Solving Quadratic Equations in Standard Form

Apr. 23/10

Recall:

1. To solve an equation, find a value (or values) that satisfy the equation (i.e., make it true).

2. Standard form: $y = ax^2 + bx + c$

   quadratic term — linear term — constant term (y-intercept)

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Case 1: no linear term
Solve $x^2 - 9 = 7$

(i) factor

$x^2 - 9 = 7$

make one side equal 0

$x^2 - 16 = 0$

diff of squares

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

$x = -4$ or $x = 4$

(ii) isolate x^2 term

$x^2 - 9 = 7$

$+9 \quad +9$

$x^2 = 16$

square root both sides

* taking $\sqrt{}$ of a variable, you must consider + and − solution

$x = \pm\sqrt{16}$ ← $x = \pm 4$

$x = \sqrt{16}$ or $x = -\sqrt{16}$

$x = 4$ $\quad$ $x = -4$

Case 2: Linear term is present

(a) $-5x^2 + 2x + 1 = 1$

① make one side 0, and coefficient of x^2 should be positive

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

$-1 \quad -1$

$-5x^2 + 2x = 0$ [x -1]

$5x^2 - 2x = 0$

$x(5x - 2) = 0$

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

$x = 0$ or $5x - 2 = 0$

$\frac{5x}{5} = \frac{2}{5}$

$x = \frac{2}{5}$

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(b) $x^2 - 3x + 1 = -1$

$+1 \quad +1$ → add to -3

$x^2 - 3x + 2 = 0$ → multiply to 2

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

$x - 2 = 0$ or $x - 1 = 0$

$x = 2$ $x = 1$

roots of equation

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(c) $18x - 14 = 4x^2$

$-18x+14$ $-18x+14$

$0 = 4x^2 - 18x + 14$

$0 = 2(2x^2 - 9x + 7)$

S : -9
P : 14
I : -7, -2

$0 = 2[2x^2 - 7x - 2x + 7]$

$0 = 2[x(2x-7) - 1(2x-7)]$

$0 = 2(2x-7)(x-1)$

$2x - 7 = 0$ $x - 1 = 0$

$2x = 7$ $x = 1$

$x = \frac{7}{2}$

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Assigned Work:

p. 315 # 2, 3, 8abc*, 9abc*