Cancel the Factors

EX06-V1 · storyboard · EX06 Divide powers & simplify quotients. Read each picture with its sentences.

Picture 1

Simplify $\dfrac{x^8}{x^2}$.

$$\frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x}$$ write it out

$$= \frac{\cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{\cancel{x} \cdot \cancel{x}}$$ cancel in pairs

$$= \boxed{x^6} \qquad 8 - 2 = 6$$

1. Simplify x^8 over x^2.
2. Write it out: eight x’s on top, two underneath.
3. Each x underneath cancels one on top.
4. Six are left on top: x^6.
5. Eight take away two is six.

Picture 2

Simplify $\frac{x^3}{x^8}$.

$$\frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x \cdot x \cdot x}$$ three pairs cancel

$$= \boxed{\frac{1}{x^5}}$$ 1 is left on top, not 0

6. Now the larger power is underneath: x^3 over x^8.
7. All three x's on top cancel.
8. Five are left underneath, and one is left on top, not zero: one over x^5.

Picture 3

Simplify $\frac{4x^9}{20x^2}$.

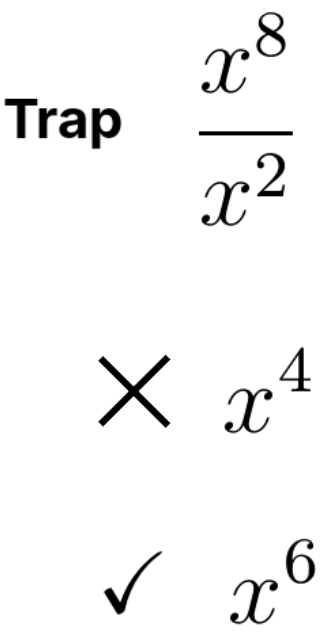
$$\frac{4}{20} \cdot \frac{x^9}{x^2}$$ numbers with numbers, letters with letters

$$= \frac{1}{5} \cdot x^7$$ lowest terms, and $9 - 2 = 7$

$$= \boxed{\frac{x^7}{5}}$$

9. One with numbers: 4x⁹ over 20x².
10. Numbers with numbers, letters with letters.
11. Four twentieths is one fifth, and nine take away two is seven.
12. So the answer is x⁷ over five.

Picture 4



13. Watch for the trap: dividing the exponents.
14. x^8 over x^2 is not x^4.
15. Subtract them: eight take away two, x^6.

Picture 5

Trap $\dfrac{3+2x}{5+3x}$

$$\times\ \frac{3+2\cancel{x}}{5+3\cancel{x}} = \frac{5}{8}$$

$$\checkmark\quad x=2:\quad \frac{7}{11} \neq \frac{5}{8}$$

16. And only factors cancel.
17. Here 3 + 2x is on top and 5 + 3x is underneath.
18. Each x is part of a sum, so you can’t cancel it.
19. Try x = 2: you get seven elevenths, not five eighths.