Writing Inequalities

Writing inequalities: Models and calculations

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Decide which side is allowed: larger values use $>$, smaller values use $<$. Then test the boundary. Include equality for at least ($\geq$) and at most ($\leq$). For example, a temperature at most -1 includes -1 and smaller numbers such as -2. State the variable and units.

Worked example

Let x be age in whole years. Write at least 13 years. Test the boundary and nearby ages.

1. The rule admits ages above 13 and excludes younger ages, so choose the greater-than direction.
2. Test the boundary: $x = 13$ is included, so use $\geq$.
3. $14 \geq 13$ is true, while $12 \geq 13$ is false; the allowed side is right.
Answer: $x \geq 13$.

Practice Problems

Show your thinking.

1. Let x be points. Write more than 8 points and test nearby values.

2. Let x be mass in kg. Write at most 15 kg.

3. Let x be hours. Write fewer than 6 hours.

4. Let x be degrees Celsius. Write no colder than -2 degrees.

5. Let x be dollars spent. Model a 20-dollar spending limit.

6. A club accepts ages $10, 11, 12, \ldots$. Recover the age inequality using x.

7. Write more than 14 centimeters using x for length.

8. Explain the inclusive boundary in at least 3 liters using x.

Answer Key

1. $x > 8$.
2. $x \leq 15$.
3. $x < 6$.
4. $x \geq -2$.
5. $x \leq 20$.
6. $x \geq 10$.
7. $x > 14$.
8. $x \geq 3$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. More than 8 means higher point totals, so choose the larger side of 8.

2. Test the boundary: $x = 8$ is excluded, so use $>$.

3. $9 > 8$ is true, while $7 > 8$ is false; the allowed side is right.

Problem 2

1. At most 15 sets a maximum mass, so masses smaller than 15 are allowed.

2. Test the boundary: $x = 15$ is included, so use $\leq$.

3. $14 \leq 15$ is true, while $16 \leq 15$ is false; the allowed side is left.

Problem 3

1. Fewer than 6 means less time, so choose numbers smaller than 6.

2. Test the boundary: $x = 6$ is excluded, so use $<$.

3. $5 < 6$ is true, while $7 < 6$ is false; the allowed side is left.

Problem 4

1. A colder temperature has a smaller number. No colder than -2 allows warmer values on the larger side.

2. Test the boundary: $x = -2$ is included, so use $\geq$.

3. $-1 \geq -2$ is true, while $-3 \geq -2$ is false; the allowed side is right.

Problem 5

1. A 20-dollar limit is a maximum, so spending less than 20 is on the allowed side.

2. Test the boundary: $x = 20$ is included, so use $\leq$.

3. $19 \leq 20$ is true, while $21 \leq 20$ is false; the allowed side is left.

Problem 6

1. The list $10, 11, 12, \ldots$ continues toward larger ages, not toward 9.

2. Test the boundary: $x = 10$ is included, so use $\geq$.

3. $11 \geq 10$ is true, while $9 \geq 10$ is false; the allowed side is right.

Problem 7

1. Lengths longer than 14 cm are larger than 14 on the number line.

2. Test the boundary: $x = 14$ is excluded, so use $>$.

3. $15 > 14$ is true, while $13 > 14$ is false; the allowed side is right.

Problem 8

1. At least 3 sets a minimum volume, so quantities above 3 are allowed.

2. Test the boundary: $x = 3$ is included, so use $\geq$.

3. $4 \geq 3$ is true, while $2 \geq 3$ is false; the allowed side is right.

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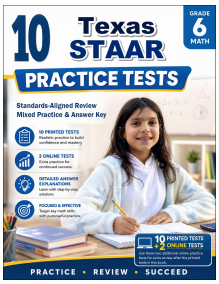

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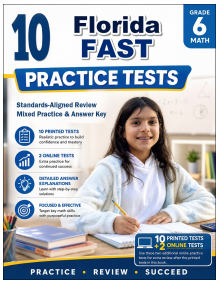

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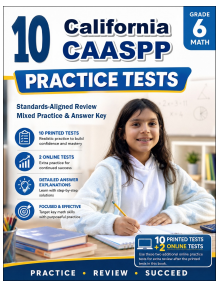

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