

Ratios, rates, proportional relationships, & units

A **ratio** compares two quantities. A **rate** compares two quantities with different units. A **proportional relationship** is one where two quantities always share the same ratio. Together **with unit conversion**, these ideas make up one of the most frequently tested groups of questions on the SAT math section.

1

Key vocabulary and definitions

Ratio

A comparison of two quantities by division. Written $a:b$ or a/b .

Rate

A ratio comparing two quantities with different units. Example: miles per hour.

Unit rate

Rate simplified so the second quantity equals one. Example: sixty miles per one hour.

Proportion

An equation stating two ratios are equal. Example, $a/b = c/d$.

Constant

The fixed value k in $y = kx$ that relates two proportional quantities.

Direct variation

A relationship where $y = kx$. As x increases, y increases at a constant rate.

2

Ratios and part-to-part versus part-to-whole

A ratio can compare a part to another part or a part to the whole group. Mixing this up is one of the most common SAT errors.

Part to part

Part to part compares two categories directly to each other.

Example: Three boys for every five girls.
Boys: Girls = 3:5.

Part to whole

Part to whole compares one category to the total.

Example: Boys out of all students.
Boys: Total = 3:8



SAT tip

When a ratio is given as three to five, check whether the question wants a **part to part answer** or a **part to whole answer**. The denominator changes.

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Ratios and part-to-part versus part-to-whole

A rate compares quantities with different units. Finding the rate unit rate makes comparisons and predictions straightforward.

Unit Rate

Unit rate = total quantity ÷ number of units.