Today's Plan:

Learning Target (standard): I will factor polynomials using different techniques.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Solving Quadratics 2:

$$1)\, n = \frac{1}{2}, -\frac{6}{5}$$

$$2)\, n = -\frac{1}{3}, 6$$

$$3)\, n = \sqrt{19}, -\sqrt{19}$$

$$4)\, v = 4, -4$$

$$5)\, n = -3, 11$$

$$6)\, x = -7 + \sqrt{19}i, -7 - \sqrt{19}i$$

$$7)\, x = -\frac{1}{3} + \frac{2\sqrt{6}}{3}i, -\frac{1}{3} - \frac{2\sqrt{6}}{3}i$$

$$8)\, x = \frac{-9 + 3\sqrt{89}}{4}, \frac{-9 - 3\sqrt{89}}{4}$$

$$9)\, n = -5, 3$$

$$10)\, x = -3, 3$$

$$11)\, x = 5, -\frac{19}{4}$$

$$12)\, x = -\frac{3}{2} - \frac{\sqrt{3}}{6}i, -\frac{3}{2} + \frac{\sqrt{3}}{6}i$$

Solve by taking square roots:

$$\left(u+\frac{3}{2}\right)^2 - 45 = 0$$

$$\sqrt{\left(u+\frac{3}{2}\right)^2} \stackrel{\checkmark}{=} \sqrt{45}$$

$$u + \frac{3}{2} = 3\sqrt{5}, -3\sqrt{5}$$

$$u = -\frac{3}{2} + 3\sqrt{5}, -\frac{3}{2} - 3\sqrt{5}$$

$$u = \frac{-3+6\sqrt{5}}{2}, \frac{-3-6\sqrt{5}}{2}$$

Solve by completing the square.

$$9x^2 - 6x + 2 = 0$$

$$\frac{9x^2}{9} - \frac{6x}{9} = \frac{-2}{9}$$

$$x^2 - \frac{2}{3}x + \frac{1}{9} = -\frac{2}{9} + \frac{1}{9}$$

$$\sqrt{\left(x-\frac{1}{3}\right)^2} \stackrel{\checkmark}{=} \sqrt{-\frac{1}{9}}$$

$$x - \frac{1}{3} = \frac{1}{3}i, -\frac{1}{3}i$$

$$x = \frac{1}{3} + \frac{1}{3}i, \frac{1}{3} - \frac{1}{3}i$$

Solve using the quadratic formula.

$$3x^2 + 10x + 6 = 0$$

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-10 \pm \sqrt{100 - 4(3)(6)}}{2(3)}$$

$$= \frac{-10 \pm \sqrt{100 - 72}}{6}$$

$$= \frac{-10 \pm \sqrt{28}}{6}$$

$$= \frac{-10 \pm 2\sqrt{7}}{6}$$

$$X = \frac{-5 + \sqrt{7}}{3}, \frac{-5 - \sqrt{7}}{3}$$

Factoring Methods:

- ## Binomials
    - difference of two squares $64x^2 - 121$
    - difference of two cubes $8x^3 - 27$
    - sum of two cubes $64x^6 + 1$

- ## Trinomials
    - guess & check $2x^2 - 11x - 40$
    - split the middle $12a^2 - 17a - 5$

- ## Four or more even number of terms
    - grouping $x^2y - 3x^2 - 2y + 6$

    * All methods may have common monomials that will need to be factored out first!!

Factor.

$64x^2 - 121$

$(8x + 11)(8x - 11)$

Factor.

$8x^3 - 27$

$(2x - 3)(4x^2 + 6x + 9)$

$x^3 - y^3$

$(x - y)(x^2 + xy + y^2)$

$x^3 + y^3$

$(x + y)(x^2 - xy + y^2)$

Factor.

$64x^6 + 1$

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

Factor.

$x^2y - 3x^2 - 2y + 6$

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

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

Factor.

$2x^2 - 11x - 40$

-80

$5 \quad -16 = -11$

$2x^2 + 5x - 16x - 40$

$x(2x+5) - 8(2x+5)$

$(2x+5)(x-8)$

Factor.

$12a^2 - 17a - 5$

-60

$3 \quad -20 = -17$

$12a^2 + 3a - 20a - 5$

$3a(4a+1) - 5(4a+1)$

$(4a+1)(3a-5)$

Factor Completely:

$$12x^2y^2 - 18x^3y + 24x^2y$$

$$-18x^3y + 12x^2y^2 + 24x^2y$$

$$-6x^2y\left(3x - 2y - 4\right)$$

Factor Completely:

$$y^{2n+2} + y^{n+2} - y^2$$

$$y^2\left(y^{2n} + y^n - 1\right)$$

$$\frac{x^m}{x^n} = x^{m-n}$$

$$\frac{y^{2n+2}}{y^2} = y^{2n+2-2}$$

$$= y^{2n}$$

Factor Completely:

$$a^{2n+2} + a^{2n+1} - a^n$$

$$a^n \left(a^{n+2} + a^{n+1} - 1 \right)$$

Factor Completely:

$$6y^2 + 5y - 6$$

$$-36$$

$$9 - 4 = 5$$

$$6y^2 + 9y - 4y - 6$$

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

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

Factor Completely:

$$6a^2 - 26a + 15$$

90

non-factorable   + = 26

Factor Completely:

$$8x^3 + 27y^9$$

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

Factor Completely:

$$2x^{n+2} - 7x^{n+1} + 3x^n$$

$$x^n\left(2x^2 - 7x + 3\right)$$

$$x^n\left(2x - 1\right)\left(x - 3\right)$$

Factor Completely:

$$a^{2n+2} - 6a^{n+2} + 9a^2$$

$$a^2\left(a^{2n} - 6a^n + 9\right)$$

$$a^2\left(a^n - 3\right)\left(a^n - 3\right)$$

$$a^2\left(a^n - 3\right)^2$$

Assignment:

Factoring Techniques

#1-18