NAME:_____

U3:L6 Solving Quadratics by Completing the Square

Remember how to complete the square?

$$f(x) = 10x^2 - 160x + 80$$

Perfect Square Trinomial

$a^2 + 2ab + b^2$

$y - 80 = 10x^2 - 160x$

$y - 80 = 10(x^2 - 16x + 64)$

$b = 8$

$(a-b)^2$

$y - 80 + 640 = 10(x-8)^2$

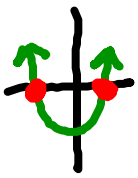
$y + 560 = 10(x-8)^2$

$y = 10(x-8)^2 - 560$

x-intercepts

ROOTS

ZEROES



You can also solve the quadratic by completing the square, isolating the squared term and taking the square root of both sides…

Remember, the square root of a positive number can be positive or negative…

$\sqrt{25} = \pm 5$ $\sqrt{-25} = ERR$

With quadratics…

$y = (x-1)^2 - 49$

$y = 0$ → ZEROES/ROOTS

$(x-1)^2 - 49 = 0$

$\sqrt{(x-1)^2} = \sqrt{49}$

$x - 1 = \pm 7$

$x - 1 = 7$

$x = 8$ (8,0)

$x - 1 = -7$

$x = -6$ (-6,0)

Prove

Verify by substituting your values back into the original equation:

(8) $y = (x-1)^2 - 49$

$0 = (8-1)^2 - 49$

$0 = (7)^2 - 49$

$0 = 49 - 49$

$0 = 0$

(-6) $y = (x-1)^2 - 49$

$0 = (-6-1)^2 - 49$

$0 = (-7)^2 - 49$

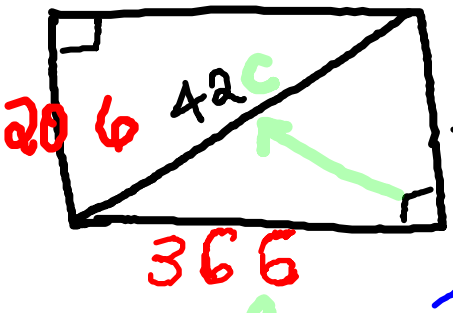
$0 = 49 - 49$

$0 = 0$

Extraneous Roots

An extraneous root is a root solution which is not allowed because of restrictions of the situation. For example…

A TV has a diagonal measure of 42 inches. The width of the screen in 16 inches more than the height. Determine the dimensions of the screen, to the tenth of an inch.



$a^2 + b^2 = c^2$

$(h+16)^2 + h^2 = 42^2$

$(h+16)(h+16) + h^2 = 1764$

$h^2 + 16h + 16h + 256 + h^2 = 1764$

$2h^2 + 32h + 256 = 1764$

$-256 \quad -256$

$2h^2 + 32h = 1508$

$2(h^2 + 16h + 64) = 1508 + 128$

$2(h+8)^2 = 1636$

$2(h+8)^2 - 1636 = 0$

$\frac{2(h+8)^2}{2} = \frac{1636}{2}$

$\sqrt{(h+8)^2} = \sqrt{818}$

$h+8 = \pm 28.6$

$h+8 = +28.6$

$h = 20.6$

$h+8 = -28.6$

$h = -36.6$

EXTRANEOUS

$a^2 + 2ab + b^2$

$2ab = 16h$

$\frac{2bh}{2h} = \frac{16h}{2h}$

$b = 8$

$(a+b)^2$

PRACTICE: Page 240, Q 1(abc), 3(ab), 4(ab), 6(cd), 7(bc)