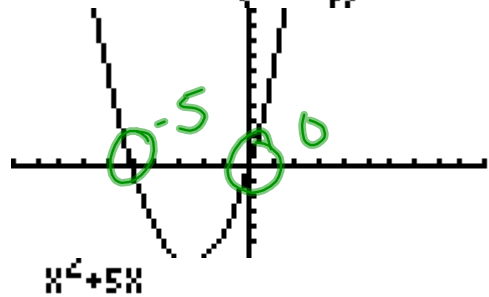
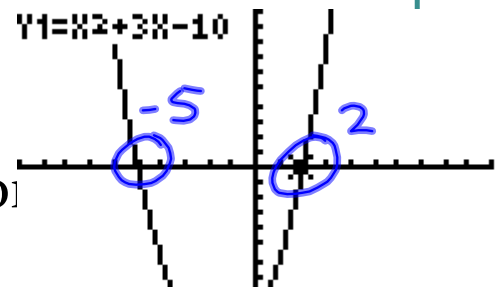


Warm Up:

Express $\frac{x^2 + 3x - 10}{x^2 + 5x}$ in simplest form

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

$$\frac{x-2}{x}$$



$$\frac{x-2}{x}$$

$$\frac{25}{26}$$

$$\frac{25}{26}$$



Multiplying/Dividing Rational Expressions

Multiplication:

- 1) Factor Completely
- 2) Cancel any common factors between the numerator + denominator

EXAMPLE:

$$(y+1)\left(\frac{y}{1-y^2}\right)$$

$$\frac{\cancel{(y+1)}}{1} \cdot \frac{y}{(1+\cancel{y})(1-y)}$$

$$\boxed{\frac{y}{1-y}}$$

when we divide with fractions,

KCF

we KEEP CHANGE FLIP
(aka multiply by the reciprocal)

reciprocal- flip fraction over

Division:

- 1) Factor Completely
- 2) KCF
- 3) Cancel

EXAMPLE:

$$\frac{36 - x^2}{x^2 + 8x + 12} \div \frac{x^2 - 6x}{x - 2}$$

$$\frac{(6+x)(6-x)}{(x+6)(x+2)} \cdot \frac{x(x-6)}{x-2}$$

$$\frac{\cancel{(6+x)}(\cancel{6-x})^{-1}}{\cancel{(x+6)}(x+2)} \cdot \frac{(x-2)}{x\cancel{(x-6)}}$$

* if terms are switched around subtraction they cancel to -1

$$\frac{-1(x-2)}{x(x+2)} = \frac{-x+2}{x^2+2x}$$

Mixed examples: $x^2(x-3) + 6(x-3)$

$$\frac{(x^3 - 3x^2) + 6(x-18)}{x^2 - 4x} \cdot \frac{2x-4}{x^4 - 3x^3} \div \frac{x^2 + 2x - 8}{16 - x^2}$$

$$\frac{(x-3)(x^2+6)}{x(x-4)} \cdot \frac{2(x-2)}{x^3(x-3)} \div \frac{(x+4)(x-2)}{(4+x)(4-x)}$$

$$\frac{\cancel{(x-3)}(x^2+6)}{x\cancel{(x-4)}} \cdot \frac{2\cancel{(x-2)}}{x^3\cancel{(x-3)}} \cdot \frac{\cancel{(4+x)}\cancel{(4-x)} - 1}{\cancel{(x+4)}\cancel{(x-2)}}$$

$$\frac{-2(x^2+6)}{x^4}$$

$$\frac{x^2 - 9}{x^2 - 5x} \cdot \frac{5x - x^2}{x^2 - x - 12} \div \frac{x - 4}{x^2 - 8x + 16}$$

Why do we need a common denominator to add/subtract rational expressions, but not when we multiply/divide?

Homework: p. 53 #26-30

In 25–30, perform the indicated operations and write the result in simplest form

$$26. \frac{3x}{x-1} \cdot \frac{x^2-1}{x} \div \frac{x+1}{3}$$

$$27. \frac{2a}{a+2} \cdot \frac{a^2-4}{4a^2} \div \frac{a-2}{a}$$

$$28. (x^2 - 2x + 1) \div \frac{x-1}{3} \cdot \frac{x+4}{3x}$$

$$29. (3b)^2 \div \frac{3b}{b+2} \cdot \frac{2b+4}{b}$$

$$30. \frac{x^2-3x+2}{4x} \cdot \frac{12x^2}{x^2-2x} \div \frac{x-1}{x}$$