Name: **Key**　　　　　　　　　　　　　　　HR: _____

Quadratics Practice

Directions: Solve Through Factoring.

1. $x^2 + 15x + 56 = 0$

$(x+8)(x+7) = 0$

$x = -8 \quad x = -7$

$\{-8, -7\}$

2. $81x^2 - 4 = 0$

$(9x+2)(9x-2) = 0$

$x = \frac{-2}{9} \quad x = \frac{2}{9}$

$\left\{ \frac{-2}{9}, \frac{2}{9} \right\}$

3. $5x^2 + x - 6 = 0$

$\left(x - \frac{5}{5}\right)\left(x + \frac{6}{5}\right) = 0$

$(x-1)(5x+6) = 0$

$\left\{ -\frac{6}{5}, 1 \right\}$

4. $18x^2 + 12x - 6 = 0$

GCF

$6(3x^2 + 2x - 1) = 0$

$6\left(x - \frac{1}{3}\right)\left(x + \frac{3}{3}\right) = 0$

$6(3x-1)(x+1) = 0$

$x = \frac{1}{3} \quad x = -1$

5. $6x^2 - 19x + 3 = 0$

$\left(x - \frac{18}{6}\right)\left(x - \frac{1}{6}\right) = 0$

$(x-3)(6x-1) = 0$

$x = 3 \quad x = \frac{1}{6}$
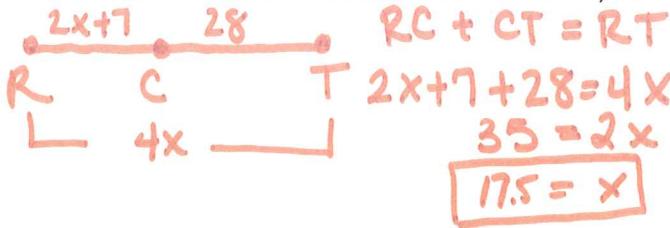
$\left\{ \frac{1}{6}, 3 \right\}$

6. $49x^2 - 81 = 0$

$(7x+9)(7x-9) = 0$

$x = \frac{-9}{7} \quad x = \frac{9}{7}$

$\left\{ -\frac{9}{7}, \frac{9}{7} \right\}$
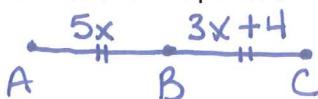
7. C is between R and T. Find RT if RC = 2x + 7, CT = 28, and RT = 4x.

$RC + CT = RT$　Segment addition

$2x + 7 + 28 = 4x$

$35 = 2x$

$17.5 = x$

Check Work HERE:

$2(17.5) + 7 + 28 = 4(17.5)$

$70 = 70 ✓$

8. B is the midpoint of segment AC. AB = 5x and BC = 3x + 4. Find AB, BC, and AC.

$AB = 10 ✓$

$BC = 10 ✓$

$AC = 20$

$AB = BC$

$5x = 3x + 4$

$2x = 4$

$x = 2$
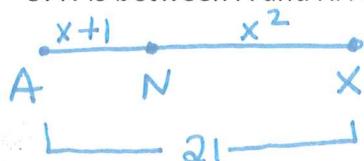
Check Work HERE:

9. N is between A and X. AN = x + 1, NX = x^2, and AX = 21. Find x and the length of each segment.

$AN + NX = AX$　Segment addition

$x + 1 + x^2 = 21$

$x^2 + x - 20 = 0$

$(x-4)(x+5) = 0$

$x = 4 \quad x = -5$

Check Work HERE:

check $x = 4$

$4 + 1 + 4^2 = 21$
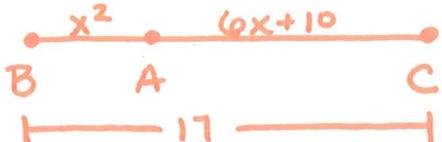
$21 = 21$

$-5 + 1 + (-5)^2 = 21?$

$-4 + 25 = 21$

↑ can't have a neg. distance ∴

$x = 4, \quad AN = 5$

$NX = 16 \quad AX = 21$

10. A is between B and C. BA = x^2, AC = 6x + 10, and BC = 17. Find x and the length of each segment.

x^2 6x+10

B   A   C

├──── 17 ────┤
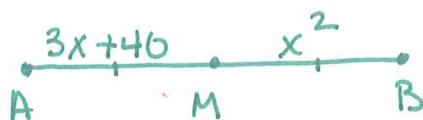
BA + AC = BC seg. addition

$x^2 + 6x + 10 = 17$

$x^2 + 6x - 7 = 0$

$(x+7)(x-1) = 0$ $\boxed{x = -7}$ $\boxed{x = 1}$

check -7: $(-7)^2 + 6(-7) + 10 = 17$

$49 - 42 + 10 = 17$

$49 + -32 = 17$ ✓ dist. can't be neg.

check $x = 1$:

$(1^2) + 6(1) + 10 = 17$
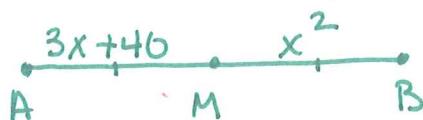
$1 + 6 + 10 = 17$

$17 = 17$ ✓

11. Point M is the midpoint of segment AB. AM = 3x + 40 and MB = x^2. Find x and AB.

3x+40 x^2

A   M   B

AM ≅ MB def of midpt

$3x + 40 = x^2$

$0 = x^2 - 3x - 40$

$0 = (x-8)(x+5)$

$\boxed{x = 8}$ $\boxed{x = -5}$

Check $x = 8$

AM = 3(8) + 40 ✓ = 64

MB = 8^2 ✓ = 64 $\boxed{x = 8}$

AB = 64 + 64 $\boxed{AB = 128}$
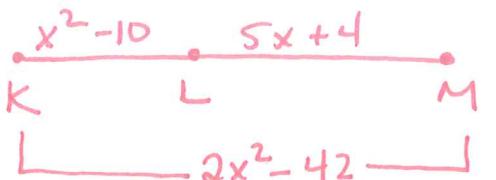
Check $x = -5$

AM = 3(-5) + 40 = 25 ✓

MB = $(-5)^2 = 25$ $\boxed{x = -5}$

AB = 25 + 25 $\boxed{AB = 50}$

12. L is between K and M. KL = $x^2 - 10$, LM = 5x + 4, and KM = $2x^2 - 42$. Find x.

$x^2 - 10$ 5x + 4

K   L   M

└─── $2x^2 - 42$ ───┘

$(x - 9)(x + 4) = 0$

$\boxed{x = 9}$ $\boxed{x = -4}$

yay!

KL + LM = KM seg. add

$x^2 - 10 + 5x + 4 = 2x^2 - 42$

$x^2 + 5x - 6 = 2x^2 - 42$

$0 = x^2 - 5x - 36$

KL + LM = KM

$9^2 - 10 + 5(9) + 4 = 2(9)^2 - 42$
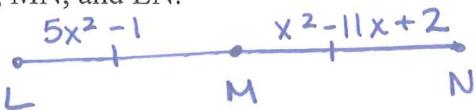
$71 + 49 = 120$ ✓

Check $x = -4$

$(-4)^2 - 10 + 5(-4) + 4 \stackrel{?}{=} 2(-4)^2 - 42$

$6 \qquad -16$

Can't have neg. distance

13. 2. M is the midpoint of segment LN. If LM = $5x^2 - 1$ and MN = $x^2 - 11x + 2$ find the value of x, length of LM, MN, and LN.

$5x^2 - 1$ $x^2 - 11x + 2$

L   M   N

☐ · ☐ = -12

↓   ↓

☐ + ☐ = 11

LM ≅ MN def of midpt.

$5x^2 - 1 = x^2 - 11x + 2$

$4x^2 + 11x - 3 = 0$

$(x + \frac{12}{4})(x - \frac{1}{4}) \rightarrow (x+3)(4x-1) = 0$

$\boxed{x = -3}$ $\boxed{x = \frac{1}{4}}$

yes!

Check $x = -3$

LM = $5(-3)^2 - 1 = 44$ ✓

MN = $(-3)^2 - 11(-3) + 2 = 44$

LN = 44 + 44 = 88

check $x = \frac{1}{4}$

LM = $5(\frac{1}{4})^2 - 1 = -.6875$

can't have neg. distance