

Math 115

Fall 2018

Lecture 21

$$? a^2 + b^2 = c^2 ?$$

$$y = mx + b \quad ? \quad d = rt$$

Feb 19-8:47 AM

Factor out the GCF:

$$\textcircled{1} \quad 12x - 18 = 6(2x - 3)$$

$$\textcircled{2} \quad 15x^2 + 25x = 5x(3x + 5)$$

$$\textcircled{3} \quad 7x(2x - 3) + 10(2x - 3) = (2x - 3)(7x + 10)$$

$$\textcircled{4} \quad 16x^3 - 24x^2 + 8x = 8x(2x^2 - 3x + 1)$$

Nov 28-6:04 AM

Factor by grouping:

$$\textcircled{1} \quad \underbrace{x^3 + 5x^2}_{x^2(x+5)} + \underbrace{2x + 10}_{2(x+5)} = \boxed{(x+5)(x^2+2)}$$

$$\textcircled{2} \quad \underbrace{4x^3 - 7x^2}_{x^2(4x-7)} + \underbrace{12x - 21}_{3(4x-7)} = \boxed{(4x-7)(x^2+3)}$$

$$\textcircled{3} \quad \underbrace{5x^3 + 8x^2}_{x^2(5x+8)} - \underbrace{20x - 32}_{4(5x+8)} = \boxed{(5x+8)(x^2-4)}$$

Can be factored \rightarrow

Nov 28-6:15 AM

Factor the following using our lecture from yesterday:

$$\textcircled{1} \quad x^2 \boxed{+6x} + 8 = \underbrace{x^2 + 2x}_{x(x+2)} + \underbrace{4x + 8}_{4(x+2)} = \boxed{(x+2)(x+4)}$$

$P=8, S=6$
 $1, 8$
 $\boxed{2, 4}$

$$\textcircled{2} \quad x^2 \boxed{-2x} - 15 = \underbrace{x^2 + 3x}_{x(x+3)} - \underbrace{5x - 15}_{5(x-3)} = \boxed{(x+3)(x-5)}$$

$P=-15, S=-2$
 $1, -15$
 $\boxed{3, -5}$

Nov 28-6:27 AM

③ $x^2 - 13x + 36 = x^2 - 4x - 9x + 36$ -1, 36
-2, 18
-3, 12
-4, 9
-6, 6

$P=36$ ✓
 $S=-13$ ✓

$= x(x-4) - 9(x-4)$

$= (x-4)(x-9)$

④ $5x^2 + 9x + 4$ 1, 20
2, 10
4, 5

$P=20$ ✓
 $S=9$ ✓

$= 5x^2 + 4x + 5x + 4$

$= x(5x+4) + 1(5x+4)$

$= (5x+4)(x+1)$

Nov 28-6:37 AM

⑤ $3x^2 + 7x - 10$ -1, 30
-2, 15
-3, 10
-5, 6

$P=-30$ ✓
 $S=7$ ✓

$= 3x^2 - 3x + 10x - 10$

$= 3x(x-1) + 10(x-1)$

$= (x-1)(3x+10)$

⑥ $4x^2 - 11x + 7$ -1, -28
-2, -14
-4, -7

$P=28$ ✓
 $S=-11$ ✓

$= 4x^2 - 4x - 7x + 7$

$= 4x(x-1) - 7(x-1) = (x-1)(4x-7)$

Nov 28-6:50 AM

⑦ $x^2 + 10x + 25 = x^2 + 5x + 5x + 25$
 $P=25$
 $S=10$
 $5 \ \& \ 5$

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

⑧ $x^2 + 10x + 40$
 $P=40$
 $S=10$

1, 40
 2, 20
 4, 10
 5, 8

Not factorable
 Prime Expression.

Nov 28-7:03 AM

Simplify

① $(x^6)^3 \cdot (x^{-2})^{-6} = x^{18} \cdot x^{12} = x^{30}$
 Monomial, D=30, C=1

② $\frac{12x^6y^{-8}}{36x^{-4}y^8} = \frac{1x^6x^4}{3y^8y^8} = \frac{x^{10}}{3y^{16}}$

③ $(2x+5)(3x-1) - 4(6x-1)$
 foil Dist. Const
 $= 6x^2 - 2x + 15x - 5 - 24x + 4 = 6x^2 - 11x - 1$
 Trinomial, D=2, LC=6,

Nov 28-7:11 AM

$$\textcircled{4} \quad \underbrace{(3x^2 - 4)(3x^2 + 4)}_{\text{Conjugates}} = (3x^2)^2 - (4)^2$$

$$= \boxed{9x^4 - 16}$$

$$\textcircled{5} \quad (7x - 3)^2 = (7x)^2 - 2(7x)(3) + (3)^2$$

$$= \boxed{49x^2 - 42x + 9}$$

$$\textcircled{6} \quad \frac{35x^3y^4 - 7x^2y^3}{-7x^2y^3}$$

$$= \frac{\overset{5}{\cancel{35}}x^3y^4}{\cancel{-7}x^2y^3} - \frac{7x^2y^3}{\cancel{-7}x^2y^3} = \boxed{-5xy + 1}$$

D=2, L.C. = -5
Const = 1

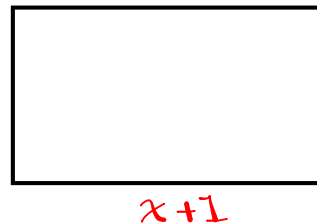
Nov 28-7:19 AM

The length and width of a rectangular shape are two cons. integers.

1) Draw & label clearly.

2) find its area.

3) find its perimeter.



$$\rightarrow A = LW$$

$$= x(x+1)$$

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

$$P = 2L + 2W$$

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

$$= 2x + 2x + 2 = \boxed{4x + 2}$$

Nov 28-8:05 AM

The length and width of a rectangular shape are two cons. odd integers

1) Draw & label clearly.

2) find its area.

x



3) find its perimeter.

$x+2$

$$A = LW = x(x+2) = \boxed{x^2 + 2x}$$

$$P = 2L + 2W = 2(x) + 2(x+2) = 2x + 2x + 4 = \boxed{4x + 4}$$

Nov 28-8:05 AM

The length of a rectangular shape is 1 ft shorter than 3 times its width.

1) Draw & label clearly.

2) find its area.

x



3) find its perimeter.

$3x-1$

$$A = LW = x(3x-1) = \boxed{3x^2 - x}$$

$$P = 2L + 2W = 2x + 2(3x-1) = 2x + 6x - 2 = \boxed{8x - 2}$$

Nov 28-8:05 AM

Divide: $\frac{x^3 - 7x - 6}{x + 1}$

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

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

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

$$\begin{array}{r}
 x+1 \overline{) \begin{array}{r} x^3 + 0x^2 - 7x - 6 \\ -(x^3 + x^2) \\ \hline -x^2 - 7x - 6 \\ -(-x^2 - x) \\ \hline -6x - 6 \\ -(-6x - 6) \\ \hline 0 \end{array} \\
 \boxed{x^2 - x - 6}
 \end{array}$$

Nov 28-8:17 AM

Simplify:

$$\begin{aligned}
 \textcircled{1} & \quad (8.2 \times 10^{-12}) \cdot (7.5 \times 10^{-11}) \\
 & = 61.5 \times 10^{-23} = 6.15 \times 10^1 \times 10^{-23}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{2} & \quad \frac{7.5 \times 10^{-14}}{1.875 \times 10^{-16}} \\
 & = 4 \times 10^{-14-16} = 4 \times 10^{-30}
 \end{aligned}$$

Nov 28-8:24 AM

① Give degree & Coef of $-32x^6y^4$.

$$D = 6 + 4 = 10, \quad C = -32$$

② Simplify $(-3x^{-4})^3$

$$= (-3)^3 (x^{-4})^3$$

$$= -27x^{-12} = \boxed{\frac{-27}{x^{12}}}$$

③ Simplify: $\left(\frac{x^2y^{-3}}{z^{-4}}\right)^5$

$$= \left(\frac{x^2z^4}{y^3}\right)^5$$

$$= \left(\frac{y^3}{x^2z^4}\right)^5 = \boxed{\frac{y^{15}}{x^{10}z^{20}}}$$

Nov 28-8:30 AM

Simplify:

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

$$= \cancel{x^3} + \cancel{2x^2} + \cancel{4x} - \cancel{2x^2} - \cancel{4x} - 8 + \cancel{x^3} - \cancel{2x^2} + \cancel{4x} + \cancel{2x^2} + \cancel{4x} + 8$$

$$= \boxed{2x^3} \quad \text{Monomial, } D=3, \quad C=2$$

Simplify

$$\underbrace{(x+y)(x-y)}_{\text{conjugate}} (x^2+y^2)(x^4+y^4)$$

$$= \underbrace{(x^2-y^2)(x^2+y^2)}_{\text{conjugates}} (x^4+y^4)$$

$$= \overbrace{(x^4-y^4)(x^4+y^4)} = (x^4)^2 - (y^4)^2 = \boxed{x^8 - y^8}$$

Nov 28-8:37 AM

Divide: $\frac{8x^4 - 12x^3 - 2x^2 + 7x - 6}{2x - 3}$

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

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

$4x^3 - x + 2$

Nov 28-8:47 AM

30 Coins.

Quarters & Dimes only.

Total Value: \$5.55

How many of each?

Dimes $\rightarrow D$

Quarters $\rightarrow R$

$$\begin{cases}
 D + R = 30 \\
 10D + 25R = 555
 \end{cases}$$

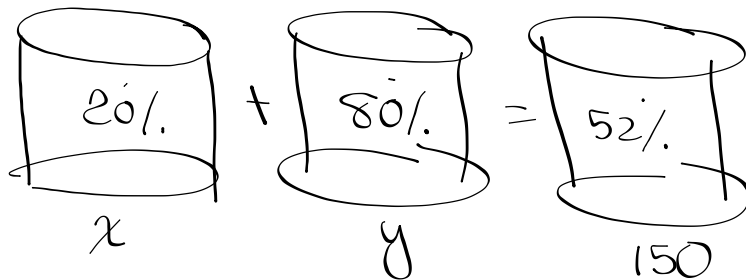
\triangleright Make Sure to
Solve this.

Nov 28-8:58 AM

We need 150 liters of
52% alcohol.

We have unlimited supply of 20% & 80% alcohol.

How many liters of each?



$$\begin{cases} x + y = 150 \\ .20x + .80y = .52(150) \end{cases} \quad \text{Make sure to finish.}$$

Nov 28-9:01 AM

We need 100 liters of 85% acid.

We have unlimited supply of 40% acid & Pure acid.

How many liters of each?



$$\begin{cases} x + y = 100 \\ .4x + 1y = .85(100) \end{cases} \quad \text{Make sure to finish this}$$

Due Thurs.
SG
12, 13, & 14

Nov 28-9:09 AM