

Math 115

Fall 2017

Lecture 19



use special product $(A+B)^2 = A^2 + 2AB + B^2$
to find

$$(2x^3 + 5)^2 = (2x^3)^2 + 2(2x^3)(5) + (5)^2$$

$$= 4x^6 + 20x^3 + 25$$

Trinomial, D=6, L.C.=4

Constant = 25

$$(3x^5 + y^4)^2 = (3x^5)^2 + 2(3x^5)(y^4) + (y^4)^2$$

Trinomial

D=10, L.C.=9
No const.

$$= 9x^{10} + 6x^5y^4 + y^8$$

Use special product $(A-B)^2 = A^2 - 2AB + B^2$
to find $(x^8 - 3x^5)^2$

$$= (\textcolor{red}{x}^8)^2 - 2(\textcolor{red}{x}^8)(\textcolor{green}{3x}^5) + (\textcolor{green}{3x}^5)^2$$

$$= x^{16} - 6x^8x^5 + 9x^{10}$$

$$= \boxed{x^{16} - 6x^{13} + 9x^{10}}$$

Trinomial

$$D=16$$

$$L.C.=1$$

NO

Constant

$$(5x^{10} - 6y^5)^2 = (\textcolor{red}{5x}^{10})^2 - 2(\textcolor{red}{5x}^{10})(\textcolor{green}{6y}^5) + (\textcolor{green}{6y}^5)^2$$

$$= 25x^{20} - 60x^{10}y^5 + 36y^{10}$$

Trinomial, $D=20$, $LC=25$, NO
constant

$$(4x^3y^2 - 7)^2 = (\textcolor{red}{4x}^3\textcolor{red}{y}^2)^2 - 2(\textcolor{red}{4x}^3\textcolor{red}{y}^2)(\textcolor{green}{7}) + (\textcolor{green}{7})^2$$

$$= 16x^6y^4 - 56x^3y^2 + 49$$

Trinomial, $D=10$, $LC=16$, Const.=49.

use special product $(A+B)(A-B) = A^2 - B^2$
 to find

$$(9x^6 + 5)(9x^6 - 5) = \underbrace{(9x^6)^2}_{\text{conjugates}} - (5)^2$$

$$= 81x^{12} - 25$$

Binomial $D=12$, L.C.=81 Const.=

$$\frac{(12x^8 - 7y^3)(12x^8 + 7y^3)}{-25}$$

$$= (12x^8)^2 - (7y^3)^2 = \boxed{144x^{16} - 49y^6}$$

Simplify

$$x^{\frac{2}{5}} \cdot x^{\frac{1}{4}} = x^{\frac{2}{5} + \frac{1}{4}} = x^{\frac{13}{20}}$$

$$\frac{x^{\frac{5}{7}}}{x^{\frac{1}{3}}} = x^{\frac{5}{7} - \frac{1}{3}} = \boxed{x^{\frac{8}{21}}}$$

$$\left(x^{\frac{3}{5}}\right)^{\frac{5}{8}} = x^{\frac{3}{5} \cdot \frac{5}{8}} = \boxed{x^{\frac{3}{8}}}$$

Reduce

$$\frac{(5x^3)^3}{10x^4} = \frac{5^3 x^9}{10x^4} = \frac{\cancel{125}^{\cancel{25}} x^9}{\cancel{10}_2 x^4} = \boxed{\frac{25}{2} x^5}$$

$$\frac{(4x^4y^6)^3}{(-8x^5y)^2} = \frac{\cancel{64} x^{12} y^{18}}{\cancel{64} x^{10} y^2} = x^{12-10} y^{18-2}$$

$$= x^2 y^{16}$$

Monomial
D = 2 + 16 = 18 C = 1

Simplify $\frac{\cancel{45}^{\cancel{3}} x^3 y^{10}}{\cancel{30}_2 x^8 y^2} = \boxed{\frac{3 y^8}{2 x^5}}$

$x^{3-8} = x^{-5}$ $y^{10-2} = y^8$

$$(\underline{8.4} \times 10^{17}) (\underline{4.5} \times 10^{22})$$

$$= \boxed{37.8} \times 10^{39} = 3.78 \times 10^1 \times 10^{39}$$

$$= \boxed{3.78 \times 10^{40}}$$

Simplify

$$\frac{7.5 \times 10^{-18}}{3 \times 10^{12}} = 2.5 \times 10^{-18-12}$$

$$= 2.5 \times 10^{-30}$$

$$\frac{2.1 \times 10^{24}}{8.4 \times 10^{-16}}$$

$$= .25 \times 10^{24-(-16)} = .25 \times 10^{40}$$

$$= 2.5 \times 10^{-1} \times 10^{40} = 2.5 \times 10^{39}$$

Divide :

$$\frac{24x^6 - 36x^4 + 12x^3}{6x^3}$$

Division by monomial

$$= \frac{24x^6}{6x^3} - \frac{36x^4}{6x^3} + \frac{12x^3}{6x^3}$$

Now Reduce

$$= 4x^3 - 6x + 2$$

Divide: $\frac{50x^6y^7 - 40x^3y^{10} + 30x^2y^4}{-5x^3y^6}$

$$= \frac{50x^6y^7}{-5x^3y^6} - \frac{40x^3y^{10}}{-5x^3y^6} + \frac{30x^2y^4}{-5x^3y^6}$$

$$= -10x^3y + 8y^4 - \frac{6}{xy^2}$$

Not a Polynomial, why not?

Divide by long division

$$\begin{array}{r} 2x^3 - 5x^2 + 4x - 1 \\ x - 1 \end{array}$$

$$x \boxed{2x^2} = 2x^3$$

$$x \boxed{-3x} = -3x^2$$

$$x \boxed{1} = x$$

$$2x^2 - 3x + 1$$

$$\begin{array}{r} 2x^2 - 3x + 1 \\ x-1 \overline{) 2x^3 - 5x^2 + 4x - 1} \\ \underline{-(2x^3 - 2x^2)} \\ -3x^2 + 4x - 1 \\ \underline{-(-3x^2 + 3x)} \\ x - 1 \\ \underline{-(x - 1)} \\ 0 \end{array}$$

Find an equation for the problem given below in Simplest form:

$$\begin{array}{c} x \\ \boxed{A=35} \\ 2x-3 \end{array}$$

$$A = LW$$

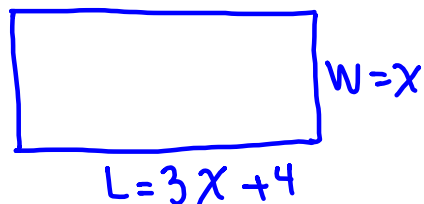
$$x(2x-3) = 35$$

$$2x^2 - 3x = 35$$

$$2x^2 - 3x - 35 = 0$$

The length of a rectangle is 4 inches longer than 3 times its width.

1) Draw & label



2) Find expression in Simplest form for

a) its area

$$A = LW$$

$$= (3x+4)x$$

$$\boxed{A = 3x^2 + 4x}$$

b) its Perimeter

$$P = 2L + 2W$$

$$= 2(3x+4) + 2(x)$$

$$\boxed{P = 8x + 8}$$

Divide: $\frac{6x^2 + 10x - 5}{3x - 1}$

$$\begin{array}{r}
 2x + 4 \\
 3x - 1 \overline{) 6x^2 + 10x - 5} \\
 \underline{-(6x^2 - 2x)} \\
 12x - 5 \\
 \underline{-(12x - 4)} \\
 \text{Rem.} \rightarrow -1
 \end{array}$$

$3x \boxed{2x} = 6x^2$
 $3x \boxed{4} = 12x$

$$2x + 4 + \frac{-1}{3x-1}$$

Divide: $\frac{4x^2 + 7 + 8x^3}{2x + 3}$

$$\begin{array}{r}
 4x^2 - 4x + 6 \\
 2x + 3 \overline{) 8x^3 + 4x^2 + 0x + 7} \\
 \underline{-(8x^3 + 12x^2)} \\
 -8x^2 + 0x + 7 \\
 \underline{-(-8x^2 - 12x)} \\
 12x + 7 \\
 \underline{-(12x + 18)} \\
 -11
 \end{array}$$

$2x \boxed{4x^2} = 8x^3$
 $2x \boxed{-4x} = -8x^2$
 $2x \boxed{6} = 12x$

$$4x^2 - 4x + 6 + \frac{-11}{2x+3}$$

$$\frac{2x^4 - x^3 + 3x^2 - 8x + 7}{x^2 + 1}$$

$x^2 \boxed{2x^2} = 2x^4$
 $x^2 \boxed{-x} = -x^3$
 $x^2 \boxed{1} = x^2$

Always

$$2x^2 - x + 1 + \frac{-7x + 6}{x^2 + 1}$$

$2x^2 - x + 1$
 $x^2 + 1 \overline{) 2x^4 - x^3 + 3x^2 - 8x + 7}$
 $\underline{-(2x^4 + 2x^2)}$
 $-x^3 + x^2 - 8x + 7$
 $\underline{-(-x^3 - x)}$
 $x^2 - 7x + 7$
 $\underline{-(x^2 + 1)}$
 $-7x + 6$

Divide

$$\frac{6x^2 + 20 - 20x}{3x - 1}$$

$3x \boxed{2x} = 6x^2$
 $3x \boxed{-6} = -18x$

$$2x - 6 + \frac{14}{3x - 1}$$

$3x - 1 \overline{) 6x^2 - 20x + 20}$
 $\underline{-(6x^2 - 2x)}$
 $-18x + 20$
 $\underline{-(-18x + 6)}$
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Class QZ:

1) Simplify: $(x^5)^3 \cdot x^{10}$

2) Simplify: $\frac{x^{12}y^3}{x^{20}y^{-2}}$

3) Multiply: $(5x-3)(4x-2)$

} Due Tuesday
Project 2
ε
SG 13