Student 1

Multiple Representations of Linear Functions

Stardollars Coffee hosted a coffee-cup-stacking contest. Anthony noticed a pattern. He told the judges that Figure 100 would have 203 coffee cups stacked up. Was he correct? Use mathematics to prove or disprove Anthony's claim.

- Include a **table**, a **graph**, and a **rule** (equation) in your solution.
- Justify your solution.
- You need to explain how the **table**, **graph**, **rule**, and the **figures** prove or disprove Anthony's claim in your justification.

Figure 1   Figure 2   Figure 3
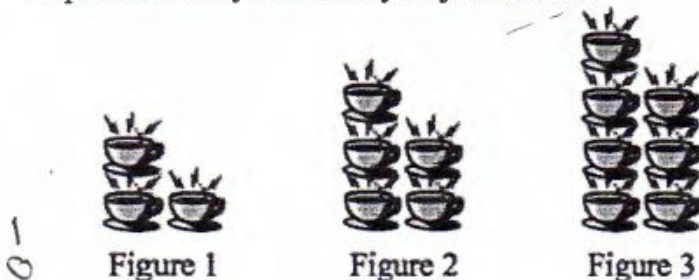
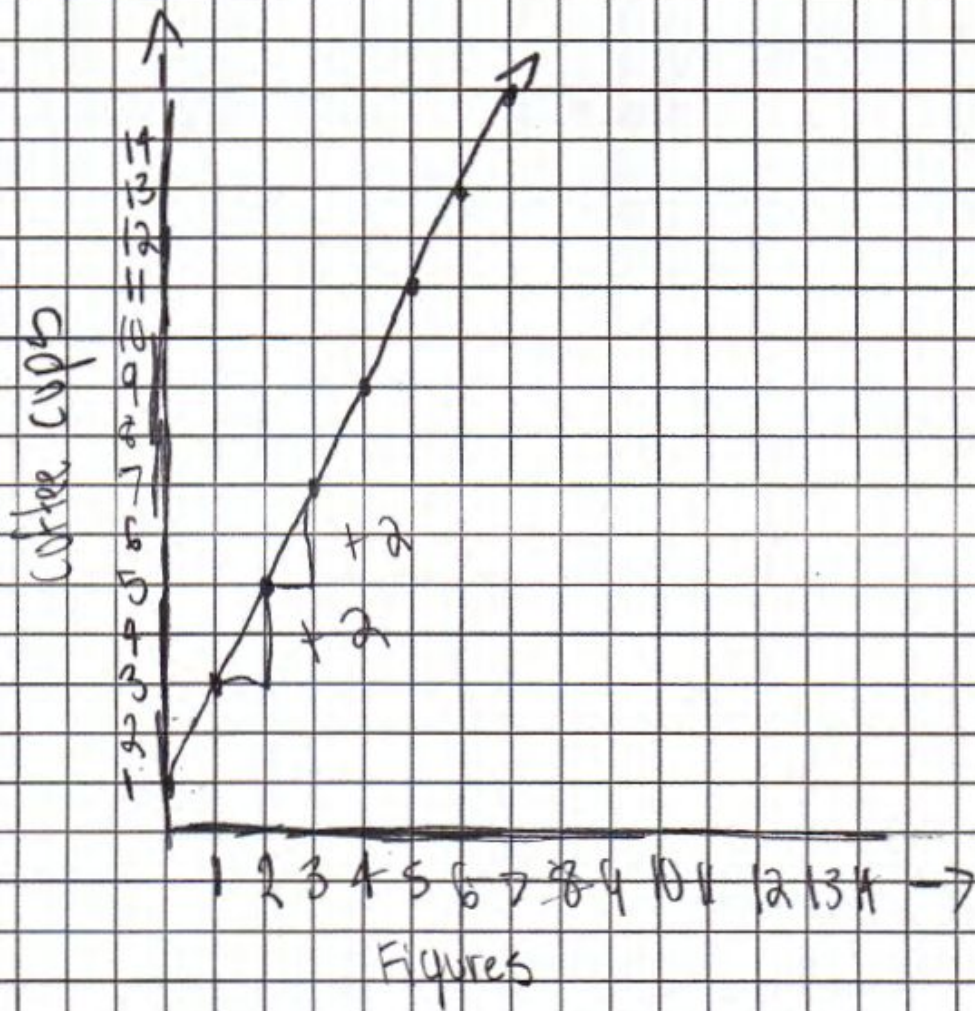| Figures	coffee cups
0	1
1	3 $+2$
2	5 $+2$
3	7 $+2$
$\downarrow$	$\downarrow$
100	203

$$y = 2x + 3$$

$y = 2(100) + 3$

$200 + 3$

203

CC - coffee cups

Anthony was correct in his claim that by figure 100 he would have 203 coffee cups. He was right because in figure 1 there were 3 CC's and in figure 2 there were CC's, etc. If this pattern continues increasing by 2 each time by the 100th figure you would have 203 CC's. I know this because I plugged 100 as x into my equation and got a result of 203. Looking at my graph you notice that up every dot there are 2 blocks in between, this also tells me that the pattern increases by 2. In my table you subtract 2 each time and eventually end up with 203. My table, graph, and my equation all show me my Anthony's claim.

Student 1

The graph shows a vertical axis labeled "Coffee Cups" with markings 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and a horizontal axis labeled "Figures" with markings 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14. A line is drawn with slope triangles labeled +2 and +2.

Student 2

Multiple Representations of Linear Functions

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Figure 1   Figure 2   Figure 3

$$(23 \times 100) = 203$$

0	3
1	5
2	7
3	9
4	11
5 6	14
7	16
8	18
9	20
10	22

$$\begin{array}{r} 23.10 \\ 100\overline{)203} \\ \times 100 \\ \hline 23 \\ -23 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 2?7 \times 100 \\ \times \ 23 \\ \hline 203 \end{array}$$

Studen

Student 2

Axis labels (y-axis, top to bottom): 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0

x-axis: 10 20 30 40 50 60 70 80 90 100

Student 3

Multiple Representations of Linear Functions

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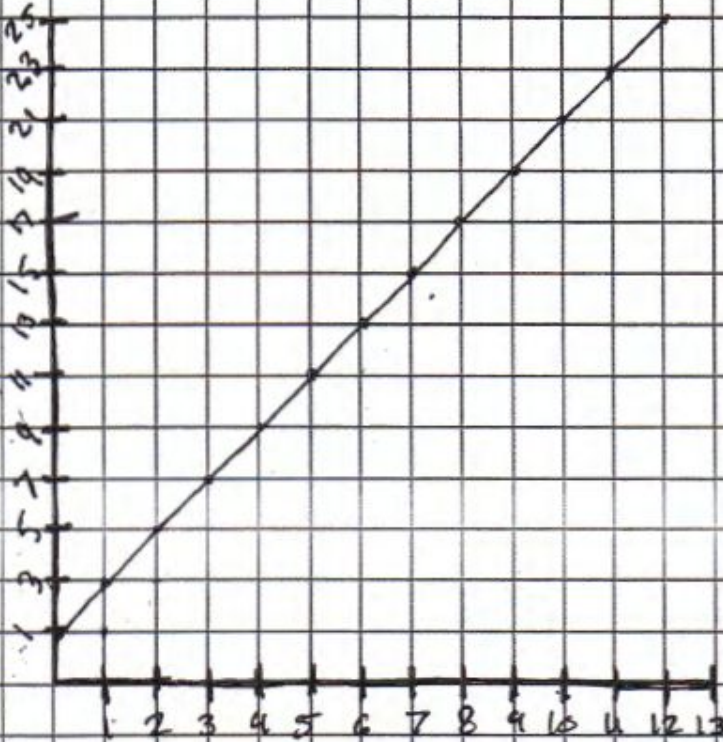
Figure 1   Figure 2   Figure 3

figure	cups
0	1
1	3
2	5
3	7
4	9
5	11
6	13
10	21
20	41
30	61
40	81
50	101
60	121
70	141
80	161
90	181
100	201

$y = 2x + 1$

He was incorrect. By every 5 figures you would have added 10. And by the time you get to figure 100, you would have 201 coffee cups. Not 203. It was pretty close though.

Student 3

Student 4

Multiple Representations of Linear Functions

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- You need to explain how the **table, graph, rule,** and the **figures** prove or disprove Anthony's claim in your justification.

+1

+1

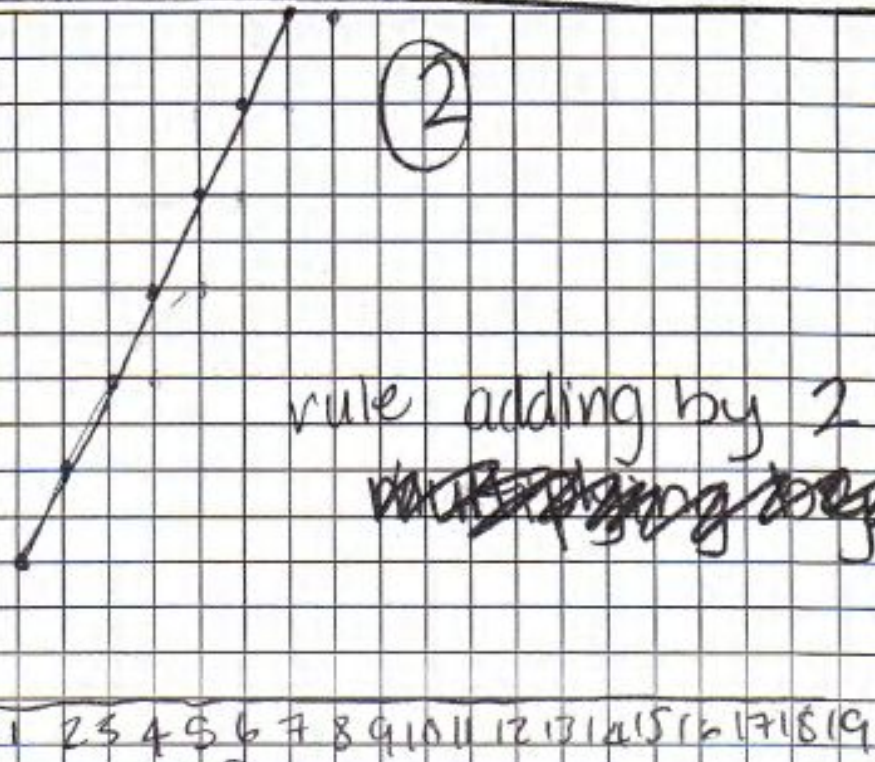Figure 1   Figure 2   Figure 3   Figure 4

① Table

② Graph

③ rule

④ Explain why Anthony is right

Student 4

② rule adding by 2 ~~an~~

~~crossed out~~

Cups
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

figures

① Table

Fig	Cups
1	3
2	5
3	7
4	9

③ rule: adding by 2 and it is linear. cause it was going up so it is positive.

④ He is right because if you keep on adding 2 each time untill you get to 100 then you will get 203.

Student 5

Multiple Representations of Linear Functions

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- You need to explain how the **table**, **graph**, **rule**, and the **figures** prove or disprove Anthony's claim in your justification.

3

5

7

Figure 1   Figure 2   Figure 3

Fig	# of Cups
0	0
1	3
2	5
3	7

Arithmetic, +2

$t(0) = 0$
$t(1) = 3$
$t(1+1) = 5$

$t(n) = n + 2$
$t(100) n + 2$
$= 102$

Anthony was wrong. There will be 102 cups

No Graph for Student 5

Student 5