SOLVING QUADRATIC EQUATIONS BY FACTORING : Day 2 Notes

- The roots of a quadratic equation occur when the product of the factors is equal to zero
  - **zero product property**: "If the product of two real numbers is zero, then one or both of the numbers must be zero" ie. de=0 … then d = 0 and / or e = 0

Solve a Quadratic Equation or Function

1) Quadratic must equal zero
2) Factor (GCF, simple, messy, difference of □'s)
3) Set each factor equal to zero.
4) Solutions are the roots
5) Verify your solution(s)
- calculator
- by substitution

ex. $3x^2 - 2x = 5$

$3x^2 - 2x - 5 = 0$ messy trinomial

$a \times c = -15$, $b = -2$, $-5, 3$ — pick

$3x^2 + 3x - 5x - 5 = 0$

$3x(x+1) - 5(x+1) = 0$

$(3x-5)(x+1) = 0$

Two answers:

$x+1=0$, $x=-1$

$3x-5=0$, $3x=5$, $x=\frac{5}{3}$

$3(-1)^2 - 2(-1) = 5$

$3+2 = 5$

$5=5$ ✓

$3\left(\frac{5}{3}\right)^2 - 2\left(\frac{5}{3}\right) = 5$

$\frac{25}{3} - \frac{10}{3} = 5$

EX. 3 Determine the roots of each quadratic equation. Verify your solutions.

a) $x^2 + 6x + 9 = 0$ ☺ simple trinomial

$(x+3)(x+3) = 0$

soln $x = -3$

b) $x^2 + 4x - 21 = 0$

$(x+7)(x-3) = 0$

$x = -7$ & 3

c) $2x^2 - 9x - 5 = 0$

$a \times c = -10$, $b = -9$, $-10, +1$

$2x^2 - 10x + 1x - 5 = 0$

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

$(x-5)(2x+1) = 0$

$x = 5$ $\quad x = -\frac{1}{2}$

Types to remember:

GCF $6x^2 - 24x = 0$

$6x(x-4) = 0$

$x = 0, +4$

$25x^2 = 9$

$25x^2 - 9 = 0$ difference of squares

$(5x+3)(5x-3) = 0$

$x = -\frac{3}{5}$ & $+\frac{3}{5}$

OR ….

$25x^2 = 9$

$x^2 = \frac{9}{25}$

$\sqrt{x^2} = \sqrt{\frac{9}{25}}$

$x = \pm\frac{3}{5}$