

"Ask" the Right Question to Get the Right Answer

Teacher Notes

Do you know what the answer means for a given equation? This is not the same as knowing what the solution is for an equation. When you understand what the answer means, you can use the graphing calculator to find the solution to the equation without doing the symbolic manipulation that you would be asked to do as a part of regular class work.

Look at the equation in the problem given below. What is the meaning of the value of x in the given equation? _____

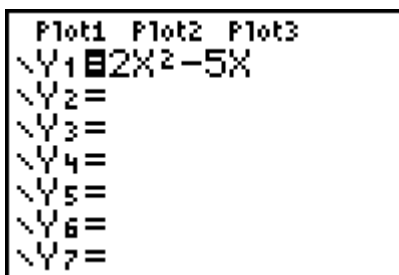
(the meaning of x is the value for which the given expression is equal to 18)

46 The area of a rectangle is given by the equation $2x^2 - 5x = 18$, in which x is the rectangle's length. What is the length of the rectangle?

- F** 1.5
- G** 2
- H** 4.5
- J** 6

Using the table on the graphing calculator is an efficient way to find the solution to the equation when the student understands equivalence completely.

The student should enter the equation in the equation editor.



There are three ways that the student could use the table on the calculator to find the solution to the equation. The first would have the student use a typical starting place in the table with a table start at 0 and counting by 1. The student who understands independent and dependent variables knows to look in the table for the value of x for which the value of y is 18.

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TABLE SETUP TblStart=0 ΔTbl=1 Indent: Auto Ask Depend: Auto Ask	<table border="1"> <thead> <tr> <th>X</th> <th>Y₁</th> <th></th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td></td></tr> <tr><td>1</td><td>-3</td><td></td></tr> <tr><td>2</td><td>-2</td><td></td></tr> <tr><td>3</td><td>12</td><td></td></tr> <tr><td>4</td><td>25</td><td></td></tr> <tr><td>5</td><td>42</td><td></td></tr> </tbody> </table> X=0	X	Y ₁		0	0		1	-3		2	-2		3	12		4	25		5	42	
X	Y ₁																					
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5	42																					

The student can interpret the answer from this point in two ways. Some students might notice that the value for 18 does not appear in the table but, if it did, it would be between 12 and 25. This implies that the x value would be between 4 and 5. Answer choice H would be that value.

Some students would notice that the answer choices are not all integers but are numbers that count by halves. These students would change the Table Setup. Scrolling down the table allows the student to see that the input is 4.5 for which the output is 18.

TABLE SETUP TblStart=0 ΔTbl=.5 Indent: Auto Ask Depend: Auto Ask	<table border="1"> <thead> <tr> <th>X</th> <th>Y₁</th> <th></th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td></td></tr> <tr><td>.5</td><td>-2</td><td></td></tr> <tr><td>1</td><td>-3</td><td></td></tr> <tr><td>1.5</td><td>-2</td><td></td></tr> <tr><td>2</td><td>0</td><td></td></tr> <tr><td>2.5</td><td>3</td><td></td></tr> </tbody> </table> X=3	X	Y ₁		0	0		.5	-2		1	-3		1.5	-2		2	0		2.5	3		<table border="1"> <thead> <tr> <th>X</th> <th>Y₁</th> <th></th> </tr> </thead> <tbody> <tr><td>1.5</td><td>-3</td><td></td></tr> <tr><td>2</td><td>-2</td><td></td></tr> <tr><td>2.5</td><td>0</td><td></td></tr> <tr><td>3</td><td>3</td><td></td></tr> <tr><td>3.5</td><td>7</td><td></td></tr> <tr><td>4</td><td>12</td><td></td></tr> <tr><td>4.5</td><td>18</td><td></td></tr> </tbody> </table> X=4.5	X	Y ₁		1.5	-3		2	-2		2.5	0		3	3		3.5	7		4	12		4.5	18	
X	Y ₁																																														
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4	12																																														
4.5	18																																														

Other students might use the "ASK" capacity of the table to find which of the given input values will generate an output of 18. This is not familiar to all students.

The student would set the independent variable to "ASK" and then would input the four answer choices into the table. This again would show that 4.5 is the input for which 18 is the output.

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TABLE SETUP TblStart=0 ΔTbl=1 Indent: Auto Depend: ASK Ask		X	Y ₁	
		X=		
X	Y ₁			
1.5	-3			
2	-2			
4.5	18			
6	42			
		X=		

Another type of question where the ASK capacity is very efficient is given below.

19 A function is described by the equation $f(x) = x^2 + 5$. The replacement set for the independent variable is {1, 5, 7, 12}. Which of the following is contained in the corresponding set for the dependent variable?

- A 0
- B 6
- C 7
- D 15

In this problem, the student could enter the equation into the equation editor and select "ASK" for the independent variable in the table setup.

Plot1 Plot2 Plot3 \Y ₁ X²+5 \Y ₂ = \Y ₃ = \Y ₄ = \Y ₅ = \Y ₆ = \Y ₇ =	TABLE SETUP TblStart=0 ΔTbl=1 Indent: Auto ASK Depend: ASK Ask
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The student will enter the four answer choices into the table.

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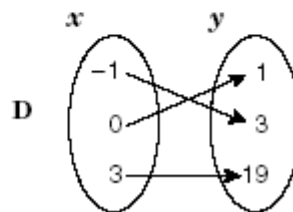
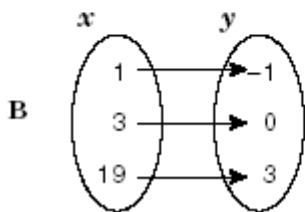
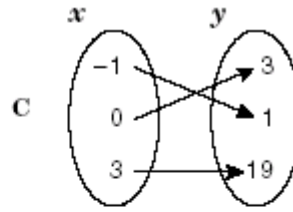
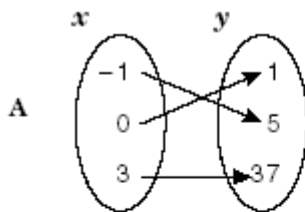
X	Y ₁	
1	6	
5	30	
7	54	
12	149	
X=		

Using the ASK capacity of the table allows the student to see that 6 is a value that is part of the solution set generated by the given replacement set.

Another question that could be solved efficiently using the ASK capacity of the table is given below.

It also uses the term "mapping". What does the term "mapping" mean?

43 Which mapping best represents the function $y = 2x^2 + 1$ when the replacement set for x is $\{-1, 0, 3\}$?



Explain how you can use your graphing calculator to find the answer of the question?
