Two Quantities That Change Together

Two quantities that change together: Models and calculations

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 $x = 0, 1, 2$.

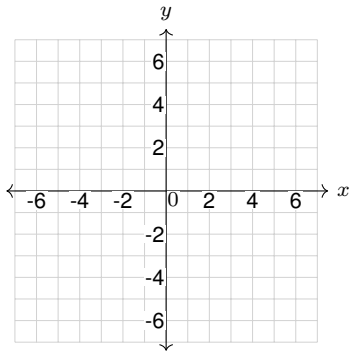
1. At $x = 0$, $y = 2 \times 0 + 1 = 1$.
2. At $x = 1$, $y = 2 \times 1 + 1 = 3$; at $x = 2$, $y = 2 \times 2 + 1 = 5$.
3. Each unit increase in x changes y by 2, with starting value 1.
Answer: $(0, 1), (1, 3), (2, 5)$.

x	0	1	2
y			

Practice Problems

Show your thinking.

1. Complete the table and graph the pairs. Use $y = 3x + 0$ for $x = 0, 1, 2$.



x	0	1	2
y			

2. Find outputs from the rule. Use $y = 2x + 3$ for $x = 0, 1, 2$.

x	0	1	2
y			

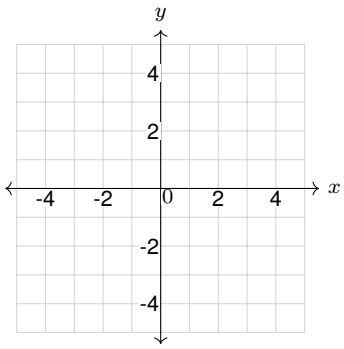
3. Complete the table and explain the starting value. Use $y = 1x + 2$ for $x = 0, 2, 4$.

x	0	2	4
y			

4. Each bicycle has 2 wheels. Let x count bicycles and y wheels. Fill the table. Use $y = 2x + 0$ for $x = 1, 2, 3$.

x	1	2	3
y			

5. Find the outputs and graph them. Use $y = 1x + 1$ for $x = 0, 2, 3$.



x	0	2	3
y			

6. Recover the values hidden in the blank output row. Use $y = 4x + 2$ for $x = 0, 1, 2$.

x	0	1	2
y			

Answer Key

1. $(0, 0), (1, 3), (2, 6)$.
2. $(0, 3), (1, 5), (2, 7)$.
3. $(0, 2), (2, 4), (4, 6)$.
4. $(1, 2), (2, 4), (3, 6)$.
5. $(0, 1), (2, 3), (3, 4)$.
6. $(0, 2), (1, 6), (2, 10)$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

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.

Problem 2

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

Problem 3

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

Problem 4

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

Problem 6

1. At $x = 0$, $y = 4 \times 0 + 2 = 2$.
2. At $x = 1$, $y = 4 \times 1 + 2 = 6$; at $x = 2$, $y = 4 \times 2 + 2 = 10$.
3. Each unit increase in x changes y by 4, with starting value 2.

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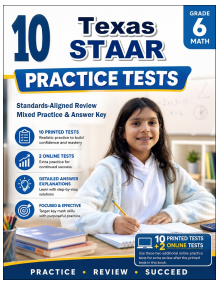

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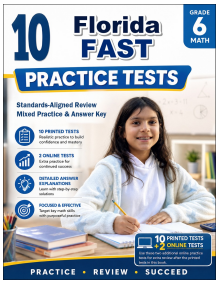

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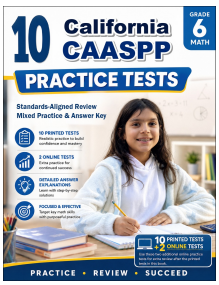

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