NAME:	ANTHONY [redacted]
DATE:	11/21/23
INSTRUCTOR	Samuel Chukwuemeka
PROJECT:	POWER BILL: RESIDENTIAL AREA
COMPANY	FIRST ENERGY CORP ELECTRIC COMPANY LINK: https://firstenergycorp.com/content/dam/customer/billinserts/2023-09%20NJ%20Resident%20Service%20Rates%200923.pdf
OBJECTIVE:	(1.) Calculate the basic generation summer power rate (June-September) of the residents of New Jersey within each range of specific power usage manually using the Arithmetic method. (2.) Write a piecewise function of the residential rates. (3.) Recalculate the same power bill of the residents of New Jersey within each range of specific power usage algebraically using the Piecewise Function method.
Information	Example 1 RS–Residential Service This Service Classification is available to individual residential dwelling units, associated incidental nonresidential use and separately metered auxiliary residential use.

	Summer Rate (JuneSeptember) Customer Charge $3.25 Basic Generation Svc.* First 600 kWh @ 9.3361¢ per kWh Over 600 kWh @ 10.2586¢ per kWh Delivery Charges First 600 kWh @ 3.2032¢ per kWh Over 600 kWh @ 8.4997¢ per kWh Customers using 1,200 kWh per month would compute their bills as follows: Customer Charge ....$3.25 600 kWh x .093361...................56.02 600 kWh x .102586...................61.55 600 kWh x .032032...................19.22 600 kWh x .084997...................57.00 Total Bill $191.04 I ignored delivery charges
Tested Numbers	0 KWh, 200 KWh, 600 KWh, 1000 KWh

Arithmetic Method	BILLING MONTHS FOR JUNE THROUGH SEPTEMBER: FIRST: 600KWh @ 9.3361¢ per kWh $9.3361¢ \times \frac{\$1}{100}$ $= \$0.093361KWh$ Over 600KWh @10.2586¢ per KWh $10.2586¢ \times \frac{\$1}{100}$ $= \$0.102586KWh$ --- 0 KWh: Base Charge = \$3.25 Using Charge Rate (below 600 KWh) = $0.093361KWh$ Using Equation: Cost = Charge Rate * Usage + Base Charge Applying Equation: $cost = \$0.093361 \times 0 + \$3.25 = \$3.25$ Final Bill for using 0 KWh = \$3.25 --- 200 KWh (<u>rounded in 2 decimal places final price)</u> Base Charge = \$3.25 Using Charge Rate (below 600 KWh) = $\$0.093361KWh$ Using Equation: Cost = Charge Rate * Usage + Base Charge

	Applying Equation: $Cost = \$0.093361 \times 200 + \$3.25 = \$21.9222$ Final Bill for using 200 KWh = \$21.92 ――――――――――――――――――――――― 600 KWh (<u>rounded in 2 decimal places final price)</u> Base Charge = \$3.25 Using Charge Rate (At 600 Kwh) = $\$0.093361 Kwh$ Using Equation: Cost = Charge Rate * Usage + Base Charge Applying Equation: $Cost = \$0.093361 \times 600 + \$3.25 = \$59.2666$ Final Bill For Using 600 KWh = \$59.27 ――――――――――――――――――――――― 1000 KWh (<u>rounded in 2 decimal places final price)</u> Base Charge = \$3.25 Using Charge Rate (up to 600 KWh) = $\$0.093361\ KWh$ Using Charge Rate (over 600 KWh) = $\$0.102586\ KWh$ Using Equation: Cost = Charge Rate * Usage

	Applying Equation for (up to 600 KWh): $Cost = \$0.093361 \times 600 = \$56.0166$ Applying Equation For (over 600 KWh): $Cost = \$0.102586 \times 400 = \$41.0344$ Adding both Numbers + Base Charge Final Bill For Using 1000 KWh $= \$56.0166 + \$41.0344 + \$3.25$ $= \$100.301$ $\cong \$100.30$
Piecewise Function	Piecewise Function: Let C = Charge Let P = KWh Basic Customer Charge = \$3.25 First Piece: Using Up To 600 KWh = \$0.093361 $C(P) = \$0.093361(P) + \$3.25$ Second tier: solving Basic Charge

	Up to 600 Kwh $C(P) = \$0.093361(600) + \$3.25 = \$59.2666$ Up to 600 Kwh will be charged \$59.2666 Over 600 Kwh $\$0.102586 \times (P - 600)$ $C(P) = \$59.2666 + 0.102586 \times (P - 600)$ $C(P) = \$59.2666 + 0.102586P - 61.5516$ $C(P) = 0.102586P - 2.285$ $C(P) = \begin{cases} 0.093361P + \$3.25, \ if\ 0 \le P \le 600 \\ 0.102586P - \$2.285, \ if\ P > 600 \end{cases}$
Piecewise Function method	Using Same tested number to apply on Piecewise function New Equation 0 KWh $C(P) = \$0.093361P + \$3.25, \ if\ 0 \le P \le 600$ $C(0) = \$0.093361(0) + \$3.25$ $C(0) = \$3.25$ --- 200 KWh (rounded in 2 decimal places final price) $C(P) = \$0.093361P + \$3.25, if\ 0 \le P \le 600$

<table>
<tr><td></td><td>

$$C(200) = \$0.093361(200) + \$3.25$$
$$C(200) = \$21.9222$$
$$\cong \$21.92$$

600 KWh (rounded in 2 decimal places final price)

$$\mathrm{C}(P) = \$0.093361P + \$3.25,\ if\ 0\ \leq P\ \leq 600$$
$$C(600) = \$0.093361(600) + \$3.25$$
$$C(600) = \$59.2666$$
$$\cong \$59.27$$

1000 KWh Rounded in 2 decimal place final price.

$$C(P) = \$0.102586P - \$2.285,\ if\ P > 600$$
$$C(1000) = \$0.102586(1000) - \$2.285$$
$$C(1000) = \$100.301$$
$$\cong \$100.30$$

</td></tr>
<tr><td>WORK CITED (MLA)</td><td>

2023-09 NJ General Service Rates - FirstEnergy Corp.., https://firstenergycorp.com/content/dam/customer/billinserts/2023-09%20NJ%20Resident%20Service%20Rates%200923.pdf Accessed 9 Oct. 2023.

"Piecewise Functions." *Precalculus.appspot.com,* precalculus.appspot.com/PiecewiseFunctions/piecewise-functions.html#studentProjectPowerBill. Accessed 19 Nov. 2023.

</td></tr>
</table>