

3.1 Quantitative comparison and number reasoning

Name: _____ Class: _____ Date: _____

KEY WORDS constraint • indeterminate

Objective

Compare quantities across all allowed values; Use arithmetic, ratios, divisibility and powers; Recognise when the relationship cannot be determined.

Original public tasks and locally authored marking guidance. No official score is assigned.

1 Key knowledge and worked examples

constraint : A condition limiting allowed values.

indeterminate : Not fixed by the given information.

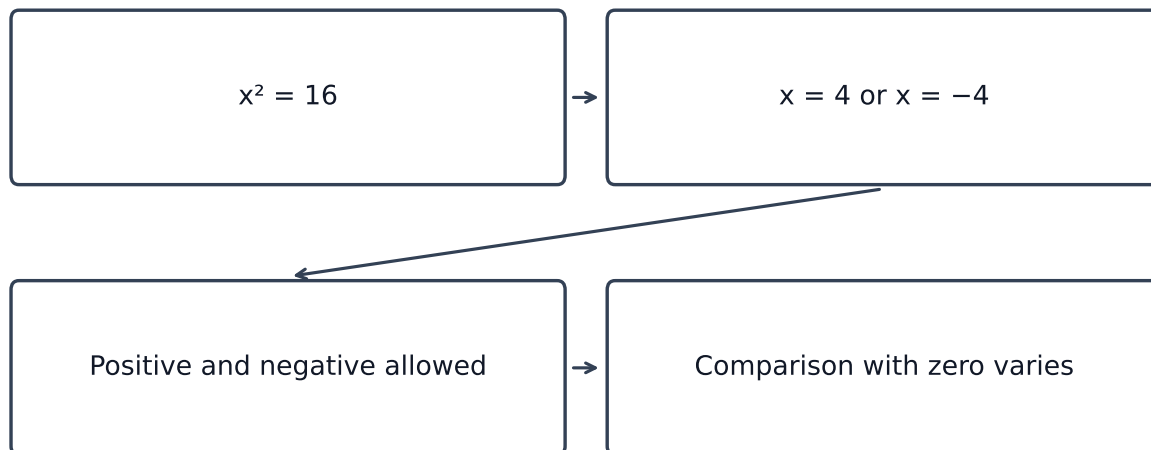
Quantitative Comparison has four fixed relationships: A greater, B greater, equal, or cannot determine.

Check all constraints. A variable can be negative, zero or fractional unless the stem restricts it.

Use strategic substitutions to disprove a fixed relation. They can show indeterminacy but a few examples do not prove universality.

Simplify both quantities without silently dividing by a value that could be zero or negative.

Given $x^2=9$, x can be 3 or -3 . Quantity $A=x$; $B=0$. A is greater for 3 and smaller for -3 , so the relationship cannot be determined. If x is positive, only 3 is allowed and A is greater.



$x^2 = 16$ allows $x = 4$ or $x = -4$, so the comparison with zero is not fixed

2 Practice

2.1 Quantitative Comparison uses these relationships: A. Quantity A is greater. B. Quantity B is greater. C. Equal. D. Cannot be determined. Given real x with $x^2 = 16$, compare Quantity A: x , Quantity B: 0. Repeat with the added condition $x > 0$.

3 Exam-style questions

3.1 With the same four answer categories, let $a > 0$ and $b < 0$. Compare Quantity A: a/b , Quantity B: b/a . Give admissible examples if the relationship can vary, and identify when equality occurs.

Solutions

2.1 Without the added condition, **D**: $x=4$ makes A greater, while $x=-4$ makes B greater. With $x > 0$, **A**, because only $x=4$ is permitted. The principal square root of 16 is four, but the equation has both roots. One chosen example cannot prove a relationship over all allowed values.

3.1 D. For $a=2, b=-1$, $A=-2$ and $B=-1/2$, so B is greater. For $a = 1, b=-2$, $A=-1/2$ and $B=-2$, so A is greater. For $a = 1, b=-1$ they are equal. More generally $a/b = b/a$ means $a^2 = b^2$, and the stated opposite signs give $a=-b$. Multiplying an inequality by the negative product ab reverses direction; ignoring this sign would reverse conclusions.

Local review checklist: follow every response instruction; support the answer with the stated evidence; explain rejected alternatives or an opposing view; check scope, restrictions and clarity. For writing, this is a formative checklist, not an official rubric score.