Two Quantities That Change Together

Two quantities that change together: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

An independent quantity is the input; the dependent quantity follows a rule. If $y = 2x + 1$, inputs $0, 1, 2$ give outputs $1, 3, 5$. The output increases by 2 for each input increase of 1, but starts at 1. A table, equation, and graph can show the same relationship.

Worked example

Complete the input-output table. Use $y = 2x + 1$ for $x = 0, 1, 2$.

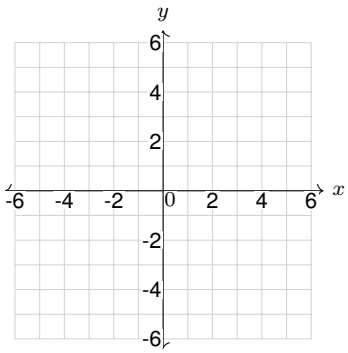
1. At $x = 0$, $y = 2 \times 0 + 1 = 1$.
2. At $x = 1$, $y = 2 \times 1 + 1 = 3$; at $x = 2$, $y = 2 \times 2 + 1 = 5$.
3. Each unit increase in x changes y by 2, with starting value 1.
Answer: $(0, 1), (1, 3), (2, 5)$.

x	0	1	2
y			

Practice Problems

Show your thinking.

1. A student starts the graph at $(0, 0)$. Complete and graph the correct outputs. Use $y = 2x + 1$ for $x = 0, 1, 2$.



x	0	1	2
y			

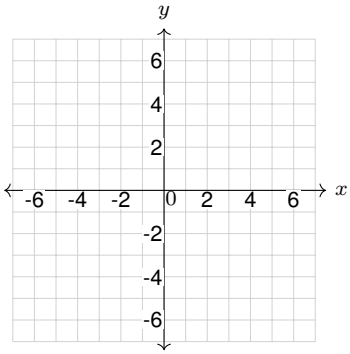
2. The starting value is 2 and the increase is 3 per input unit. Recover the table. Use $y = 3x + 2$ for $x = 0, 1, 2$.

x	0	1	2
y			

3. A student multiplies by 4 instead of adding 4. Correct the outputs. Use $y = 1x + 4$ for $x = 0, 1, 3$.

x	0	1	3
y			

4. The output is twice the input. Recover and graph its pairs. Use $y = 2x + 0$ for $x = 0, 2, 3$.



x	0	2	3
y			

5. Explain why the first output is 1, not 4. Use $y = 4x + 1$ for $x = 0, 1, 2$.

x	0	1	2
y			

6. A table lists outputs $0, 3, 5$. Repair the output at $x = 2$. Use $y = 3x + 0$ for $x = 0, 1, 2$.

x	0	1	2
y			

Answer Key

1. $(0, 1), (1, 3), (2, 5)$.
2. $(0, 2), (1, 5), (2, 8)$.
3. $(0, 4), (1, 5), (3, 7)$.
4. $(0, 0), (2, 4), (3, 6)$.
5. $(0, 1), (1, 5), (2, 9)$.
6. $(0, 0), (1, 3), (2, 6)$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. At $x = 0$, $y = 2 \times 0 + 1 = 1$.
2. At $x = 1$, $y = 2 \times 1 + 1 = 3$; at $x = 2$, $y = 2 \times 2 + 1 = 5$.
3. Each unit increase in x changes y by 2, with starting value 1.

Problem 2

1. At $x = 0$, $y = 3 \times 0 + 2 = 2$.
2. At $x = 1$, $y = 3 \times 1 + 2 = 5$; at $x = 2$, $y = 3 \times 2 + 2 = 8$.
3. Each unit increase in x changes y by 3, with starting value 2.

Problem 3

1. At $x = 0$, $y = 1 \times 0 + 4 = 4$.
2. At $x = 1$, $y = 1 \times 1 + 4 = 5$; at $x = 3$, $y = 1 \times 3 + 4 = 7$.
3. Each unit increase in x changes y by 1, with starting value 4.

Problem 4

1. At $x = 0$, $y = 2 \times 0 + 0 = 0$.
2. At $x = 2$, $y = 2 \times 2 + 0 = 4$; at $x = 3$, $y = 2 \times 3 + 0 = 6$.
3. Each unit increase in x changes y by 2, with starting value 0.

Problem 5

1. At $x = 0$, $y = 4 \times 0 + 1 = 1$.
2. At $x = 1$, $y = 4 \times 1 + 1 = 5$; at $x = 2$, $y = 4 \times 2 + 1 = 9$.
3. Each unit increase in x changes y by 4, with starting value 1.

Problem 6

1. At $x = 0$, $y = 3 \times 0 + 0 = 0$.
2. At $x = 1$, $y = 3 \times 1 + 0 = 3$; at $x = 2$, $y = 3 \times 2 + 0 = 6$.
3. Each unit increase in x changes y by 3, with starting value 0.

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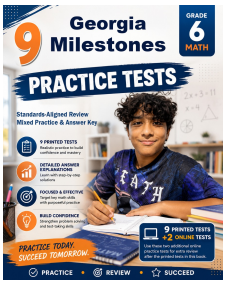

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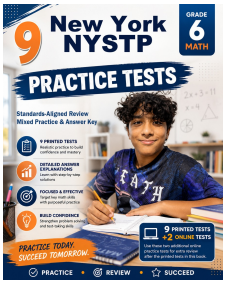

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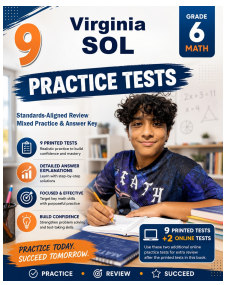

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