2021A6 (EQUATIONS)

Level 1: Each turbine gives out a $5,000 scholarship for each year that it has been in operation. Multiply the number of years by the number of turbines, and then multiply by $5,000. An example for the turbines that have been operational for 5 years is below.

$$Money\ Awarded = \frac{\$5{,}000}{turbine/year} * \#\ of\ turbines * \#\ of\ years\ operational$$

$$Money\ Awarded = \frac{\$5{,}000}{turbine/year} * 5\ turbines * 5\ years$$

$$Money\ Awarded = \$125{,}000$$

Repeat for the other turbine groups.

$$Total\ Money\ Awarded = \frac{\$5{,}000}{turbine/year} * 5\ years * 5\ turbines + \frac{\$5{,}000}{\frac{turbine}{year}} * 4\ years * 4\ turbines + \frac{\$5{,}000}{\frac{turbine}{year}} * 3\ years * 2\ turbines + \frac{\$5{,}000}{\frac{turbine}{year}} * 2\ years * 6\ turbines + \frac{\$5{,}000}{\frac{turbine}{year}} * 1\ year * 3\ turbines)$$

$$Total\ Money\ Awarded = \$125{,}000 + \$80{,}000 + \$30{,}000 + \$60{,}000 + \$15{,}000$$

$$Total\ Money\ Awarded = \$310{,}000$$

Level 2: The total scholarship money awarded to date depends on the number of years each turbine has been in operation. To determine the scholarship money awarded at the end of the given year, we can write an equation that expresses the money awarded for any year. We can relate the number of years of operation for the turbines to each other. For example, if Y is the number of operating years of the last three turbines installed, then a turbine that was installed a year prior would be operational for (Y+1) years. Substitute this value into the Total Money Awarded equation above. Assign Y to the number of years of operation for the most recent turbines installed. Because all turbine groups are multiplied by $5,000, this can be pulled to the front of the equation.

$$Total\ Money\ Awarded = \$5{,}000 * ((Y+4) * 5\ turbines + (Y+3) * 4\ turbines + (Y+2) * 2\ turbines + (Y+1) * 6\ turbines + Y * 3\ turbines)$$

Distribute and simplify.

$$Total\ Money\ Awarded = \$5{,}000 * (5Y + 20 + 4Y + 12 + 2Y + 4 + 6Y + 6 + 3Y)$$

$$Total\ Money\ Awarded = \$5{,}000 * (20Y + 42)$$

$$Total\ Money\ Awarded = \$100{,}000Y + \$210{,}000$$

Now we can substitute 7 for Y, because we want the money awarded at the end of the seventh year of the last turbines installed.

$$Total\ Money\ Awarded = \$100{,}000(7) + \$210{,}000$$

$$Total\ Money\ Awarded = \$910{,}000$$

A Megawatt Scholarship recipient unveiling her name on the turbine that provided her award.