Using Tables and Graphs to Determine the Better Deal

Smedley High School graduates approximately 25 students per year, and their school plays 6-man football. As a fundraiser, the Math and Science Team decides to have members sell programs for the high school football games. The team must choose between two offers. The first offer provides an income of $40 plus $1 for each program sold. The second offer provides an income of $10 plus $2 for each program sold. Now the team must decide which contract to sign.

1. In this situation, what factors might affect the success of the project?

2. Complete the table to show the money earned for offer 1 and for offer 2, based on the number of programs sold.

Programs Sold	Process Column Offer 1	Income for Offer 1 ($)	Process Column Offer 2	Income for Offer 2 ($)
5				
10				
15				
20				
30				
40				
50				
70				
100				

3. Describe in words a pattern that you see for the income from offer 1.

4. Describe in words a pattern that you see for the income from offer 2.

5. Extend the table to complete the nth row, based on the patterns that you noticed.

Programs Sold	Process Column Offer 1	Income for Offer 1 ($)	Process Column Offer 2	Income for Offer 2 ($)
n				

6. In this scenario, what is the independent variable? What is the dependent variable? Write a sentence using "is a function of" that shows the relationship between these two variables.

7. Let n be the number of programs sold, let I be the total income from the programs sold using offer 1, and let J be the total income from the programs sold using offer 2. Write a function rule $I(n)$ for offer 1 and a function rule $J(n)$ for offer 2.

8. As the number of programs sold increases, what happens to the income?

9. How many programs must the team sell to make $90 with offer 1? With offer 2? Justify the answers.

10. Based on the table, when is the income from both offers the same?

11. Write an equation that can be used to determine the number of programs sold for which the two offers yield the same amount.

12. What is a reasonable domain for the functions? Justify your answer.

13. Determine an appropriate scale for the graphs of both functions.
    x-minimum
    x-maximum
    x-scale
    y-minimum
    y-maximum
    y-scale

14. Graph the data points from the table in question 2, using different colored pencils or different symbols for offer 1 and offer 2. Label the axes and indicate which graph is offer 1 and which is offer 2.
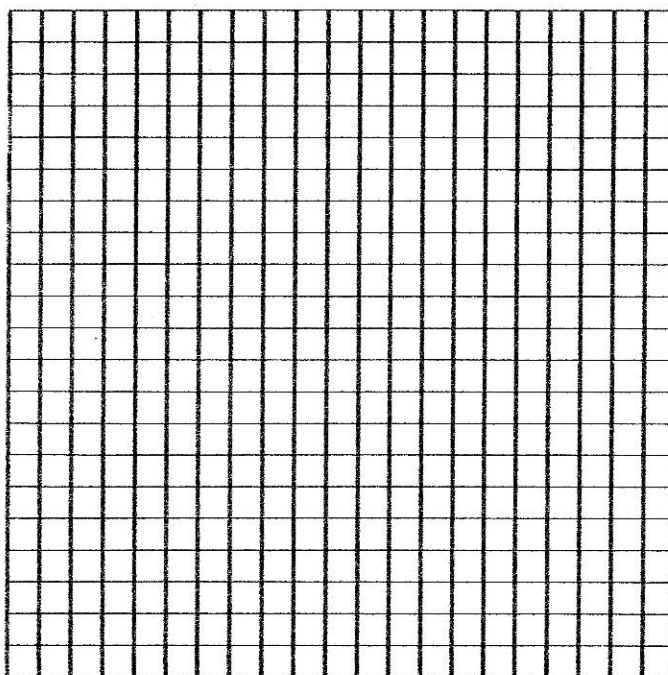
15. If the team does not sell any programs, with which offer will they make the most money? Describe the location of this number on the graph. Identify the number in the equation.

16. In which offer graph does the team's income increase faster? Justify your answer. Identify the number in the equation that supports your conclusion.

17. What are the coordinates of the intersection point of the two graphs? Write a sentence interpreting the meaning of the intersection point in terms of the situation, including what happens before and after this point in regard to income.

18. You are on the committee to decide which offer to choose. Carefully consider your choice. Once you decide and sign a contract, you cannot change your mind. Explain the reasoning behind your choice.