

Supercells

Unit: Number Play - Student Practice Worksheet

Overview: Ms. Rao lined up seven children of different heights and asked each to say 0, 1, or 2 based on the children standing right beside them. Some shouted 2 because both neighbors were taller. Others said 0 because no neighbor beat them — and those children turned out to be supercells. The same local rule works for numbers in a row: a supercell beats every cell touching it directly.

Practice Questions (30 Total)

Section A - Easy

Q1. The teal cells beat their touching neighbors. What are those cells called?



- ☐ A. Supercells
- ☐ B. The whole-row maximum only
- ☐ C. Even numbers
- ☐ D. The smallest numbers

Q2. A child says 0 in the height line game. What does that mean?

- ☐ A. No neighbor is taller — a supercell
- ☐ B. Both neighbors are taller
- ☐ C. Exactly one neighbor is taller
- ☐ D. All children have equal height

Q3. In the row 645, 700, 233, is 700 a supercell?

- ☐ A. No, since 645 is nearby
- ☐ B. Yes, since $700 > 645$ and $700 > 233$
- ☐ C. Cannot be determined
- ☐ D. Only if it's the last cell

Q4. The first cell 5 only touches 3. How many neighbors does a first cell have?



- ☐ A. Zero
- ☐ B. Two
- ☐ C. One
- ☐ D. Three

Q5. Can two supercells ever be direct neighbors?

- ☐ A. No, never
- ☐ B. Yes, always
- ☐ C. Only at the ends of a row
- ☐ D. Only if both numbers are equal

Q6. A child says 1 in the height line game. What is true?

- ☐ A. Yes
- ☐ B. One taller and one shorter neighbor
- ☐ C. Cannot be determined
- ☐ D. Only sometimes

Q7. The teal 8 sits between 3 and 1. Is 8 a supercell?



- ☐ A. No, 8 is not the biggest possible number
- ☐ B. Cannot be determined
- ☐ C. Only if 8 is at the end
- ☐ D. Yes, since $8 > 3$ and $8 > 1$

Q8. If five children stand in strictly ascending order, how many say 0?

- ☐ A. Zero
- ☐ B. Two
- ☐ C. All five

☐ D. Exactly one

Q9. In the row 9, 2 (2 is last), is 2 a supercell?

☐ A. No, since $2 < 9$

☐ B. Yes

☐ C. Cannot be determined

☐ D. Only sometimes

Q10. How many neighbors does the last cell in a row have?

☐ A. Zero

☐ B. Two

☐ C. One

☐ D. Three

Section B - Medium

Q11. Which numbers in this highlighted row are supercells?

5	3	8	1	9	2
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☐ A. 5, 8, and 9

☐ B. 3 and 1 only

☐ C. Only 9

☐ D. All six cells

Q12. A child says 2 in the height line game. What is true?

☐ A. Both neighbors are taller

☐ B. No, all cells would be supercells

☐ C. Only the first cell would be a supercell

☐ D. Only the last cell would be a supercell

Q13. In the row 4, 9, 2, 7, 6, 10, 3, which cells are supercells?

☐ A. 4, 2, and 6

☐ B. 9, 7, and 10

☐ C. Only 10

☐ D. 3 only

Q14. Five children stand in strictly ascending order. How many say 1?

1	2	3	4	5
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☐ A. Two

☐ B. Three

☐ C. Four

☐ D. All five

Q15. Five children stand in strictly ascending order. How many say 2?

☐ A. Zero

☐ B. One

☐ C. Four

☐ D. All five

Q16. In the row 2, 6, 1, 8, 3, how many supercells are there?

☐ A. 1

☐ B. 2

☐ C. 3

☐ D. 4

Q17. The teal highs sit in a low-high-low zigzag. How many supercells are there?

1	9	2	8	3
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☐ A. 5, every cell

☐ B. 0, none qualify

☐ C. 3, all the low positions

☐ D. 2 — the two high positions

Q18. If N children stand in strictly ascending order, how many say 1?

- ☐ A. All N
- ☐ B. Zero
- ☐ C. N minus 1
- ☐ D. Exactly one

Q19. In a row of exactly 2 cells, like 7, 3, how many supercells are there?

- ☐ A. 0
- ☐ B. 2
- ☐ C. Cannot be determined
- ☐ D. 1

Q20. In the row 51, 29, 24, 20, 10 (largest to smallest), how many supercells?

- ☐ A. Five, every cell
- ☐ B. Three, the middle cells
- ☐ C. Two, the end cells
- ☐ D. One, only 51

Section C - Challenge

Q21. These seven slots alternate High and Low. What is the maximum number of supercells in 7 cells?

H L H L H L H

- ☐ A. 7
- ☐ B. 3
- ☐ C. 1
- ☐ D. 4

Q22. Why can two supercells never be direct neighbors?

- ☐ A. Each would need to be both bigger and smaller than the other
- ☐ B. It's just a rule with no underlying reason
- ☐ C. Because supercells must always be odd numbers
- ☐ D. Two supercells actually CAN be neighbors

Q23. In the row 645, 700, 233, 215, 1809, how many supercells are there?

- ☐ **A.** One — only 700 qualifies
- ☐ **B.** Three — the middle cells
- ☐ **C.** Five — every single cell
- ☐ **D.** Two — the end positions

Q24. Four equal 5s. How many supercells does this row have?

5 5 5 5

- ☐ **A.** 4
- ☐ **B.** 1
- ☐ **C.** 2
- ☐ **D.** 0

Q25. What is the minimum number of supercells in a row of 2 or more DISTINCT numbers?

- ☐ **A.** 0, a row can have zero supercells
- ☐ **B.** It depends only on row length, not values
- ☐ **C.** At least 1, the row's unique maximum
- ☐ **D.** Exactly half the row

Q26. Kabir claims reversing a row changes which cells are supercells. Is he right?

- ☐ **A.** Yes, reversing always changes every supercell
- ☐ **B.** No, the same cells stay supercells
- ☐ **C.** Only end cells are affected by reversing
- ☐ **D.** Reversing removes all supercells

Q27. If N children stand in strictly ascending order, how many say 0?

1	2	3	4	5
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- ☐ **A.** Zero
- ☐ **B.** N minus 1

- ☐ C. Exactly one
- ☐ D. All N

Q28. Why does checking only immediate neighbors make finding supercells efficient?

- ☐ A. Each cell needs only 1-2 comparisons
- ☐ B. It doesn't actually save any comparisons
- ☐ C. Because the whole row must still be checked anyway
- ☐ D. Efficiency has nothing to do with comparisons

Q29. If seven children stand in strictly ascending order, how many say 1?

- ☐ A. One
- ☐ B. Six
- ☐ C. Seven
- ☐ D. Zero

Q30. Why is 'supercell' a useful idea even though it only looks at local information?

- ☐ A. It shows local rules can reveal real structure
- ☐ B. It has no real mathematical use
- ☐ C. Local rules always give wrong answers
- ☐ D. It only works for very short rows

Answer Key

- Q1:** (A) (a) Supercells. Teal marks 5, 8, and 9 — each is bigger than every cell touching it.
- Q2:** (A) (a) No neighbor is taller — the child is taller than every neighbor touching them, so they are a supercell.
- Q3:** (B) (b) Yes — 700 beats both touching cells, 645 and 233.
- Q4:** (C) (c) One — only the cell to its right.
- Q5:** (A) (a) No, never — each would need to be both bigger and smaller than the other.
- Q6:** (B) (b) Exactly one neighbor is taller and one is shorter — that is why the child says 1.
- Q7:** (D) (d) Yes — it beats both touching cells.
- Q8:** (D) (d) Exactly one — only the tallest child at the end has no taller neighbor.
- Q9:** (A) (a) No, since $2 < 9$, its one neighbor.
- Q10:** (C) (c) One — only the cell to its left.
- Q11:** (A) (a) 5, 8, and 9 — the teal cells each beat their touching neighbor(s).
- Q12:** (A) (a) Both neighbors are taller — say 2 when every touching neighbor beats you.
- Q13:** (B) (b) 9, 7, and 10. $9 > 4$ and $9 > 2$; $7 > 2$ and $7 > 6$; $10 > 6$ and $10 > 3$.
- Q14:** (C) (c) Four — every child except the tallest says 1 (one taller, one shorter neighbor).
- Q15:** (A) (a) Zero — no child has two taller neighbors in a strictly rising line.
- Q16:** (B) (b) 2. 6 beats 2 and 1; 8 beats 1 and 3.
- Q17:** (D) (d) 2 — 9 and 8 each beat both smaller neighbors.
- Q18:** (C) (c) N minus 1 — every child except the tallest has one taller and one shorter neighbor.
- Q19:** (D) (d) 1. 7 beats 3; 3 does not beat 7.
- Q20:** (D) (d) One — only 51 beats its neighbor 29; every other cell loses to a touching neighbor.
- Q21:** (D) (d) 4. Supercells cannot be adjacent, so H-L-H-L-H-L-H places four peaks.
- Q22:** (A) (a) Each would need to be both bigger and smaller than the other.
- Q23:** (A) (a) One — only 700 beats both touching cells; neighbors of a supercell cannot qualify.
- Q24:** (D) (d) 0. A cell must be strictly bigger, and equals do not beat each other.
- Q25:** (C) (c) At least 1 — the unique maximum always beats its neighbor(s). Ties can make zero, but this item asks for distinct numbers.
- Q26:** (B) (b) No — each cell still has the same neighbor values.
- Q27:** (C) (c) Exactly one — only the tallest child at the end has no taller neighbor.
- Q28:** (A) (a) Each cell needs only 1-2 comparisons instead of comparing to every other cell.
- Q29:** (B) (b) Six — seven minus one; every child except the tallest says 1.
- Q30:** (A) (a) Simple local rules can reveal real structure without seeing the whole picture at once.

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