Factor

① $x^2 - 9$

-9 / 3×-3 / 0

$(x+3)(x-3)$

② $16x^2 - 1$

$16x^2 + 0x - 1$

-16 / -4×4 / 0

$\frac{1}{4} \times -\frac{4}{16} = -\frac{1}{4}$

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

③ $2x^2 - 50$

$= 2(x^2 - 25)$

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

-25 / -5×5 / 0

$a^2 - b^2 = (a+b)(a-b)$

HW: pg. 136 # 19, 22-24 and pg. 149 # 1-8

8.3/9.1 Factoring w/ Complex #s, Taking Square Roots, and Completing the Square

Factoring with Complex Numbers

$a^2 + b^2 = (a+bi)(a-bi)$

$a^2 - b^2 = (a+b)(a-b)$

Ex #1 Factor $3x^2+12$.

$= 3(x^2+4) = \boxed{3(x+2i)(x-2i)}$

Ex #2 Factor $5x^2+80y^2$.

$= 5(x^2+16y^2) = 5(x+4yi)(x-4yi)$

Ex #3 Factor $25x^2+3y^2$

$= \boxed{(5x+\sqrt{3}yi)(5x-\sqrt{3}yi)}$

Solving by Taking the Square Root

If the "bx" of ax^2+bx+c is missing, then

① Isolate the squared part

② Take the square root of both sides of the equation, don't forget the "±"!!!

Ex #4 Solve $9x^2-49=0$

$+49 \quad +49$

$\frac{9x^2}{9} = \frac{49}{9}$

$\sqrt{x^2} = \sqrt{\frac{49}{9}}$

$x = \pm\sqrt{\frac{49}{9}}$

$\boxed{x = \pm\frac{7}{3}}$

Ex #5 $25x^2-7=0$

$+7 \quad +7$

$\frac{25x^2}{25} = \frac{7}{25}$

$\sqrt{x^2} = \sqrt{\frac{7}{25}}$

$x = \pm\sqrt{\frac{7}{25}}$

$\boxed{x = \pm\frac{\sqrt{7}}{5}}$

Ex #6 $2x^2+50=0$

$-50 \quad -50$

$\frac{2x^2}{2} = \frac{-50}{2}$

$\sqrt{x^2} = \sqrt{-25}$

$x = \pm\sqrt{-1}\sqrt{25}$

$\boxed{x = \pm 5i}$

Ex #7 $4(x+5)^2 - 49 = 0$

$+49 \quad +49$

$\frac{4(x+5)^2}{4} = \frac{49}{4}$

$\sqrt{(x+5)^2} = \sqrt{\frac{49}{4}}$

$x + 5 = \pm \frac{7}{2}$

$-5 \quad -5$

$x = \pm \frac{7}{2} - 5$

$x = \frac{7}{2} - 5\left(\frac{2}{2}\right)$ $\quad x = -\frac{7}{2} - 5\left(\frac{2}{2}\right)$

$x = \frac{7}{2} - \frac{10}{2}$ $\quad x = -\frac{7}{2} - \frac{10}{2}$

$\boxed{x = -\frac{3}{2} \qquad x = -\frac{17}{2}}$

Ex #8 $5(x+1)^2 - 8 = 0$

$+8 \quad +8$

$\frac{5(x+1)^2}{5} = \frac{8}{5}$

$\sqrt{(x+1)^2} = \sqrt{\frac{8}{5}}$

$x + 1 = \pm \frac{2\sqrt{2}}{\sqrt{5}} \left(\frac{\sqrt{5}}{\sqrt{5}}\right)$

$x + 1 = \pm \frac{2\sqrt{10}}{5}$

$-1 \quad -1$

$\boxed{x = -1 \pm \frac{2\sqrt{10}}{5}}$

We'll finish the rest of notes after break!!