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Equations and inequalities Problem Solving (set A)

Bronze

a) $x^2 - (2x+3) + 2k = 0$

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

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

b) $d = b^2 - 4ac$

$a \quad b \quad c$

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

$(-2)^2 - (4)(1)(2k-3) = 0$

$4 - (4)(2k - 3) = 0$

$4 - (8k - 12) = 0$

$4 - 8k + 12 = 0$

$-8k = -16$

$k = 2$

c) $y = 2x + 3$

$x^2 - y + 4 = 0 \longleftarrow (x^2 - y + 2(2) = 0)$

$x^2 - (2x+3) + 4 = 0$

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

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

$x = 1$

$y = 2(1) + 3$

$y = 5$

Silver

a) $y = -\frac{1}{4} + 4x$

$x^2 - 4k(-\frac{1}{4} + 4x) + 3k = 0$

$x^2 + k - 16kx + 3k = 0$

$x^2 - 16kx + 4k = 0$

b) $d = b^2 - 4ac$

$a \quad b \quad c$

$x^2 - 16kx + 4k = 0$

$d = (-16k)^2 - 4(1)(4k)$

$d = 256k^2 - 16k$

$k = \frac{1}{16}$

$x^2 - 16(\frac{1}{16})x + 4(\frac{1}{16}) = 0$

$x^2 - 1x + \frac{1}{4} = 0$

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

$y = -\frac{1}{4} + 4(\frac{1}{2})$

$y = \frac{7}{4}$

Gold

$y + \frac{1}{2} = 5x$

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

$x^2 - 4k(5x - \frac{1}{2}) + 3k = 0$

$x^2 - 20kx + 2k + 3k = 0$

$a \quad b \quad c$

$x^2 - 20kx + 5k = 0$

$d = b^2 - 4ac$

$(-20)^2 - 4(1)(5k) = 0$

$400k^2 - 20k = 0$

$k_1 = \frac{1}{20} \quad k_2 = 0$

k is non 0 constant

$x^2 - 20kx + 5k = 0$

$x^2 - 20(\frac{1}{20})x + 5(\frac{1}{20}) = 0$

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

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

$y = 5(\frac{1}{2}) - \frac{1}{2}$

$y = 2$