Name: Key Hour: ___________

Quadratics Review (3 terms)

"Aussie" Method AKA Magic Method AKA Factor MD

Seems strange at first. But if you get the pattern it will always work for you!!!

ALWAYS factor out the GCF 1st (if possible)!

Example:
$20x^2 + 22x - 12$ has a GCF of 2 – factor it out!
$2(10x^2 + 11x - 6)$

1. Draw 2 sets of parenthesis and place x's in them.
2. Multiply the coefficients (#s) from the first and last terms. (a and c)
3. Determine which number pair will get you BOTH the sum as the MIDDLE term (the x term) and the product as the number you got in step 3
4. Place the two #'s from step 2 & 3 in the parenthesis.
5. Divide the numbers that you just placed in the parenthesis by the original lead coefficient (a) then simplify any fractions
6. If it does not divide evenly, and take the value of the denominator and move it in front of the x within that factor.
7. To solve: set both factors (the two sets of parentheses) equal to zero and solve both equations, this will give you your solutions. ☺

Example: $10x^2 + 11x - 6$

Step1: (x) (x)

Step 2:

Step 3:

Multiply a • c
10•-6
-60

Find
-4

Find
15

b term
11

$$\boxed{-4} \bullet \boxed{15} = -60$$

$$\boxed{-4} + \boxed{15} = 11$$

Step 4: $(x - 4)(x + 15)$

Step 5: $(x - \frac{4}{10})(x + \frac{15}{10})$ now simplify $(x - \frac{2}{5})(x + \frac{3}{2})$

Step 6:
Since there are fractions left, you must move 5 and 2 in front of the x's
$(5x - 2)(2x + 3)$, STOP HERE IF DIRECTIONS SAY FACTOR

IF THE DIRECTIONS SAY SOLVE, SET EACH = 0:

$(2x + 3) = 0$ and $(5x - 2) = 0$

$2x = -3$ $\quad$ $5x = 2$

$x = \frac{-3}{2}$ and $x = \frac{2}{5}$

Factoring Examples

1. $5x^2 + 36x + 7$

$a \cdot c = 5 \cdot 7 = 35$

$\boxed{35} \cdot \boxed{1} =$

$\downarrow \quad \downarrow$

$35 + 1 = 36$

$(x + \frac{35}{5})(x + \frac{1}{5})$

$\boxed{(x+7)(5x+1)}$

2. $7x^2 - 30x + 8$

$a \cdot c = 7 \cdot 8 = 56$

$\boxed{-28} \cdot \boxed{-2} = 56$

$-28 + -2 = -30$

$(x - \frac{28}{7})(x - \frac{2}{7})$

$\boxed{(x-4)(7x-2)}$

Directions: Solve by Factoring.

3. $2x^2 - 7x + 3 = 0$

$\boxed{-6} \cdot \boxed{-1} = 6$

$-6 + -1 = -7$

$(x - \frac{6}{2})(x - \frac{1}{2}) = 0$

$(x-3)(2x-1) = 0$

$x - 3 = 0 \qquad 2x - 1 = 0$

$\boxed{x = 3} \qquad \boxed{x = \frac{1}{2}}$

4. $5x^2 - 7x + 2 = 0$

$\boxed{-5} \boxed{-2} = 10$

$-5 + -2 = -7$

$(x - \frac{5}{5})(x - \frac{2}{5}) = 0$

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

$x - 1 = 0 \qquad 5x - 2 = 0$

$\boxed{x = 1} \qquad \boxed{x = \frac{2}{5}}$

5. $3x^2 - 15x + 12 = 0$

$(x - \frac{3}{3})(x - \frac{12}{3}) = 0$

$(x-1)(x-4)=0$

$\boxed{x=1}$ $\boxed{x=4}$

$\boxed{-3}\ \boxed{-12} = 36$

$-3 + -12 = -15$

Quadratics: Prefect Square Binomials
Factor Together

1. $16x^2 - 81$

$(4x-9)(4x+9)$

Solve Together

2. $9x^2 - 4 = 0$

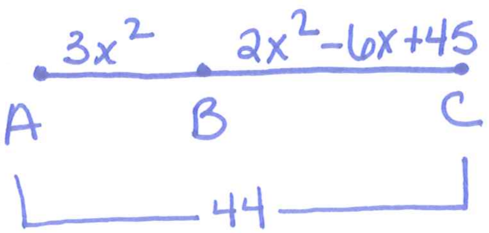
$(3x+2)(3x-2)=0$

$3x+2=0$ $\quad$ $3x-2=0$

$\boxed{x = -2/3}$ $\quad$ $\boxed{x = 2/3}$

Segment Examples:

1. B lies between A and C on a segment AC. If AC = 44, AB = 3x^2, and BC = 2x^2 - 6x + 45, find the value of x and the length of BC.



$5 \cdot 1 = 5$

$-5 \cdot -1 = +5$

$-5 + -1 = -6$

$AB + BC = AC$ Seg. addim

$3x^2 + 2x^2 - 6x + 45 = 44$

$5x^2 - 6x + 45 = 44$

$5x^2 - 6x + 1 = 0$

$(x - \frac{5}{5})(x - \frac{1}{5}) = 0$

$\rightarrow (x-1)(5x-1)=0$

$\boxed{x=1}$ $\boxed{x=\frac{1}{5}}$

Check Work HERE:

Check $x=1$

$AB + BC = AC$

$\underbrace{3(1)^2}_{3} + \underbrace{2(1)^2 - 6(1) + 45}_{41} = 44$ ✓

$= 44$

$\boxed{x=1 \text{ and } BC=41}$

check $x = \frac{1}{5}$

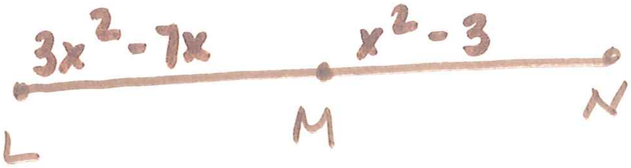
$\underbrace{3(\frac{1}{5})^2}_{.12} + 2(\frac{1}{5})^2 - 6(\frac{1}{5}) + 45$

$.12 + 43.85 = 44$

$44 = 44$ ✓

$\boxed{x = \frac{1}{5} \text{ and } BC = 43.85}$

2. M is the midpoint of segment LN. If LM = $3x^2 - 7x$ and MN = $x^2 - 3$ find the value of x, length of LM, MN, and LN.



LM ≅ MN def of mid pt

$3x^2-7x = x^2-3$ $\quad 2 \cdot 3 = 6$

$2x^2-7x+3=0$ $\quad -6 \cdot -1 = 6$

$(x-\frac{6}{2})(x-\frac{1}{2})=0$ $\quad -6 + -1 = -7$

$(x-3)(2x-1)=0$

$\boxed{x=3}$ $\boxed{x=\frac{1}{2}}$

Check Work HERE:

Check $x=3$

LM = MN

$3(3)^2-7(3) = (3)^2-3$

$6 = 6$ ✓

$\boxed{x=3}$ $\boxed{LM=6}$ $\boxed{MN=6}$

$\boxed{LN=12}$

Check $x=\frac{1}{2}$

$3(\frac{1}{2})^2-7(\frac{1}{2}) = (\frac{1}{2})^2-3$

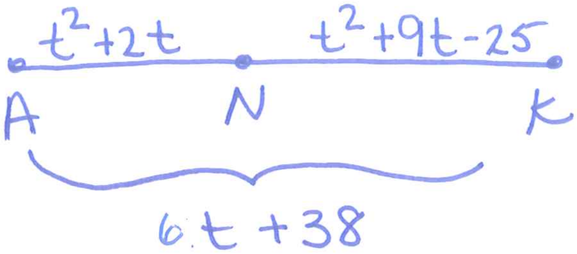
$-2.75 = -2.75$

$x \neq \frac{1}{2}$ distance can not be negative!

3. N is between A and K. AN = $t^2 + 2t$, NK = $t^2 + 9t - 25$ and AK = 2t + 38. Find t and the length of each segment.

$= 6t+38$

Check Work HERE: $\boxed{t=\frac{9}{2}}$



AN + NK = AK Segment addition

$t^2+2t+t^2+9t-25 = \quad +38$

$2t^2+11t-25 = 6t+38$

$2t^2+5t-63=0$ $\quad a \cdot c = -126$

$(t-\frac{9}{2})(t+\frac{14}{2})=0$ $\quad \boxed{-9}\ \boxed{14} = -126$

$-9+14=5$

$(2t-9)(t+7)=0$

$2t-9=0 \quad t+7=0$

$t=9/2 \quad t=-7$

AN + NK = AK

$\underbrace{(4.5)^2+2(4.5)}_{29.25} + \underbrace{4.5^2+9(4.5)-25}_{35.75} = 6(4.5)+38 \to 65$

$\boxed{\begin{array}{l} AN = 29.25 \\ NK = 35.75 \\ AK = 65 \end{array}}$ $\boxed{t = 9/2}$

check $t=-7$

$\underbrace{(-7)^2+2(-7)}_{35} + \underbrace{(-7)^2+9(-7)-25}_{-39}$

can't have neg distance so $t \neq -7$.

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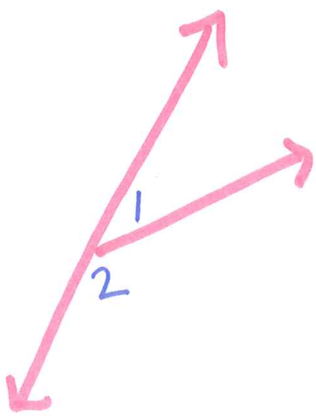
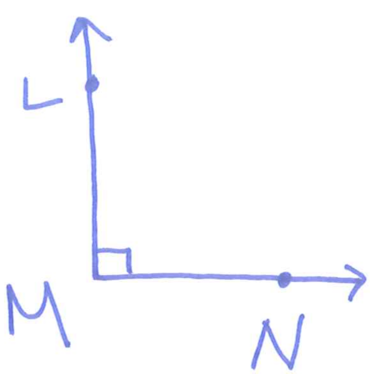
Warm Up: Illustrate the following.

1. < 1 and < 2 are linear pairs



2. $\overrightarrow{AB}$ and $\overrightarrow{AC}$ are opposite rays

3. <LMN is a right angle



4. <2 is an obtuse angle