**WORKSHEET – Linearizing Data and determining relationships**

**Goal:** Determine the type of relationship between each set of dependent and independent variables.

1. Open up an Excel file
   1. Enter the data
   2. Plot the data as a scatter plot
   3. Find the best-fit curve for the data
2. Use the equation of the curve to help you figure out how to straighten/linearize the data
   1. Make a new data column with a formula to linearize the original data
   2. Plot this new data as a scatter plot.
   3. Find the best-fit straight line for this new data.
3. **HARD -** Express the equation of the best-fit straight line in terms of the data, NOT in terms of "y" and "x."

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| --- | --- |
| Data Set 10 | |
| Time (s) **t** | Distance (m) **d** |
| 0.00 | 0.00 |
| 1.00 | 6.90 |
| 2.00 | 23.60 |
| 3.00 | 50.10 |
| 4.00 | 86.40 |
| 5.00 | 132.50 |
| 6.00 | 188.40 |
| 7.00 | 254.10 |
| 8.00 | 329.60 |
| 9.00 | 414.90 |
| 10.00 | 510.00 |

|  |  |
| --- | --- |
| Data Set 9 | |
| Distance (m) **d** | Force (N) **F** |
| 0.50 | 60.00 |
| 0.70 | 30.61 |
| 0.90 | 18.52 |
| 1.10 | 12.40 |
| 1.30 | 8.88 |
| 1.50 | 6.67 |
| 1.70 | 5.19 |
| 1.90 | 4.16 |
| 2.10 | 3.40 |
| 2.30 | 2.84 |
| 2.50 | 2.40 |

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| --- | --- | --- |
| **Data set #** | **Type of relationship** | **Equation of best-fit curve** |
| **7** | Linear (direct) | F = 4m |
| **8** | Linear (direct) | F = 1.8C + 32 |
| **9** | Inverse | F = 15d-2 |
| **10** | Squared | D = 4.9t2 + 2t |
| **11** | Linear (direct) | G = 0.4ts |
| **12** | Inverse | G = 3.8tg-1 OR G = 3.8/tg |

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| --- | --- |
| Data Set 8 | |
| Temp (0C) **C** | Temp (0F) **F** |
| -25.00 | -13.00 |
| -20.00 | -4.00 |
| -15.00 | 5.00 |
| -10.00 | 14.00 |
| -5.00 | 23.00 |
| 0.00 | 32.00 |
| 5.00 | 41.00 |
| 10.00 | 50.00 |
| 15.00 | 59.00 |
| 20.00 | 68.00 |
| 25.00 | 77.00 |

|  |  |
| --- | --- |
| Data Set 7 | |
| mass (kg) **m** | Force (N ) **F** |
| 1.00 | 4.00 |
| 1.50 | 6.00 |
| 2.00 | 8.00 |
| 2.50 | 10.00 |
| 3.00 | 12.00 |
| 3.50 | 14.00 |
| 4.00 | 16.00 |
| 4.50 | 18.00 |
| 5.00 | 20.00 |
| 5.50 | 22.00 |
| 6.00 | 24.00 |

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| Data Set 12 | |
| Gaming time (hours/week) **tg** | GPA **G** |
| 1.00 | 3.80 |
| 2.00 | 1.90 |
| 3.00 | 1.27 |
| 4.00 | 0.95 |
| 5.00 | 0.76 |
| 6.00 | 0.63 |
| 7.00 | 0.54 |
| 8.00 | 0.48 |
| 9.00 | 0.42 |
| 10.00 | 0.38 |

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| --- | --- |
| Data Set 11 | |
| Study time (hours/week) **ts** | GPA **G** |
| 1.00 | 0.40 |
| 2.00 | 0.80 |
| 3.00 | 1.20 |
| 4.00 | 1.60 |
| 5.00 | 2.00 |
| 6.00 | 2.40 |
| 7.00 | 2.80 |
| 8.00 | 3.20 |
| 9.00 | 3.60 |
| 10.00 | 4.00 |