Math 115
Fall 2017
Lecture 22

$\sqrt{xy}$
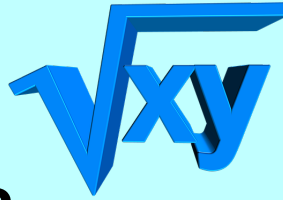
Factor Completely:

1) $30x - 45y$

$= \boxed{15(2x - 3y)}$

2) $6y^4 + 18y^3$

$= \boxed{6y^3(y + 3)}$

3) $8(x + 2) - y(x + 2)$

$= \boxed{(x + 2)(8 - y)}$

4) $2x^3 - x^2 + 10x - 5$

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

$= \boxed{(2x - 1)(x^2 + 5)}$

5) $x^2 - 10x + 9$

$= \boxed{(x-1)(x-9)}$

6) $x^2 + 3x - 70$

$= \boxed{(x+10)(x-7)}$

7) $2x^2 + 20x + 32$

$= 2(x^2 + 10x + 16)$

$= \boxed{2(x+8)(x+2)}$

8) $6x^3 + 54x^2 + 120x$

$= 6x(x^2 + 9x + 20)$

$= \boxed{6x(x+5)(x+4)}$

9) $x^2 - 3x + 16$

$\underline{Prime}$

10) $3x^3 + 3x^2 - 126x$

$= 3x(x^2 + x - 42)$

$= \boxed{3x(x+7)(x-6)}$

11) $x^2 - 3xy - 4y^2$

$= (x+1y)(x-4y)$

$= \boxed{(x+y)(x-4y)}$

12) $3m^2 - 45m + 162$

$= 3(m^2 - 15m + 54)$

$= \boxed{3(m-6)(m-9)}$

13) $2x^2 + 13x + 15 = 2x^2 + 10x + 3x + 15$

3 & 10

30

P=30
S=13

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

$= \boxed{(x+5)(2x+3)}$

14) $6x^2 - 13xy + 5y^2 = 6x^2 - 3xy - 10xy + 5y^2$

−3 & −10

30

P=30
S=−13

$= 3x(2x-y) - 5y(2x-y)$

$= \boxed{(2x-y)(3x-5y)}$

15) $x + 3x^2 - 2 = 3x^2 + x - 2 = 3x^2 - 2x + 3x - 2$

−2 & 3

P=−6
S=1

−6

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

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

16) $18x^2 - 14 - 9x = 18x^2 - 9x - 14$

1, 252
2, 126
3, 84
4, 63
12, 21

P=−252
S=−9

−252

$= 18x^2 + 12x - 21x - 14$

$= 6x(3x+2) - 7(3x+2)$

$= \boxed{(3x+2)(6x-7)}$

17) $x^2 - 144$

$= x^2 - 12^2$

$= (x+12)(x-12)$

18) $4x^2 + 100$

$= 4(x^2 + 25)$

$\rightarrow A^2 + B^2$

19) $x^3 - 27$

$= x^3 - 3^3$

$A^3 - B^3$

$= (x-3)(x^2 + 3x + 9)$

20) $x^3 + 8$

$= x^3 + 2^3$

$A^3 + B^3$

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

use perfect- sqr trinomials to factor:

$(A \pm B)^2$

21) $9x^2 - 24xy + 16y^2$

$= (3x - 4y)^2$

22) $25x^2 + 60xy + 36y^2$

$(5x + 6y)^2$

23) $64x^3 + 1$

$A^3 - B^3$

$A^3 + B^3$

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

$= (4x + 1)(16x^2 - 4x + 1)$

24) $54x^3 + 16y^3$

$= 2[27x^3 + 8y^3]$

$= 2[(3x)^3 + (2y)^3] = 2(3x + 2y)(9x^2 - 6xy + 4y^2)$

25) $32x^5 - 500x^2y^3$

Hint: GCF First.

$= 4x^2(8x^3 - 125y^3)$

$= 4x^2[(2x)^3 - (5y)^3]$

$= 4x^2(2x - 5y)(4x^2 + 10xy + 25y^2)$

26) $x^2 + 6x + 9 - 25y^2$

Hint: Group the first 3 terms

$= (x+3)^2 - (5y)^2$ Now use

$A^2 - B^2$

$= (x+3+5y)(x+3-5y)$

27) $2x^3 + 3x^2 - 2x - 3$

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

$= (2x+3)(x^2-1)$ Now use $A^2 - B^2$

to factor more

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

28) $3x^3 + x^2 - 12x - 4$

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

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

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

29) $x^2(x - 4) - 8x(x - 4) + 16(x - 4)$

$= (x - 4)(x^2 - 8x + 16)$

$= (x - 4)(x - 4)^2$

$= (x - 4)^3$

30)

$$4x^2(2x+5) + 20x(2x+5) + 25(2x+5)$$

$$= (2x+5)\left[4x^2 + 20x + 25\right]$$

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

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

Area of rectangle is $25x^2 - 36$.

The width is $5x + 6$.

Find its length.

$$A = LW$$

$$25x^2 - 36 = L \cdot (5x+6)$$

$$(5x+6)(5x-6) = L \cdot (5x+6)$$

$$\boxed{L = 5x-6}$$

$A = 4x^2 - 1$

$L = 2x + 1$

$4x^2 - 1 = (2x + 1) \cdot W$

$(2x + 1)(2x - 1) = (2x + 1) \cdot W$

$2x - 1 = W$

Area $= 6x^2 + x - 2$

width $= 2x - 1$

find length

$L = 3x + 2$

$(2x - 1)(3x + 2) = 6x^2 + x - 2$

verify the middle term
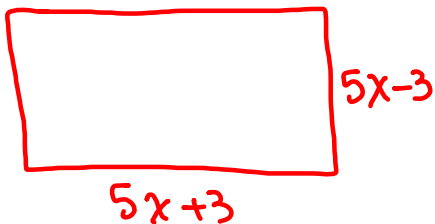
$4x - 3x = x$

Width $= 3x - 5$

Area $= 27x^3 - 125$

Length $= ?$

$$(3x-5)(9x^2 + 15x + 25) = 27x^3 - 125$$

$$= (3x)^3 - (5)^3$$

$$(3x - 5)(9x^2 + 15x + 25)$$

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find Area & perimeter in simplest form.

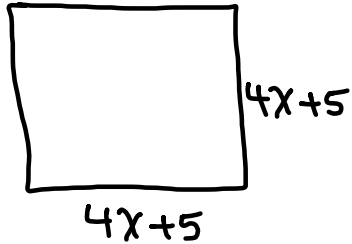$5x - 3$

$5x + 3$

$A = LW$

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

$= 25x^2 - 9$

$P = 2L + 2W = 2(5x+3) + 2(5x-3)$

$$= 20x$$

find the area

$A = S^2$

$= (4x+5)^2$

$= (4x+5)(4x+5)$

$= 16x^2 + 20x + 20x + 25$

$$A = 16x^2 + 40x + 25$$

4x+5

4x+5

Divide $\dfrac{4x^3 + 5x^2 - 7x - 2}{x-2}$

$$\begin{array}{r} 4x^2 + 13x + 19 \\ x-2 \overline{\smash{\big)}\, 4x^3 + 5x^2 - 7x - 2} \\ -(4x^3 - 8x^2) \\ \hline 13x^2 - 7x - 2 \\ -(13x^2 - 26x) \\ \hline 19x - 2 \\ -(19x - 38) \\ \hline 36 \end{array}$$

$$4x^2 + 13x + 19 + \frac{36}{x-2}$$

Solve

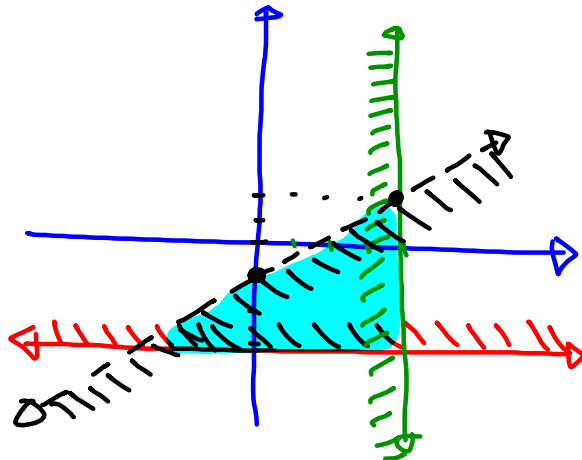$$\begin{cases} 7x - 3y = -14 \\ 3\{-3x + y = 6 \end{cases} \rightarrow -3(-2) + y = 6$$

$$-2x = 4 \qquad\qquad 6 + y = 6$$

$$\boxed{x = -2} \qquad\qquad \boxed{y = 0}$$

$$(-2, 0)$$

Graph & Shade

$$\begin{cases} y \geq -3 \\ x \leq 4 \\ y < \frac{3}{4}x - 1 \end{cases}$$

Monday Agenda

1) Collect Project III

2) Exam 3:
       1) Come as early as you can
       2) Class resumes at 10:40
       3) Review Exam 1 & 2
       4) Review Class Quizzes
       5) Review recent SGs.
              6) Factoring, factoring,...