6.2 #37

$$\frac{y+1}{y^2-6y+8} - \frac{3}{y^2-16}$$

$(y-4)(y-2)$ $(y-4)(y+4)$

LCD = $(y-4)(y+4)(y-2)$

$$= \frac{y+1}{(y-4)(y-2)} \cdot \frac{y+4}{y+4} - \frac{3}{(y-4)(y+4)} \cdot \frac{y-2}{y-2}$$

$$= \frac{(y+1)(y+4) - 3(y-2)}{(y-4)(y-2)(y+4)}$$

$$\frac{1}{2\cdot 2} - \frac{2}{3\cdot 2} = \frac{1}{2\cdot 2}\cdot\frac{3}{3} - \frac{2}{3\cdot 2}\cdot\frac{2}{2} = \frac{(1)(3)-(2)(2)}{2\cdot 2\cdot 3}$$

Ivan

$$= \frac{y^2+5y+4-3y+6}{(y-4)(y-2)(y+4)}$$

$$= \frac{y^2+2y+10}{(y-4)(y-2)(y+4)}$$

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§ 6.3 Complex Fractions.

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

$$\frac{\frac{2}{3}}{\frac{4}{7}} = \frac{2}{3} \cdot \frac{7}{4} = \frac{\cancel{2}^{1}}{3} \cdot \frac{7}{\cancel{2}_{1} \cdot 2} = \frac{7}{6}$$

$$\frac{\frac{15}{2x}}{\frac{5}{6x}} = \frac{\cancel{15}^{3}}{\cancel{2x}_{1}} \cdot \frac{\cancel{6x}^{3}}{\cancel{5}_{1}} = 9$$

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$$\frac{\dfrac{x^2-9y^2}{xy}}{\dfrac{1}{y}-\dfrac{3}{x}} = \frac{\dfrac{x^2-9y^2}{xy}}{\dfrac{x-3y}{xy}} = \frac{x^2-9y^2}{xy}\cdot\frac{xy}{x-3y}$$

$$\frac{1}{y}\cdot\frac{x}{x}-\frac{3}{x}\cdot\frac{y}{y}=\frac{x-3y}{xy}$$

This is old-school.

$$=\frac{\cancel{(x-3y)}(x+3y)}{(\cancel{xy})}\cdot\frac{(\cancel{xy})}{\cancel{(x-3y)}} = x+3y$$

$$\frac{\dfrac{x^2-9y^2}{xy}}{\dfrac{1}{y}-\dfrac{3}{x}} = \frac{\dfrac{x^2-9y^2}{xy}\cdot\dfrac{xy}{1}}{\dfrac{1}{y}\cdot\dfrac{xy}{1}-\dfrac{3}{x}\cdot\dfrac{xy}{1}}$$

LCD $= xy$

$$=\frac{\dfrac{x^2-9y^2}{\cancel{xy}}\cdot\dfrac{\cancel{xy}}{1}}{\dfrac{1}{\cancel{y}}\cdot\dfrac{x\cancel{y}}{1}-\dfrac{3}{\cancel{x}}\cdot\dfrac{\cancel{x}y}{1}} = \frac{\dfrac{(x^2-9y^2)(1)}{(1)(1)}}{\dfrac{(1)(x)}{1}-\dfrac{3y}{1}}$$

$$=\frac{x^2-9y^2}{x-3y}=\frac{\cancel{(x-3y)}(x+3y)}{\cancel{(x-3y)}}=x+3y$$

$$\frac{a^{-1}-4}{4+a^{-2}} = \frac{\frac{1}{a}-4}{4+\frac{1}{a^2}}$$

method 1

$$\frac{\frac{1}{a}-\frac{4}{1}\cdot\frac{a}{a}}{\frac{4}{1}\cdot\frac{a^2}{a^2}+\frac{1}{a^2}}$$

$$= \frac{\frac{1-4a}{a}}{\frac{4a^2+1}{a^2}}$$

$$= \frac{1-4a}{a}\cdot\frac{a^2}{4a^2+1}$$

$$= \frac{(1-4a)(a^2)}{(a)(4a^2+1)}$$

$$= \frac{(1-4a)a^1}{4a^2+1} \longrightarrow \frac{a^2}{a^1} = a^{2-1} = a^1 = a$$

As far as it goes.

Method 2

LCD $= a^2$

$$\frac{\frac{1}{a}\cdot\frac{a^2}{1}-\frac{4}{1}\cdot\frac{a^2}{1}}{4a^2+\frac{1}{a^2}\cdot\frac{a^2}{1}}$$

$$= \frac{a-4a^2}{4a^2+1}$$

§6.3 ⓐ end of class on Monday.

§6.4 Polynomial Division.

Quotient $\frac{A}{B} = \frac{\text{Numerator or Dividend}}{\text{Denominator or Divisor}}$

we've done this already

Factor out the GCF

$6x^5 - 8x^4 + 2x^3$

$= 2x^3\left(\frac{6x^5}{2x^3} - \frac{8x^4}{2x^3} + \frac{2x^3}{2x^3}\right)$

Division by monomial

$2x^3$ is old stuff

$= 2x^3(3x^2 - 4x + 1)$

Divide $6x^5 - 8x^4 + 2x^3$ by $2x^3$

Simplify $\frac{6x^5 - 8x^4 + 2x^3}{2x^3}$

Division by monomial is term-by-term

Oct 22-9:43 AM

Division of Two Integers

$\frac{296}{7}$

$$\begin{array}{r} 42\,r2 \\ 7\,\overline{)\,296} \\ -\,280 \\ \hline 16 \\ -\,14 \\ \hline 2 \end{array}$$

This says:

$$\frac{296}{7} = 42 + \frac{2}{7} = \text{Quotient} + \frac{\text{Remainder}}{\text{Divisor}}$$

It also says

$$296 = 7 \cdot 42 + 2 = \text{Divisor} \cdot \text{Quotient} + \text{Remainder}$$

Oct 22-9:48 AM

$$\frac{x^2+7x+10}{x+5}$$

$$\begin{array}{r} x+2 \quad r\,0 \\ x+5 \overline{\big)\, x^2+7x+10} \\ -(x^2+5x) \quad\quad \\ \hline 2x+10 \\ -(2x+10) \\ \hline 0 \end{array}$$

$$\frac{x^2}{x}=x$$

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

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

This says $\dfrac{x^2+7x+10}{x+5} = x+2$

$$x^2+7x+10 = (x+5)(x+2)$$

$$2x^3 - 6x^2 + 7x - 18 \quad r\ 17x - 51$$

$$x^2 - 3 \;\Big)\; 2x^5 - 6x^4 + x^3 + 0x^2 - 4x + 3$$

$$-\left(2x^5 \quad - 6x^3\right)$$

$$-6x^4 + 7x^3 + 0x^2 - 4x + 3$$

$$-\left(-6x^4 \quad + 18x^2\right)$$

$$7x^3 - 18x^2 - 4x + 3$$

$$-\left(7x^3 \quad - 21x\right)$$

$$-18x^2 + 17x + 3$$

$$-\left(-18x^2 \quad + 54\right)$$

$$17x - 51$$

$$\frac{2x^5}{x^2} = 2x^3$$

$$\frac{-6x^4}{x^2}$$

$$(-6x^2)(-3)$$