Problem-Based Task: It's Electric!

Coaching Sample Responses

a. What are the turning points of the polynomial function?

The turning points of the graph are where the graph of the function changes from sloping upward to downward or vice versa. This function appears to have 7 turning points. The turning points are approximately (1960, 6), (1970, 8), (1980, 1), (1990, 5.5), (2010, –1), (2012, 1.75), and (2030, 0.25).

b. What does each turning point represent?

The point (1960, 6) is a local minimum; this indicates the growth of demand for electricity decreased from 1950 to 1960 and then began to increase until the year 1970, when the growth of demand reached a local maximum. After 1970, the growth of demand again decreased until it reached another local minimum in 1980. The point (1990, 5.5) represents another local maximum. The growth of demand decreased from this point until 2010, when the growth of demand was approximately –1%. The growth of demand increased until 2012 and is projected to decrease until the year 2030, when it is projected that the growth of demand will increase until at least 2040.

c. What are the real roots of this polynomial?

The real roots of this function are found at the x-intercepts. This function appears to have two real roots, at the points (2003, 0) and (2011, 0).

d. What do the real roots represent?

The real roots represent the years in which the growth of demand for electricity was 0%.

e. What is the behavior of this function as t approaches positive infinity?

It is difficult to tell from the graph what the end behavior of the function is, but it appears as though $D(t)$ approaches $+\infty$ as t approaches $+\infty$.

f. Do you expect the growth of demand for electricity to increase or decrease from 2040 to 2050? Explain.

Based on the number of turning points and the end behavior of the function represented by the graph, as well as possible advances in technology, it is possible that the growth in demand for electricity will continue to increase from 2040 to 2050. However, it is also possible that because of alternate power sources, the growth in demand for electricity will decline from 2040 to 2050.

Recommended Closure Activity

Select one or more of the essential questions for a class discussion or as a journal entry prompt.