

Complex Fractions... when they're factored for you

Rule #4: Complex fractions (fractions inside fractions) are just division problems.**EXAMPLE**

$$\frac{\frac{(x-4)(x+3)}{(8)(x+5)}}{\frac{(x-4)(x-7)}{(4)(x+5)}}$$

This looks like a really difficult problem, but it's actually the same problem we used as an example on the last handout (under rule #3).

The big fraction bar means divide. That's all it is—a division problem.

$$\text{Top fraction} \div \text{Bottom fraction} \\ \frac{(x-4)(x+3)}{(8)(x+5)} \div \frac{(x-4)(x-7)}{(4)(x+5)}$$

Flip the **second** fraction.

$$\frac{(x-4)(x+3)}{(8)(x+5)} \cdot \frac{(4)(x+5)}{(x-4)(x-7)}$$

Multiply and cancel.

$$\begin{aligned} &= \frac{\cancel{(x-4)}(x+3)(4)\cancel{(x+5)}}{(8)\cancel{(x+5)}\cancel{(x-4)}(x-7)} \\ &= \frac{(4)(x+3)}{(8)(x-7)} \\ &= \frac{\cancel{4}(x+3)}{\cancel{4}(2)(x-7)} \\ &= \frac{x+3}{(2)(x-7)} \\ &= \boxed{\frac{x+3}{2x-14}} \end{aligned}$$

EXAMPLE

$$\frac{\frac{(7)(x+6)}{(x+8)(x-9)}}{\frac{(14)(x+1)}{(3)(x+8)}}$$

Again, this problem is not new. It's the second example on the last handout (under rule #3).

Write it as a division problem.

$$\text{Top fraction} \div \text{Bottom fraction} \\ \frac{(7)(x+6)}{(x+8)(x-9)} \div \frac{(14)(x+1)}{(3)(x+8)}$$

Flip the **second** fraction.

$$\frac{(7)(x+6)}{(x+8)(x-9)} \cdot \frac{(3)(x+8)}{(14)(x+1)}$$

Multiply and cancel.

$$\begin{aligned} &= \frac{(7)(x+6)(3)\cancel{(x+8)}}{\cancel{(x+8)}(x-9)(14)(x+1)} \\ &= \frac{(7)(3)(x+6)}{(14)(x-9)(x+1)} \\ &= \frac{\cancel{7}(3)(x+6)}{\cancel{7}(2)(x-9)(x+1)} \\ &= \frac{(3)(x+6)}{(x-9)(x+1)} = \boxed{\frac{3x+18}{x^2-8x-9}} \end{aligned}$$

EXAMPLE

$$\frac{\frac{(11)(x-3)}{(15)(x+10)}}{\frac{(x+2)(x-5)}{(12)(x+10)}}$$

This is the third example on the last handout (under rule #3).

Write it as a division problem.

$$\text{Top fraction} \div \text{Bottom fraction} \\ \frac{(11)(x-3)}{(15)(x+10)} \div \frac{(x+2)(x-5)}{(12)(x+10)}$$

Flip the **second** fraction.

$$\frac{(11)(x-3)}{(15)(x+10)} \cdot \frac{(12)(x+10)}{(x+2)(x-5)}$$

Multiply and cancel.

$$\begin{aligned} &= \frac{(11)(x-3)(12)\cancel{(x+10)}}{(15)\cancel{(x+10)}(x+2)(x-5)} \\ &= \frac{(11)(12)(x-3)}{(15)(x+2)(x-5)} \\ &= \frac{(11)\cancel{3}(4)(x-3)}{\cancel{3}(5)(x+2)(x-5)} \\ &= \frac{(11)(4)(x-3)}{(5)(x+2)(x-5)} \\ &= \frac{44(x-3)}{(5)(x^2-3x-10)} \\ &= \boxed{\frac{44x-132}{5x^2-15x-50}} \end{aligned}$$

1.
$$\frac{\frac{(x+1)(x-5)}{(4)(x+4)}}{\frac{(x-5)(x+10)}{(16)(x+4)}}$$

2.
$$\frac{\frac{(7)(x+1)}{(5)(x+3)}}{\frac{(14)(x-4)}{(25)(x+3)}}$$

3.
$$\frac{\frac{(x+5)(x-8)}{(12)(x+2)}}{\frac{(5)(x+5)(x+8)}{(24)(x+2)}}$$

<p>4. $\frac{\frac{(x+1)(x-4)}{(3)(x-8)}}{\frac{(x+1)(x-1)}{(9)(x)}}$</p>	<p>5. $\frac{\frac{(x+4)(x+2)}{(8)(x-12)}}{\frac{(x+4)(x-1)}{(10)(x-12)}}$</p>	<p>6. $\frac{\frac{(3)(x+3)}{(10)(x-4)}}{\frac{(12)(x+14)}{(5)(x-4)}}$</p>
<p>7. $\frac{\frac{(x-10)(x+3)}{(12)(x-1)}}{\frac{(x+8)(x+3)}{(8)(x-1)}}$</p>	<p>8. $\frac{\frac{(9)(x+13)}{(7)(x+10)}}{\frac{(6)(x-8)}{(35)(x+10)}}$</p>	<p>9. $\frac{\frac{(x-8)(x-3)}{(12)(x+20)}}{\frac{(5)(x-3)}{(8)(x+20)}}$</p>
<p>10. $\frac{\frac{(x+11)(x)}{(6)(x-8)}}{\frac{(x+15)(x)}{(18)(x-8)}}$</p>	<p>11. $\frac{\frac{(x-1)(x+8)}{(4)(x+13)}}{\frac{(x-1)(x+1)}{(2)(x+13)}}$</p>	<p>12. $\frac{\frac{(5)(x-2)}{(13)(x+12)}}{\frac{(25)(x+13)}{(26)(x+12)}}$</p>