

FRACTIONS. CANCELLATIONS. ZERO-QUOTIENT

$$\frac{a}{b} \rightarrow \frac{a}{a} ?$$

$$\frac{a \cancel{b} + c}{b \cancel{d}}$$

$$\frac{4}{0} = ?$$

$$\frac{a}{b} \times \frac{c}{a} ?$$

$$\frac{0}{f} = ?$$

Multiplication of Fractions:

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

$$\text{EX: } \frac{2}{3} \cdot \frac{4}{5} = \frac{8}{15}$$

Division of Fractions

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

$$\text{EX: } \frac{\frac{2}{3}}{\frac{4}{5}} = \frac{2}{3} \cdot \frac{5}{4} = \frac{10}{12} = \frac{5}{6}$$

Cancellations

If  $a \cancel{c} = b \cancel{c}$  then  $a = b$  (if  $c \neq 0$ )

$$3 \cdot \cancel{0} = 4 \cdot \cancel{0} \Rightarrow 3 = 4 \text{ ABSURD}$$

$$\frac{a \cancel{c}}{b \cancel{c}} = \frac{a}{b} \quad \text{if } c \neq 0, b \neq 0$$

$$\text{EX: } \frac{2 \cdot \cancel{3}}{4 \cdot \cancel{3}} = \frac{2}{4}$$

$$\frac{2 \cdot \cancel{3} + 4}{4 \cdot \cancel{3}} \quad \text{invalid} \quad \frac{10}{12}$$

Zero-Product Property

$$a \cdot b = 0 \Rightarrow a = 0 \text{ or } b = 0$$

$$\text{EX: } (x+3)(x-2) = 0 \Rightarrow x+3 = 0 \text{ or } x-2 = 0$$

$$x = -3 \quad x = 2$$

Zero-Quotient Property

$$\frac{a}{b} = 0 \Rightarrow a = 0 \text{ and } b \neq 0$$

Ex:  $\frac{12}{4} = 3$  because 3 is the only number that  $\times 4 = 12$

$\frac{0}{4} = 0$  " " " " " "  $\times 4 = 0$

$\frac{12}{0} = \text{undefined}$  because there is no number that  $\times 0 = 12$

$$\frac{0}{0}$$

$$\frac{2x+3}{x-2} = 0 \Rightarrow 2x+3=0 \Rightarrow 2x=-3 \Rightarrow x = \left(-\frac{3}{2}\right)$$

Ex: solve  $\frac{(x+2)(x+3)}{(4+2x)} = 0 \Rightarrow (x+2)(x+3) = 0 \Rightarrow$

$$\Rightarrow (x+2) = 0 \text{ or } (x+3) = 0$$

$$\boxed{x = -2}$$

$$\boxed{x = -3} \checkmark$$

$$\rightarrow 4+2x = 4+2(-2) = 0$$