Last Class

F Jan 14

WS #3.)

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

(c) $\sqrt{x^2}$ ← can't square root negs. $\Rightarrow x \geq 0$

$x^3 - 2x^2 - 8x$ ← 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) $\dfrac{\frac{x}{x}\frac{x}{y} - \frac{y}{x}\frac{y}{y}}{\frac{y^2}{y^2}\frac{1}{x^2} - \frac{1}{y^2}\frac{x^2}{x^2}} = \dfrac{\frac{x^2-y^2}{yx}}{\frac{y^2-x^2}{x^2y^2}} = \dfrac{(x+y)(x-y)}{yx} \cdot \dfrac{x^2y^2}{(y+x)(y-x)}$

$-(-y+x)$ recip

$= -xy$

Aline's Techniques:

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

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

$= -xy$

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

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

7.)

(a) $\frac{1}{\sqrt{x}+1} \cdot \frac{\sqrt{x}-1}{\sqrt{x}-1}$

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

Diff of Squares

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

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§1.5 Equations

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

Linear Equations: (or equations equiv to linear)

(a) $3x+5=25$

$3x = 20$

$x = 20/3$

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

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

$3x+5 = 4x-2$

$7 = x$

(c) (#19 in text p 55)

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

$3(x+1)$

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

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

$18 - 3x - 3 = 2$

$13 = 3x$

$13/3 = x$

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

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

$$\frac{RR_2}{R_2 - R} = R_1$$

$$\frac{RR_2}{R_2 R\left(\frac{1}{R} - \frac{1}{R_2}\right)} = R_1$$

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

Square formula:

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

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

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

($+1^2$: add B^2; -1^2: balance equation)

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