

Name:	Ryan C.																		
Date:	11/4/2021																		
Instructor	Samuel Chukwuemeka																		
Project:	Power Bill: Residential Areas																		
Company:	Georgia Power																		
Objectives:	<p>(1.) Calculate the winter power bill of the residents of the State of Georgia within each range of specific power usage manually using Arithmetic method.</p> <p>(2.) Write a piecewise function of the residential rates.</p> <p>(3.) Recalculate the same power bill of the residents of the State of Georgia within each range of specific power usage algebraically using the Piecewise Function method.</p>																		
Information:	<table border="1"> <thead> <tr> <th colspan="3">Winter Rate Schedule</th> </tr> <tr> <th>Tier</th> <th>Usage</th> <th>Cost per kWh</th> </tr> </thead> <tbody> <tr> <td>1st tier</td> <td>up to 650kWh</td> <td>\$ 0.056582</td> </tr> <tr> <td>2nd tier</td> <td>next 350kWh</td> <td>\$ 0.048533</td> </tr> <tr> <td>3rd tier</td> <td>over 1000kWh</td> <td>\$ 0.047641</td> </tr> <tr> <td colspan="3">Basic Service Cost: \$10</td> </tr> </tbody> </table>	Winter Rate Schedule			Tier	Usage	Cost per kWh	1st tier	up to 650kWh	\$ 0.056582	2nd tier	next 350kWh	\$ 0.048533	3rd tier	over 1000kWh	\$ 0.047641	Basic Service Cost: \$10		
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<p>Arithmetic Method:</p>	<p>Numbers to be tested: 0 KWh 251 KWh 822 KWh 1145 KWh</p> <p>$10 + 251 \times 0$ $10 + 0$ 10 \$10.00</p> <p>$10 + 251 \times .056582$ $10 + 14.202082$ 24.202082 \$24.20</p> <p>$10 + (650 \times .056582) + (172 \times .048533)$ $10 + 36.7783 + 8.347676$ 55.125976 \$55.13</p> <p>$10 + (650 \times .056582) + (350 \times .048533) + (145 \times .047641) = 70.67$ $10 + 36.7783 + 16.98655 + 6.907945$ 70.672795 \$70.67</p>
<p>Piecewise Function:</p>	<p>C=Cost, P=Power</p> <p>First Tier Basic Service Fee=10</p> <p>Cost of KWh=\$ 0.056582 $P \times 0.056582 = 0.056582P$ $C(P) = 0.056582P + 10$</p> <p>Second Tier Basic Service Fee=10</p> <p>Finish the first tier (Maximum is 650 KWh):</p>

	$650 \times 0.056582 = 36.7783$ $36.7783 + 10 = 46.7783$ <p>Multiply the remaining power consumption rate by .048533</p> $C(P) = 46.7783 + .048533(P - 650)$ $C(P) = 46.7783 + .048533P - 31.54645$ $C(P) = .048533P + 15.23185$ <p style="text-align: center;">Third Tier</p> <p style="text-align: center;">Basic service cost=10</p> <p>Finish the first tier (Maximum is 650 KWh)</p> $650 \times 0.056582 = 36.7783$ $36.7783 + 10 = 46.7783$ <p>Finish the second tier (Up to an additional 350 KWh)</p> $350 \times 0.048533 = 16.98655$ <p style="text-align: center;">Add the two first tiers</p> $46.7783 + 16.98655 = 63.76485$ <p>Finish the remaining consumption (0.047641)</p> $C(P) = 63.76485 + .047641(P - 1000)$ $C(P) = 63.76485 + .047641P - 47.641$ $.047641P + 16.12385$ $C(P) = \begin{cases} .056582P + 10; & 1 \leq P \leq 650 \\ .048533P + 15.23185; & 650 < P \leq 1000 \\ .047641P + 16.12385; & 1000 < P \end{cases}$
Piecewise Function Method:	<p style="text-align: center;">Numbers to be tested:</p> <p style="text-align: center;">0 KWh</p> <p style="text-align: center;">251 KWh</p> <p style="text-align: center;">822 KWh</p> <p style="text-align: center;">1145 KWh</p> $.056582(0) + 10$ $0 + 10$ 10 $\text{\$}10.00$

	$.056582(251) + 10$ $14.202082 + 10$ 24.202082 $\$24.20$ $.048533(822) + 15.23185$ $39.894126 + 15.23185$ 55.125976 $\$55.13$ $.047641(1145) + 16.12385$ $54.548945 + 16.12385$ 70.672795 $\$70.67$
Citation:	<p style="text-align: center;">APA style:</p> <p><i>C++ (Cplusplus)</i>. (n.d.). Wwww.chukwuemekasamuel.com. Retrieved November 4, 2021, from https://www.chukwuemekasamuel.com/CPlusPlus/cplusplus.html#module5</p> <p><i>Piecewise Functions</i>. (n.d.). Wwww.piecewise-Functions.appspot.com. Retrieved November 4, 2021, from http://www.piecewise-functions.appspot.com/#studentProjectPowerBill</p> <p><i>Georgia Public Service Commission</i>. (n.d.). Wwww.psc.state.ga.us. http://www.psc.state.ga.us/calc/electric/GPcalc.asp</p> <p><i>Piecewise Functions - Definition, Graph, and Examples</i>. (n.d.). The Story of Mathematics - a History of Mathematical Thought from Ancient Times to the Modern Day. https://www.storyofmathematics.com/piecewise-functions</p>