**Swimming Records**

|  |  |  |
| --- | --- | --- |
| Yearsince 1910 | Time (seconds) | Athlete (Country) |
| 54 | 58.9 | Shane Gould (Australia) |
| 62 | 58.5 | Shane Gould (Australia) |
| 63 | 57.54 | Kornelia Ender (E. Ger) |
| 64 | 56.96 | Kornelia Ender (E. Ger) |
| 65 | 56.22 | Kornelia Ender (E. Ger) |
| 66 | 55.65 | Kornelia Ender (E. Ger) |
| 68 | 55.41 | Barbara Krause (E. Ger) |
| 70 | 54.79 | Barbara Krause (E. Ger) |
| 76 | 54.73 | Kristin Otto (E. Ger) |
| 82 | 54.48 | Jenny Thompson (US) |
| 84 | 54.01 | Jingyi Le (China) |
| 90 | 53.77 | Inge de Bruijn (Neth) |
| 94 | 53.52 | Jodie Henry (Australia) |
| 96 | 53.3 | Britta Steffen (Germany) |
| 98 | 52.88 | LisbethTrickett (Australia) |
| 99 | 52.07 | Britta Steffen (Germany) |

The following table lists the Women’s Long Course 100m Freestyle World Records from 1912 to 2009. (Source: [wikipedia.org](http://en.wikipedia.org/wiki/World_record_progression_100_metres_freestyle))

|  |  |  |
| --- | --- | --- |
| Yearsince 1910 | Time (seconds) | Athlete (Country) |
| 2 | 78.8 | Fanny Durack (Australia) |
| 5 | 76.2 | Fanny Durack (Australia) |
| 10 | 73.6 | Ethelda Bleibtrey (US) |
| 13 | 72.8 | Gertrude Ederle (US) |
| 14 | 72.2 | MariechenWehselau (US) |
| 16 | 70 | Ethel Lackie (US) |
| 19 | 69.4 | Albina Osipowich (US) |
| 20 | 68 | Helene Madison (US) |
| 21 | 66.6 | Helene Madison (US) |
| 23 | 66 | Willy den Ouden (Neth) |
| 24 | 64.8 | Willy den Ouden (Neth) |
| 26 | 64.6 | Willy den Ouden (Neth) |
| 46 | 62 | Dawn Fraser (Australia) |
| 48 | 61.2 | Dawn Fraser (Australia) |
| 50 | 60.2 | Dawn Fraser (Australia) |
| 52 | 59.5 | Dawn Fraser (Australia) |

The data from the table are shown in the graph.



1. Draw a trend line on the graph. Do you think this line fits the data well? Explain.
2. There is a gap in the scatter plot between the years 1936 and 1956 (26 and 46 years from 1910). What might explain this gap?
3. Sometimes it takes more than one function to model a set of data. Split the graph into two pieces. Draw a trend line for each piece. This new graph is a piecewise function.



1. Find an equation for each of your trend lines.
2. Equation for first trend line:
3. Equation for second trend line:
4. Find the domain for each trend line, that is, for which values of *x* does each line fit the data.
5. First trend line:
6. Second trend line:
7. Which trend line would you use to predict the Women’s Long Course Swimming Record for the year 2030? Why?
8. Use the trend line to predict the record for 2030. Is this interpolation or extrapolation?
9. What might cause your prediction in 2030 to be inaccurate?