> WORK ON PROBLEMS IN GROUP OF 2-4. YOUR INSTRUCTOR WILL MARK YOUR GROUP WORK IN CLASS. TURN IN YOUR OWN WORK FOR QUESTIONS MARKED AS "INDIVIDUAL WORK" INDIVIDUALLY; UPLOAD TO CANVAS OR SUBMIT IN CLASS ON THE DUE DATE.

Review-the Methods of Solving Equations with one Variable.

- **Common Factors:** Look for common factors to factor into simpler factors.

- **Use one of the Types:** At this point expect a quadratic or of the form $A^2 - B^2$ or $A^3 \pm B^3$. Use quadratic formula $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ or the difference of squares formula $A^2 - B^2 = (A - B)(A + B)$ or the sum or difference of cubes formulas $A^3 \pm B^3 = (A \pm B)(A^2 \mp AB + B^2)$ to factor.

  Here is a video that explain this briefly: https://mediahub.ku.edu/media/t/1_p41aue3s

- Factoring Quadratic Polynomials

  You may be able to use $x^2 + (a + b)x + ab$ method; here is a link to a short video for that. https://mediahub.ku.edu/media/t/1_2p7cjt92

  When factoring using Quadratic method, factor using the following schema:

$$ax^2 + bx + c = 0 \implies \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \begin{array}{c} \nearrow\; x_1 \\ \\ \searrow\; x_2 \end{array} \implies ax^2 + bx + c = a(x - x_1)(x - x_2)$$

- When factoring using Difference of squares formula or sum or difference of cubes formulas, identify A^2 and B^2 first.

- **Factoring and/or Solving for the New Variable:** Use each **factor** including any that may have been obtained in the first step and **SOLVE** for the New Variable.

  ○ Going from the factors to roots, remember to **SOLVE** each factor to find a root.

  ○ Going from the roots to factors, remember to **SUBTRACT** each root to form a factor.

  ○ To create integer coefficient use any integer factor and regroup them with the correct factor that does not have integer coefficient.

- **Graph for Equations.** (We don't use the graphs in this section.)

  Solutions to equation $f(x) = g(x)$ and the points of intersections of two graphs $y = f(x)$ and $y = g(x)$ are the same.

Review-Factoring Expressions with More Than One Parameter

Try any of the following methods if it applies.
A video of the methods: https://mediahub.ku.edu/media/t/1_vc931lao

- **Same as before:** Use any of the following: Sum/difference of cube, difference of squares and factoring a common term.

- **Use Binomial Expansion:** $(A \pm B)^2 = A^2 \pm 2AB + B^2$. Find A and B that makes the expression of the right hand side of the formula. Then write the left hand side of the formula.

- **Grouping:** Put the terms in different group and find common factor between the groups.

1. (A) Factor $4(z-3)^2 - 49$ into two linear factors; use $A^2 - B^2 = (A-B)(A+B)$ formula.
   (B) Solve $4(z-3)^2 - 49 = 0$ for z.

2. Solve $15 + 29z - 14z^2 = 0$, for z; use quadratic formula.

3. Solve $-21z + 41z^2 - 10z^3 = 0$ for z; first factor into a quadratic and a linear, then solve.

4. Solve $y^2 - 10y = -21$ for y; note the highest degree of y.

5. (A) Solve $-21x^2 - 11x + 2 = 0$ for x.

(B) Factor $-21x^2 - 11x + 2$ completely into linear factors with integer coefficients.

Fun Project: Explain how solutions of $a_0 x^2 + a_1 x + a_2 = 0$ and equation $a_2 x^2 + a_1 x + a_0 = 0$ are related.

6. Solve $(2x - 11)^3 - (2x - 11) = 0$ for x.

7. Factor $(x-7)^3 + 27$.

8. Factor $x^2 + 6xz + 9z^2$.

9. Factor $x^2 + xy - 4x - 4y$.

10. Factor as much as possible $2x^3 - 4x^2 + x - 2$.

INDIVIDUAL WORK

UPLOAD TO CANVAS OR SUBMIT IN CLASS BEFORE DUE DATE. DISCUSSING THESE QUESTIONS IN YOUR GROUP IS ENCOURAGED BUT MAKE SURE YOU ARE TURNING IN YOUR OWN WORK.

11. *(1.5 points)* Solve $2p^{\frac{1}{2}} = 26$ for p.

12. *(2.5 points)*

Solve $12q - 14q^2 + 4q^3 = 0$ for q.

13. *(3 points)*

    Solve $(2x - 7)^3 - (2x - 7) = 0$ for x.

14. *(1 point)*   Factor $(x + 11)^3 - 125$.