

## 6.1 Rational Expressions

Rational expressions  $\rightarrow$  variable in the denominator

$$\frac{3}{x} \quad \text{domain: TR except } 0$$

$$\frac{2}{(x+1)(x-3)} \quad \text{domain: } x+1 \neq 0 \quad x-3 \neq 0$$

$$x \neq -1 \quad x \neq 3$$

TR except  $-1, 3$

simplify  $\rightarrow$  factor / cancel

#  
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$$\frac{3x^2 - 11x + 10}{x^2 - 7x + 10}$$

$$\frac{2}{3} \cdot \frac{3}{4 \cdot 2} \quad \boxed{\frac{1}{2}}$$

$$3x^2 - 11x + 10 \quad \rightarrow \begin{matrix} 10 \cdot 1 \\ 5 \cdot 2 \end{matrix}$$

$$(3x-2)(x-5) \quad \text{NO}$$

$$(3x-5)(x-2)$$

$$3x^2 - 6x - 5x + 10$$

AC method

$$a = 3$$

$$a \cdot c = 3 \cdot 10 = 30$$

$$b = -11$$

$$c = 10$$

$$3x^2 - 11x + 10$$

$$3x^2 - 6x - 5x + 10$$

$$3x(x-2) - 5(x-2)$$

$$(x-2)(3x-5)$$

	30	
30	1	= 31
15	2	= 17
10	3	= 13
-6	-5	= -11

$$\frac{3x^2 - 11x + 10}{x^2 - 7x + 10} = \frac{\cancel{(x-5)}(3x-5)}{\cancel{(x-2)}(x-5)} = \frac{3x-5}{x-5}$$

division

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$$

$$x^3 - 27$$

$$\frac{a^3 + b^3}{(a+b)(a^2 - ab + b^2)}$$

$$\frac{a^3 - b^3}{(a-b)(a^2 + ab + b^2)}$$

#	<u>cube</u>
1	1
2	8
3	27
4	64
5	125
6	216
7	343
8	512
9	729
10	1000

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$$x^3 - 27 \quad a=x \quad b=3$$

$$(a-b)(a^2 + ab + b^2)$$

$$(x-3)(x^2 + (x)(3) + (3)^2)$$

$$(x-3)(x^2 + 3x + 9)$$

$$\frac{(2x^3 + 1024)}{2(x^3 + 512)}$$

$$a=x \quad b=8$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$2(x+8)(x^2 - 8x + 64)$$

~~$$\frac{x-2}{2-x} \cdot \frac{x-2}{-x+2}$$~~

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

$$\frac{x+2}{2+x} = 1$$