÷ Non-permissible values & simplifying

不允许值与化简

Date · 日期 _____ Topic · 知识点 1/4

CUES · QUESTIONS

提示 · 问题

1. Where do NPVs come from?

   > 不允许值从哪里来?

2. $\frac{x-7}{7-x}$ = ?

   > $\frac{x-7}{7-x}$ =?

3. Can you cancel the x in $\frac{x+2}{x}$?

   > $\frac{x+2}{x}$ 中的 x 能约吗?

4. NPVs of $\frac{1}{x^2+4}$?

   > $\frac{1}{x^2+4}$ 的不允许值?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

NOTES

笔记

1 · Worked example · 1 · 看一道例题 Copy one example from the page. Next to each line write WHY in a few words. · 抄一道例题，每一行旁边用几个字写「为什么」。

2 · Fill in the blanks · 2 · 填空题 Cover the steps and redo it. Leave a gap where you are unsure. · 盖住步骤自己重做，不确定的地方先空着。

3 · Your turn · 3 · 自己做 A new question. Then check it against the answer. · 做一道新题，然后对答案。

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

÷ Multiplying & dividing

有理式乘除

Date · 日期 _____ Topic · 知识点 2/4

CUES · QUESTIONS

提示 · 问题

1. Dividing rational expressions: first move?
   > 有理式相除第一步?
2. Can a top cancel with a bottom of the OTHER fraction?
   > 一个分式的分子能和另一个分式的分母约吗?
3. $\frac{x}{3} \div \frac{x}{6} = ?$
   > $\frac{x}{3} \div \frac{x}{6} = ?$
4. Why factor before multiplying?
   > 为什么要先分解再相乘?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

÷ Adding & subtracting

有理式加减

Date · 日期 _____ Topic · 知识点 3/4

CUES · QUESTIONS

提示 · 问题

1. LCD of $(x-1)(x+2)$ and $(x+2)^2$?
   > $(x-1)(x+2)$ 与 $(x+2)^2$ 的最简公分母?
2. Subtracting a fraction — what do you put around its numerator?
   > 减去一个分式时，分子外面加什么?
3. $\frac{4}{x-5} - \frac{3}{5-x}$ = ?
   > $\frac{4}{x-5} - \frac{3}{5-x}$ =?
4. Last step after combining?
   > 合并后的最后一步?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

÷ Rational equations & applications

分式方程与应用题

Date · 日期 _____ Topic · 知识点 4/4

CUES · QUESTIONS

提示 · 问题

1. First line of every rational equation?
   > 每道分式方程的第一行?
2. Rate of someone who finishes a job in 5 h?
   > 5 小时完成一件工作的效率?
3. All your answers are NPVs. Conclusion?
   > 所有答案都是不允许值，结论?
4. Boat speed v in still water, current 2 km/h. Upstream speed?
   > 静水船速 v，水流 2 km/h，逆流速度?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

NOTES

笔记

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

➗ Rational Expressions & Equations

有理式与分式方程

• Formula and trap sheet

公式与陷阱一页纸

Everything you need before a test, on the fewest pages. Fold it and keep it in your binder. · 考前要看的东西，压缩在尽量少的页数里。折起来放进文件夹。

Non-permissible values & simplifying · 不允许值与化简

FORMULAS · 公式

$\frac{AC}{BC} = \frac{A}{B}, \quad B \neq 0,\ C \neq 0$ — Cancelling a common factor

约去公因式

$\frac{a-b}{b-a} = -1, \quad a \neq b$ — Opposite factors

相反因式

REMEMBER · 记住

- NPVs: values that make the DENOMINATOR zero — factor it, set each factor $\neq 0$.
  不允许值：使分母为零的值——把分母分解，每个因式 $\neq 0$。
- State NPVs from the ORIGINAL expression; a cancelled factor still counts.
  从原式写不允许值；约掉的因式照样算。

WATCH OUT · 当心

- $\frac{x+6}{x+3} = \frac{6}{3}$ × → nothing cancels across $+$.
  $\frac{x+6}{x+3} = \frac{6}{3}$ × → 加号连接的不能约。
- Setting the numerator $= 0$ for NPVs × → only the denominator matters.
  令分子为 0 求不允许值 × → 只看分母。

Multiplying & dividing · 有理式乘除

FORMULAS · 公式

$\frac{A}{B} \cdot \frac{C}{D} = \frac{AC}{BD}$ — Multiplying $(B, D \neq 0)$

分式相乘 $(B, D \neq 0)$

$\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \cdot \frac{D}{C}$ — Dividing $(B, C, D \neq 0)$

分式相除 $(B, C, D \neq 0)$

REMEMBER · 记住

- Multiply: factor everything, cancel any top with any bottom, then multiply what is left.
  乘法：全部分解，任一分子可与任一分母约分，再把剩下的相乘。
- Divide: multiply by the reciprocal of the SECOND fraction.
  除法：乘以第二个分式的倒数。

WATCH OUT · 当心

- In $\div \frac{x-5}{x+1}$, forgetting $x \neq 5$ × — it lands on the bottom after flipping.
  $\div \frac{x-5}{x+1}$ 漏写 $x \neq 5$ ×——翻转后它到了分母。
- Cancelling across $+$: in $\frac{x+3}{x}$ nothing cancels.
  跨加号约分：$\frac{x+3}{x}$ 什么都不能约。

Adding & subtracting · 有理式加减

FORMULAS · 公式

$\frac{A}{B} \pm \frac{C}{D} = \frac{AD \pm BC}{BD}$ — Adding/subtracting (use the LCD when the denominators share factors)

分式加减（分母有公因式时用最简公分母）

REMEMBER · 记住

- Factor every denominator; LCD = each different factor at its highest power.
  把每个分母分解；最简公分母＝每个不同因式取最高次幂。
- Rewrite over the LCD, then add or subtract the NUMERATORS only.
  化成同分母，只对分子加减。

WATCH OUT · 当心

- $\frac{1}{x} + \frac{1}{y} = \frac{2}{x+y}$ × → $\frac{x+y}{xy}$.
  $\frac{1}{x} + \frac{1}{y} = \frac{2}{x+y}$ × → $\frac{x+y}{xy}$。
- $x - (x-2) = -2$ × → $+2$: the minus hits every term.
  $x - (x-2) = -2$ × → $+2$：减号作用于每一项。

Rational equations & applications · 分式方程与应用题

FORMULAS · 公式

$\frac{1}{t_1} + \frac{1}{t_2} = \frac{1}{T}$ — Work together (time alone t_1, t_2; together T)

合作工程（单独用时 t_1, t_2；合作用时 T）

$t = \frac{d}{v}$ — Time = distance ÷ speed

时间＝路程÷速度

REMEMBER · 记住

- NPVs first; then multiply EVERY term (whole numbers too) by the LCD.
  先写不允许值；再把每一项（包括整数项）都乘以公分母。
- An answer equal to an NPV is extraneous — reject it; all rejected → no solution.
  等于不允许值的解是增根，舍去；全部舍去 → 无解。

WATCH OUT · 当心

- $1 + \frac{12}{x^2-4}$: the 1 stays 1 × → it becomes $x^2 - 4$.
  $1 + \frac{12}{x^2-4}$ 里的 1 不乘 × → 它要变成 $x^2 - 4$。
- Together time $= t_1 + t_2$ × → add the RATES; together is faster than either alone.
  合作时间 $= t_1 + t_2$ × → 应该把效率相加；合作比任何一个人单干都快。