Facilitator Notes for Task
The Calling Plan Task

Company A charges a base rate of $5 per month, plus 4 cents for each minute that you're on the phone. Company B charges a base rate of only $2 per month charges you 10 cents for every minute used. How much time per month would you have to talk on the phone before subscribing to company A would save you money?

Solve the task in as many ways as you can, and consider other approaches that you think students might use to solve it.

Identify errors or misconceptions that you would expect to emerge as students work on this task.

Alabama CCR Math Standards this task will address:

Grade 8

10. Analyze and solve pairs of simultaneous linear equations. [8-EE8]
a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersections of their graphs because points of intersection satisfy both equations simultaneously. [8-EE8a]
b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. [8-EE8b]
Example: $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
c. Solve real-world and mathematical problems leading to two linear equations in two variables. [8-EE8c]

Example: Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair

Algebra

Create equations that describe numbers or relationships. (Linear, quadratic, and exponential (integer inputs only); for Standard 14, linear only.)
14. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities and interpret solutions as viable or non-viable options in a modeling context. [A-CED3]
Example: Represent inequalities describing nutritional and cost constraints on combinations of different foods.

Make a Table

Table A

Number of minutes	Cost A	Cost B	
0	5.00	2.00	
10	5.40	3.00	
20	5.80	4.00	
30	6.20	5.00	
40	6.60	6.00	
50	7.00	7.00	Same cost & min
60	7.40	8.00	

Table B

Number of minutes	Cost A	Cost B	
0	5.00	2.00	
20	5.80	4.00	
40	6.60	6.00	A is more
60	7.40	8.00	A is less
80	8.20	10.00	
100	9.00	12.00	
120	9.80	14.00	

Because A is more than B at 40, the same as B at 50 and less than B at 60, A must become a better deal at 51 minutes.

Because A is more than B at 40 and less than B at 60, the point of intersection must be somewhere between 40 and 60. If I graph them, I find that the point of intersection is 50. So A is a better deal starting at 51 minutes.
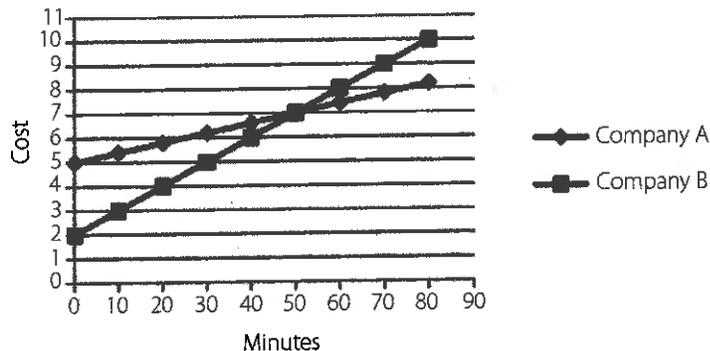
Write Equations

$y = 0.04x + 5$ (Company A)

$y = 0.10x + 2$ (Company B)

When I put the two equations into the graphing calculator, I found the point of intersection to be 50 minutes. So A becomes cheaper at 51 minutes.

Make a Graph

You can make a graph from a table of values by substituting two values for x into the equation and finding the corresponding values for y, or by putting either the table or the equation into the graphing calculator. No matter which approach you use, you find that the lines intersect at (50, 7), so plan A is better starting at 51 minutes.

Fig. 4.2. Nick Bannister's possible solutions