  | | --- | | +95,00% Cnf.Lmt | |
| |  | | --- | | Intercept | | 15,95 | 0,67 | 23,71 | 0,0002 | 13,81 | 18,09 |
| |  | | --- | | x2 | | -1,88 | 0,18 | -10,74 | 0,0017 | -2,44 | -1,33 |

Data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| temperature | | 120 °C | | 180 °C | |
| cooking time | | 1 hrs | 2 hrs | 1 hrs | 2 hrs |
| sugar | 20 g | 35 | 28 | 45 | 42 |
| 50 g | 44 | 39 | 48 | 44 |

questions

1. Calculate all the effects.

2. Draw a main effect plot for cooking time. What can you deduct?

3. Draw an interaction plot for sugar/cooking time. What can you deduct?

4. Draw an interaction plot for cooking time/temperature. What can you deduct?

5. Draw a Pareto chart. Then based on it reduce the model.

6. Using the reduced model, make an estimate for the measurement at 2 hrs cooking time, 25 g sugar and 160 °C temperature.

Data: (The conversion is the response!!!)

|  |  |  |  |
| --- | --- | --- | --- |
| pressure (bar) | temperature (°C) | pH | conversion (%) |
| 0.5 | 20 | 5 | 2.76 |
| 1 | 20 | 5 | 26.79 |
| 0.5 | 30 | 5 | 38.90 |
| 1 | 30 | 5 | 31.37 |
| 0.5 | 20 | 7 | 3.08 |
| 1 | 20 | 7 | 26.39 |
| 0.5 | 30 | 7 | 39.10 |
| 1 | 30 | 7 | 30.38 |

questions:

1. Calculate all the effects and coefficients.

2. Draw a main effect plot for the pressure. What can you deduct?

3. Draw an interaction plot for the temperature/pressure. What can you deduct?

4. Draw a Pareto chart. Then based on it reduce the model.

5. Using the reduced model, make an estimate for the conversion at 0.6 bar, 29 °C and 5.5 pH.