Math 3550 HOMEWORK #5 Name:

Due 10/05/2026, 9:30 a.m.

Solve the following problems and staple your solutions to this cover sheet. (Computer outputs must be put in the appropriate place in the solution, not attached as an appendix. You may physically cut and paste the output in the problem or allow appropriate space in the printout to add your hand written work. Use Mathematica only if necessary!)

1. Sec 2.3, Prob 3.
2. Sec 2.3, Prob 4.
3. Sec 2.4, Prob 2.
4. Sec 2.5, Prob 1. First read and understand derivation of the model in equation 2.21 in section 2.5.
5. Sec 2.5, Prob 4. First, discuss how the Strength and Agility model is developed in section 2.5 and use it to answer this problem.
6. Sec 3.1, Prob 3. You may transform data and graph it using Mathematica. But you must estimate the parameters graphically, not using Mathematica.
7. Sec 3.1, Prob 6. You may transform data and graph it using Mathematica. But you must estimate the parameters graphically, not using Mathematica.
8. Sec 3.2, Prob 2(a). To formulate the model state what type of model is sought and what conditions it must meet. To solve for the parameters, see the Mathematica commands below or Section 3.4 notebook in the course website. Also, find the maximum absolute deviation so you can use it in problem 3.3.2(a).
9. Sec 3.2, Prob 2(b). To formulate the model state what type of model is sought and what conditions it must meet. To solve for the parameters, see the Mathematica commands below or the Mathematica Notebook for Section 3.4 in the course website.
10. Free points!

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Mathematica Commands

Three versions of `FindFit` can be used to miminize the largest absolute deviation, to minimize the sum of absolute deviations and to minimize the sum of quares of deviations.

To find the best fit function that minimizes the largest absolute deviation do the following.

```
FindFit[List of data points, Function type, List of parameters to be estimated,
            List of independent variables, NormFunction -> (Norm[#, Infinity] &)]
```

For example, to find the best fit function of the form $f(x) = ax+b$ for data set `data` which minimizes the largest absolute deviation, input the following.

```
FindFit[data, {a x + b}, {a, b}, {x}, NormFunction -> (Norm[#, Infinity] &)]
```

To find the best fit function that minimizes the sum of absolute deviations do the following.

```
FindFit[List of data points, Function type, List of parameters to be estimated,
            List of independent variables, NormFunction -> (Norm[#, 1] &)]
```

For example, to find the best fit function of the form $f(x) = ax+b$ for data set `data` which minimizes the the sum of absolute deviations, input the following.

```
FindFit[data, {a x + b}, {a, b}, {x}, NormFunction -> (Norm[#, 1] &)]
```

To find the best fit function that minimizes the sum of squares of deviations do the following.

```
FindFit[List of data points, Function type or variables,
           List of parameters to be estimated, List of independent variables)]
```

For example, one way to find the best fit function of the form $f(x) = ax+b$ for data set `data` which minimizes the sum of squares of deviations, input the following.

```
FindFit[data, {a x + b}, {a, b}, {x}]
```

Another way to find the best fit function of the form $f(x) = ax+b$ for data set `data` which minimizes the sum of squares of deviations, input the following.

```
Fit[data, {1, x}, {x}]
```

In the above, `{1, x}` represents a function of a constant and variable x: a linear function.