

1.1.99 Independent transfer: Foundation then Higher

Name: _____ Class: _____ Date: _____

KEY WORDS prime factor • lower bound

<!-- Session 2 independent transfer -->

Objective

Apply this topic to unfamiliar Foundation and Higher problems; keep the two scopes distinct. Original questions and local marking guidance.

1 Key knowledge and worked examples

Use common prime factors for the largest identical pack count. A rounded positive length represents a half-open interval. Products increase with each positive input; quotients increase with numerator and decrease with positive denominator. Check whether an extreme requires an excluded endpoint.

$72 = 2^3 \times 3^2$ and $90 = 2 \times 3^2 \times 5$. Their HCF is $2 \times 9 = 18$. Make 18 bags with 4 pencils and 5 pens each. Their LCM is $2^3 \times 3^2 \times 5 = 360$. A prime integer is greater than 1 and has exactly two positive factors. The number 1 is not prime; a composite positive integer greater than 1 has more than two positive factors. Every integer greater than 1 has a unique product of prime factors apart from their order. For example, $60 = 2^2 \times 3 \times 5$. A factor divides a number; a multiple is the result of multiplying it by an integer. HCF uses common smallest powers, while LCM uses largest powers.

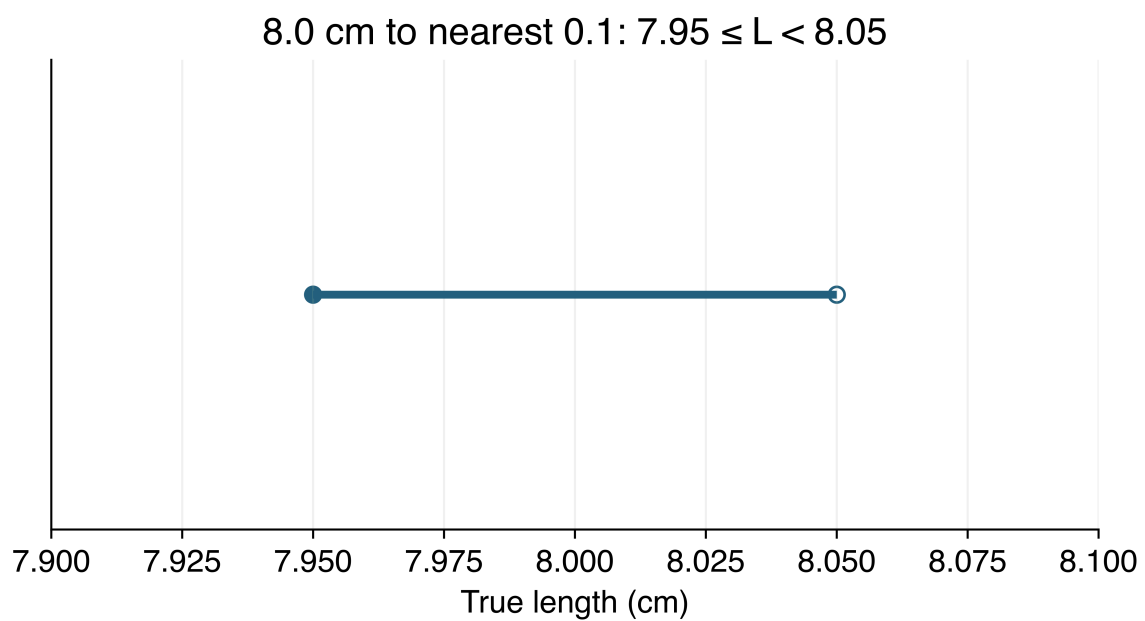
The lengths satisfy $7.95 \leq L < 8.05$ and $4.95 \leq W < 5.05$. Since $A = LW$, $39.3525 \leq A < 40.6525$. For speed d/t , the largest speed uses the largest distance and smallest positive time.

$$72 = 2^3 \times 3^2$$

$$90 = 2 \times 3^2 \times 5$$

Shared smallest powers: $2 \times 3^2 = 18$

Prerequisite example; use the transfer task's own data.



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2 Practice

2.1 Foundation: A supplier has 84 pencils and 126 pens. Find the greatest number of identical packs using everything. State each pack's contents. A delivery charge of 18.60 CNY is shared equally among six buyers; find each share without rounding intermediate values.

3 Exam-style questions

3.1 Higher: A positive rectangle has recorded length 8.0 cm and width 3.0 cm, each to the nearest 0.1 cm. Give tight lower and upper bounds for area and for length divided by width. State endpoint inclusion.

Solutions

2.1 $84 = 2^2 \cdot 3 \cdot 7$ and $126 = 2 \cdot 3^2 \cdot 7$, so the HCF is 42. Each of 42 packs has $84/42 = 2$ pencils and $126/42 = 3$ pens. This is maximal because any pack count must divide both totals. Each delivery share is $s = C/n = (18.60 \text{ CNY})/6 = 3.10 \text{ CNY}$; six shares return the original charge.

3.1 $7.95 \leq l < 8.05$ and $2.95 \leq w < 3.05$, in cm. Positivity makes product and quotient monotonic in the needed directions. Thus $23.4525 \leq A < 24.5525$ in square centimetres. For the dimensionless quotient, $7.95/3.05 < l/w < 8.05/2.95$, or $159/61 < l/w < 161/59$. Neither quotient endpoint is attained, since each requires one excluded upper measurement bound. The area lower bound is attained, since both lower bounds are allowed. Blindly using “upper over lower” without sign and endpoint checks is insufficient.

Local guidance: select and explain the relationship; calculate every requested result; check units, scope, conditions and completeness. These are authored classroom criteria.