**Paychecks & Triathlons**

Steve works for a theatrical lighting design company. He works many hours during the summer months when the company is very busy. The following table lists his gross pay (before taxes and other deductions) based on the number of hours he worked in a week.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Hours worked** | **Gross Pay** |
| 30 | 855 |
| 34 | 969 |
| 35 | 997.50 |
| 38 | 1083 |
| 40 | 1140 |
| 41 | 1182.75 |
| 46 | 1396.50 |
| 48 | 1482 |
| 54 | 1738.50 |

 |  |

1. Does one line fit the data well, or will it take more than one line to obtain a good fit?
2. When does the pattern change? What do you know about pay rates that might explain this change?
3. Use technology to find two regression lines. Line 1 contains the points with *x*-values from 30 to 40, and Line 2 contains the points with *x*-values from 41 to 54.

|  |  |
| --- | --- |
| Line 1: | Line 2: |
| What does the slope mean? | What does the slope mean? |

1. A piecewise function contains two or more rules with each rule acting on a different part of the function’s domain. Label Steve’s weekly pay function $f(x)$ and write each rule on its own line, along with the part of the domain where that rule is applied.

$$f\left(x\right)=\left\{\begin{array}{c}\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_when\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_when\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\end{array}\right.$$

1. Find $f(32)$and $f(62)$. Make sure you use the correct rule.

Helen Jenkins, of Great Britain, finished first in the Dextro Energy Triathlon in London on August 6, 2011. The race consisted of a 1.5 km swim, a 42.9 km bike ride, and a 10 km run. Below is a table and graph of her time and distance as she completed each leg of the race.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Time** | **Distance** |
| 0 | 0 |
| 24 | 1.5 |
| 24.6 | 1.5 |
| 78.2 | 44.4 |
| 89.3 | 44.4 |
| 129.3 | 54.4 |

 |  |

1. Find an equation for the total distance Helen traveled from the time she started during each event (swimming, biking, running).Find each equation by hand. (Assume that she traveled at a constant rate during each event.)

a. Swimming b. Biking c. Running

1. How much time did Helen have to rest:
2. Between swimming and biking?
3. Between biking and running ?
4. Complete the piecewise function that models the distance Helen traveled during the race

$$f\left(x\right)=\left\{\begin{array}{c}\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_when\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_when\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_when\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\end{array}\right.$$

1. Find $f(10)$.
2. Find $f(50)$.
3. Find $f(100)$.