

WS #3.)

- (a)  ~~$D: (-\infty, \infty)$~~  (b)  $x \neq 4; D = (-\infty, 4) \cup (4, \infty)$

(c)  $\sqrt{x}$  ← can't square root neg vals.  $\Rightarrow x \geq 0$

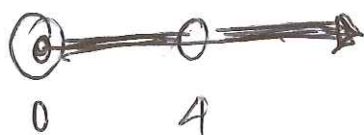
$x^3 - 2x^2 - 8x$  ← can't divide by 0.

$$x^3 - 2x^2 - 8x = 0$$

$$x(x^2 - 2x - 8) = 0$$

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

$$x \neq 0, 4, -2$$



$D: (0, 4) \cup (4, \infty)$

in general (§1.4 Rational Expressions |

vocab: Rational function:  $\frac{n(x)}{d(x)}$  where  $n(x), d(x)$  are polynomials.

Fractional expressions are just fractions of any expression. (not nece poly)

see text if you're rusty on properties of fractions... (§1.4)

$$5) (a) \frac{\frac{x}{x} \frac{x}{y} - \frac{y}{x} \frac{y}{y}}{\frac{y^2}{y^2} \frac{1}{x^2} - \frac{1}{y^2} \frac{x^2}{x^2}} = \frac{\frac{x^2 - y^2}{yx}}{\frac{y^2 - x^2}{x^2 y^2}} = \frac{(x+y)(x-y)}{yx} \cdot \frac{x^2 y^2}{(y+x)(y-x)}$$

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

$$= \frac{-xy}{1}$$

Aline's techniques:

$$\frac{\left(\frac{x}{y} - \frac{y}{x}\right) x^2 y^2}{\left(\frac{1}{x^2} - \frac{1}{y^2}\right) x^2 y^2} = \frac{x \cdot x^2 y - y \cdot x y^2}{y^2 - x^2}$$

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

$$= -xy$$

$$6. (a) \sqrt{1 + \left(\frac{x}{\sqrt{1-x^2}}\right)^2} = \sqrt{1 + \frac{x^2}{1-x^2}}$$

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

$$7.) \quad a) \quad \frac{1}{\sqrt{x}+1} \cdot \frac{\sqrt{x}-1}{\sqrt{x}-1}$$

$$= \frac{\sqrt{x}-1}{x-1}$$

$$A^2 - B^2 = (A-B)(A+B)$$

Diff of Squares

### § 1.5 Equations

Explore by example in class. (see text for further review)

Linear Equations: (or equations equiv to linear)

$$a) \quad 3x + 5 = 25$$

$$3x = 20$$

$$x = 20/3$$

$$b) \quad \frac{3x+5}{2x-1} = 2$$

$$3x+5 = 2(2x-1)$$

$$3x+5 = 4x-2$$

$$7 = x$$

c) (#19 in text p 55)

$$\left( \frac{3}{x+1} - \frac{1}{2} = \frac{1}{3x+3} \right)$$

mult both sides  
2(3)(x+1)

$$\cancel{3(2)(3)} - 3(x+1) = 2$$

$$18 - 3x - 3 = 2$$

$$\rightarrow 13 = 3x$$

$$13/3 = x$$

Example: Dealing w/ multiple unknowns.

Solve

#23.)  $PV = nRT$  for  $R$   
↑

$$\frac{PV}{nT} = R$$

#25.)  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$  for  $R_1$   
↑

$$\frac{1}{R} - \frac{1}{R_2} = \frac{1}{R_1}$$

$$\frac{R R_2}{R_2 - R} = R_1$$

$$\frac{R R_2}{R_2 \left( \frac{1}{R} - \frac{1}{R_2} \right)} = R_1$$

Complete the square.  
(Solve by C.T.S.)

Square formula:

$$(A+B)^2 = A^2 + 2AB + B^2$$

#45.)  $(x^2 + 2x) - 5$

$$= \left( x^2 + 2x + \frac{1^2}{1} - 1^2 \right) - 5$$

↑                    ↑  
add  $B^2$           balance equation

$$= (x+1)^2 - 1 - 5 = (x+1)^2 - 6$$