Problem-Based Task 3.5.3: Future Finances

Cole has just graduated from high school and is going to attend college while working on the family farm. The degree program he has chosen takes an average of 24 months to complete, but it's possible that he could finish earlier or that he might need more time. His parents have offered to pay him a single payment for all his work on the farm once he graduates. The payment will be based on one of two options. The first option is to start at $0 and earn $3,495.25 a month for the remainder of his time on the farm. This means that if Cole were somehow able to graduate at the end of the first month, he would earn just $3,495.25; but for every month he works on the farm while he is in school, the amount of what he'll eventually be paid increases by another $3,495.25. When he graduates, he will collect the amount earned for all the months he worked. The second option is to earn $0.01 the first month, and then double the previous month's pay every month for the remainder of his time on the farm. With this pay plan, he can collect his payout for the month in which he graduates, but he cannot collect the money accumulated up to that point. Which option is the better choice for Cole?

Problem-Based Task 3.5.3: Future Finances

Coaching

a. How can you determine whether receiving an increase of $3,495.25 a month for the remainder of Cole's time on the farm is linear or exponential?

b. Write a function to model receiving $3,495.25 a month for the length of Cole's time on the farm.

c. How can you determine whether receiving $0.01 for the first month and then receiving double the previous month's pay is linear or exponential?

d. Write a function to model receiving $0.01 for the first month and then receiving double the previous month's pay each month for the length of Cole's time on the farm.

e. Graph both functions on the same coordinate plane.

f. When is it a better option to choose $0.01 for the first month and then double the previous month's pay for every month after?

g. Is there a point on the graph where choosing either option results in the same payment?

h. If Cole finishes school in 21 months and collects his payment then, which is the better option?

i. If Cole finishes school in 27 months and collects his payment then, which is the better option?

j. Which is the better option for Cole?