Generating Number Patterns

Generating Number Patterns: Models and Computation

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QUICK REVIEW

Step 0 is the starting value. Apply the rule once for each step. Pair values from the same step. In (A, B), read A horizontally and B vertically.

Worked example

A starts at 2 and adds 4. B starts at 1 and adds 3. Give the starting pair and the next two pairs.

1. A: start 2; $2 + 4 = 6$ and $6 + 4 = 10$.
2. B: start 1; $1 + 3 = 4$ and $4 + 3 = 7$.
3. Match steps $0, 1, 2$: $(2, 1), (6, 4), (10, 7)$.
Answer: $(2, 1), (6, 4), (10, 7)$.

Practice Problems

Show your thinking.

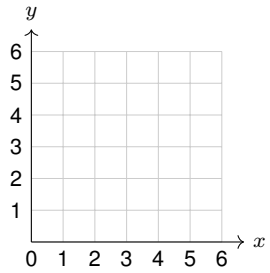
1. Start with 4 and add 3 each time. Write the first five terms, including the start.

2. Both patterns start at 0. A adds 2 and B adds 5 each step. Write the first four pairs (A, B), including the start.

3. A and B both add 2 at each step. Fill the blanks in the table and explain how B compares with A in every row.

Step	A	B
0	3	5
1	5	?
2	?	?
3	?	11

4. A starts at 1 and B at 2. Both add 1 per step. Generate and plot (A, B) at steps 0 through 3.



5. A lists $0, 3, 6, 9$ and B lists $0, 6, 12, 18$. Both continue by their same increases. How can you get B from A at the same step? Give the next pair.

6. A display starts at 20 and drops by 4 with each beep. Give the pairs (beeps, reading) from the start through the third beep.

7. A builder starts with no tiles and lays 3 red and 2 white tiles in each round. After two rounds, write the pair (red, white) and give the difference.

8. The pairs are $(1, 5), (3, 7), (5, 9), (7, 11)$. Separate the pairs into an A list and a B list. What difference stays the same?

Answer Key

1. $4, 7, 10, 13, 16$.
2. $(0, 0), (2, 5), (4, 10), (6, 15)$.
3. Steps 1 to 3: $(5, 7), (7, 9), (9, 11)$. B is 2 more.
4. $(1, 2), (2, 3), (3, 4), (4, 5)$.
5. B is twice A; next pair $(12, 24)$.
6. $(0, 20), (1, 16), (2, 12), (3, 8)$.
7. $(6, 4)$; 2 more red tiles.
8. A: $1, 3, 5, 7$. B: $5, 7, 9, 11$. B is 4 more.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. First additions: $4 + 3 = 7$, then $7 + 3 = 10$.
2. Continue: $10 + 3 = 13$, then $13 + 3 = 16$.

Problem 2

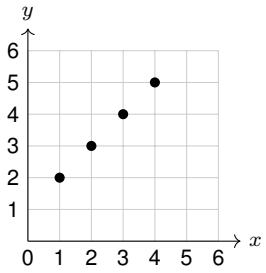
1. Add 2 along A: $0, 2, 4, 6$.
2. Add 5 along B: $0, 5, 10, 15$.
3. Pair the terms at steps 0 to 3: $(0, 0), (2, 5), (4, 10), (6, 15)$.

Problem 3

1. A starts at 3: $3 + 2 = 5$, $5 + 2 = 7$, $7 + 2 = 9$.
2. B starts at 5: $5 + 2 = 7$, $7 + 2 = 9$, $9 + 2 = 11$.
3. B starts $5 - 3 = 2$ higher. Adding 2 to both keeps that gap.

Problem 4

1. The four A-values are $1, 2, 3, 4$. The four B-values are $2, 3, 4, 5$.
2. Plot $(1, 2), (2, 3), (3, 4), (4, 5)$. For $(1, 2)$, move 1 right and 2 up.



Problem 5

1. For example, $2 \times 3 = 6$, $2 \times 6 = 12$, and $2 \times 9 = 18$.
2. A adds 3 and B adds 6, so next is $(9 + 3, 18 + 6) = (12, 24)$.

Problem 6

1. Before the first beep the reading is 20, giving $(0, 20)$.
2. Subtract 4 each time: $20 - 4 = 16$, $16 - 4 = 12$, $12 - 4 = 8$. Pair these with beeps $1, 2, 3$.

Problem 7

1. After one round: $(3, 2)$. After two: $(3 + 3, 2 + 2) = (6, 4)$.
2. $6 - 4 = 2$ more tiles are red.

Problem 8

1. Read first coordinates $1, 3, 5, 7$ for A and second coordinates $5, 7, 9, 11$ for B.
2. $5 - 1 = 7 - 3 = 9 - 5 = 11 - 7 = 4$.

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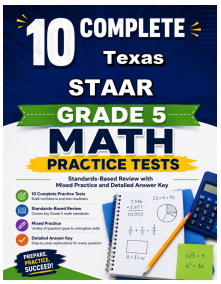

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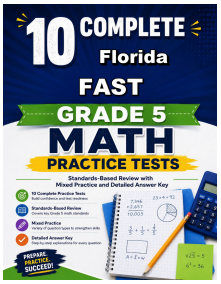

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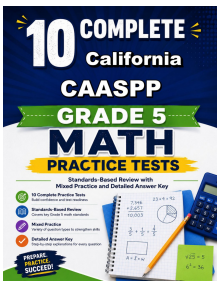

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