Quantitative response formats: all valid values and numerical entry

Original classroom teaching; not an official form or score predictor

Quantitative Response Formats: All Valid Values and Numerical Entry

- Answer "select one or more" questions by testing every option.
- Check each **candidate solution** 候选解 in the original conditions.
- Answer numerical-entry questions in the exact form asked, including **rounding** 舍入.

Select one or more answer choices

- Test each listed value against every condition.
- There may be one, several or all correct; there is no partial credit.
- A value that satisfies a simplified version may fail the original: check the original.

Candidates from algebra

- Squaring, multiplying by an expression or cancelling can create or lose solutions.
- List the restrictions first: roots need non-negative arguments; denominators cannot be zero.
- Strict and inclusive inequalities differ at the endpoints.

Numerical entry

- One box: enter an integer or a decimal. Two boxes: enter a fraction (it need not be in lowest terms unless told).
- Enter the quantity asked for: a probability, not a percentage; a total, not a count of groups.
- Round only at the end, and only as instructed.

Figure: Numerical entry



$P(\text{marked}) = 3/8$

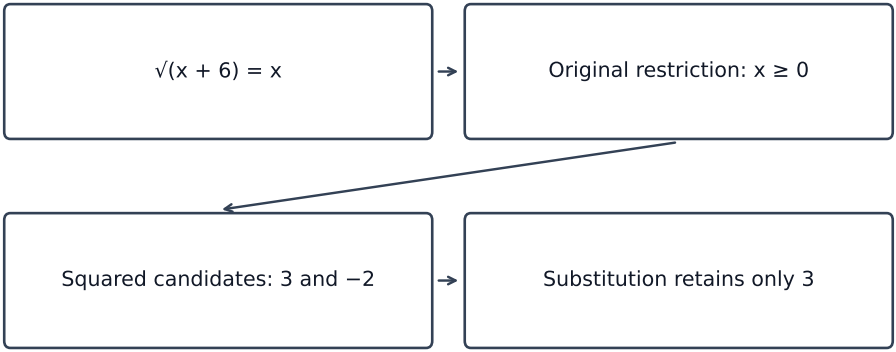
0.375 ✓

37.5 (a percent)

3 (the count)

- Enter the form the box asks for.
- Match each part of the diagram to the text.

Figure: Numerical entry ·



- Square both sides, then check each candidate in the original: only 3 survives

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Worked example: all valid values

- Factor: $(n-2)(n-3) \leq 0$, so $2 \leq n \leq 3$.
- Integers: 2 and 3. Check: $4 - 10 + 6 = 0$ and $9 - 15 + 6 = 0$, both ≤ 0.
- $n = 4$ gives $16 - 20 + 6 = 2 > 0$, so it fails.

Worked example: an original application

- Select all real solutions of $\sqrt{x+6} = x$ from -3, -2, 0, 2, 3.
- Then enter the probability of drawing one marked counter from a bag with seven marked and thirteen unmarked counters, as a decimal.
- **3 only; 0.35.** The original radical requires x nonnegative.
- Squaring gives $x^2 - x - 6 = (x-3)(x+2) = 0$.

Independent transfer

- Select every listed integer satisfying $-2 \leq x < 4$ and $x^2 > 1$: -3, -2, -1, 0, 1, 2, 3, 4.
- Then enter $7/12$ as a decimal rounded to the nearest hundredth.
- **-2, 2 and 3; 0.58.** The first restriction keeps integers -2 through 3.
- The strict squared inequality excludes -1,0,1.

Common errors

- Stopping after one correct value.
- Keeping a candidate that fails the original equation.
- Entering 37.5 when the question asks for a probability of 0.375.

Common errors (2)

- **Rounding** before the last step.
- Including an endpoint excluded by a strict inequality.

Key terms

- **candidate solution**: A value produced by a method that must still be checked in the original.
- **rounding**: Replacing a number with a nearby simpler value to a stated precision.

Check yourself

- Select all of -2, 0, 2 that satisfy $x^2 = 2x$.
- Enter $\frac{5}{8}$ as a decimal.
- Round $\frac{2}{3}$ to the nearest hundredth.