

Topic: Dividing rational functions**Question:** Find the quotient of the rational functions.

$$\frac{x^2 + x - 20}{x^2 - 8x + 15} \div \frac{x^2 - 6x + 8}{x^2 - 7x + 10}$$

Answer choices:

A $\frac{x + 3}{x - 5}$ with $x \neq 2, 3, 4$

B $\frac{x - 5}{x + 3}$ with $x \neq -5, 2, 4$

C $\frac{x - 3}{x + 5}$ with $x \neq -3, 2, 4$

D $\frac{x + 5}{x - 3}$ with $x \neq 2, 4, 5$



Solution: D

Factor the numerator and denominator of both fractions as completely as possible.

$$\frac{(x+5)(x-4)}{(x-5)(x-3)} \div \frac{(x-4)(x-2)}{(x-5)(x-2)}$$

Consider restrictions. The denominator of the dividend gives $x \neq 3, 5$, the denominator of the divisor gives $x \neq 2, 5$, and the numerator of the divisor gives $x \neq 2, 4$. So the set of restrictions we should keep in mind until the end of the problem is $x \neq 2, 3, 4, 5$.

Now turn the division problem into a multiplication problem and cancel common factors.

$$\frac{(x+5)(x-4)}{(x-5)(x-3)} \cdot \frac{(x-5)(x-2)}{(x-4)(x-2)}$$

$$\frac{x+5}{x-3}$$

This resulting quotient shows that $x \neq 3$, so we can eliminate that from our list of restrictions. Then the final answer is

$$\frac{x+5}{x-3} \text{ with } x \neq 2, 4, 5$$



Topic: Dividing rational functions**Question:** Find the quotient of the rational functions.

$$\frac{x^2 - 6x + 8}{x^2 + 7x + 12} \div \frac{x^2 - x - 20}{x^2 + 2x - 15}$$

Answer choices:

A $\frac{(x-2)(x-3)(x-4)}{(x+3)(x+4)^2}$ with $x \neq -5, 3, 5$

B $\frac{(x-2)(x-3)(x+5)}{(x+3)(x-5)}$ with $x \neq -5, -4, 3$

C $\frac{(x-2)(x-3)(x-4)(x+5)}{(x+3)(x+4)^2(x-5)}$ with $x \neq -5, 3$

D $\frac{(x-2)(x-3)(x-4)(x+5)}{2(x+3)(x+4)(x-5)}$ with $x \neq -5, -4, 3$



Solution: C

Factor the numerator and denominator of both fractions as completely as possible.

$$\frac{(x-2)(x-4)}{(x+3)(x+4)} \div \frac{(x-5)(x+4)}{(x+5)(x-3)}$$

Consider restrictions. The denominator of the dividend gives $x \neq -4, -3$, the denominator of the divisor gives $x \neq -5, 3$, and the numerator of the divisor gives $x \neq -4, 5$. So the set of restrictions we should keep in mind until the end of the problem is $x \neq -5, -4, -3, 3, 5$.

Now turn the division problem into a multiplication problem and cancel common factors.

$$\frac{(x-2)(x-4)}{(x+3)(x+4)} \cdot \frac{(x+5)(x-3)}{(x-5)(x+4)}$$

$$\frac{(x-2)(x-3)(x-4)(x+5)}{(x+3)(x+4)^2(x-5)}$$

This resulting quotient shows that $x \neq -4, -3, 5$, so we can eliminate that from our list of restrictions. Then the final answer is

$$\frac{(x-2)(x-3)(x-4)(x+5)}{(x+3)(x+4)^2(x-5)} \text{ with } x \neq -5, 3$$



Topic: Dividing rational functions**Question:** Find the quotient of the rational functions.

$$\frac{w^2 - w - 12}{w^2 + 5w + 4} \div \frac{w^2 - 9}{w^2 - 2w - 3}$$

Answer choices:

A -1

B $\frac{w + 4}{w - 4}$ with $w \neq -4, -3, -1, 3$

C $\frac{w - 4}{w + 4}$ with $w \neq -3, -1, 3$

D 1



Solution: C

Factor the numerator and denominator of both fractions as completely as possible.

$$\frac{(w-4)(w+3)}{(w+1)(w+4)} \div \frac{(w+3)(w-3)}{(w+1)(w-3)}$$

Consider restrictions. The denominator of the dividend gives $w \neq -4, -1$, the denominator of the divisor gives $w \neq -1, 3$, and the numerator of the divisor gives $w \neq -3, 3$. So the set of restrictions we should keep in mind until the end of the problem is $w \neq -4, -3, -1, 3$.

Now turn the division problem into a multiplication problem and cancel common factors.

$$\frac{(w-4)(w+3)}{(w+1)(w+4)} \cdot \frac{(w+1)(w-3)}{(w+3)(w-3)}$$

$$\frac{w-4}{w+4}$$

This resulting quotient shows that $w \neq -4$, so we can eliminate that from our list of restrictions. Then the final answer is

$$\frac{w-4}{w+4} \text{ with } w \neq -3, -1, 3$$

