Lesson 6 The Quadratic Formula...again

Example 1
Solve, using the quadratic formula:

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

$2x^2 - 2x + x - 1 = 5x$ change to trinomial form/general form

                              $ax^2 + bx + c = 0$

$2x^2 - x - 1 = 5x$ ← has to be 0

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

    $\underset{a}{\uparrow} \quad \underset{b}{\uparrow} \quad \underset{c}{\uparrow}$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ← quadratic formula

$x = \dfrac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-1)}}{2(2)}$ ← discriminant $b^2 - 4ac$

$x = \dfrac{6 \pm \sqrt{44}}{4}$ ← complex radical ∴ simplify

$x = \dfrac{6 \pm \sqrt{4 \cdot 11}}{4}$

$x = \dfrac{6 \pm 2\sqrt{11}}{4}$ divide each term by 2

$\boxed{x = \dfrac{3 \pm \sqrt{11}}{2}}$

b) $\dfrac{1}{2}x^2 - \dfrac{5}{4}x = 3$ ×4

$2x^2 - 5x = 12$

$2x^2 - 5x - 12 = 0$

   $\underset{a = 2}{\uparrow} \quad \underset{b = -5}{\uparrow} \quad \underset{c = -12}{\uparrow}$

$x = \dfrac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-12)}}{2(2)}$

$x = \dfrac{5 \pm \sqrt{121}}{4}$ ← perfect square.

$x = \dfrac{5 \pm 11}{4}$

← separate into 2 roots

$x = \dfrac{5 + 11}{4}$ $x = \dfrac{5 - 11}{4}$

$\boxed{x = 4}$ $\boxed{x = -\dfrac{3}{2}}$ simplify

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Pre-Calculus 11 Quadratic Equations

Exercise 6 The Quadratic Formula...again

1.) Solve, using the quadratic formula. (follow example 1)
   a.) $(2x - 3)(x + 2) = 3x$
   b.) $(x - 3)(3x + 1) = -7$
   c.) $(4x + 5)(2x + 1) = 9x$
   d.) $-\frac{1}{2}x^2 + 2x + 1 = 0$

   a) $x = \dfrac{1 \pm \sqrt{13}}{2}$

   b) $x = 2 \quad x = \frac{2}{3}$

   c) ϕ

   d) $x = 2 \pm \sqrt{6}$

2.) Word Problem:
   Subtracting a <u>number</u> from half its square gives a result of 11. Determine the number as an exact value.

   $\frac{x}{}$ $\quad \frac{1}{2}x^2$

   $x = \dfrac{2 \pm \sqrt{92}}{2} \qquad x = \dfrac{2 \pm 2\sqrt{23}}{2} \qquad x = 1 \pm \sqrt{23}$

3.) Factor: (follow L1, ex 1)

   a.) $18x - 36xy$
   $18x(1 - 2y)$

   b.) $3x^5y - 12x^2y^3$
   $3x^2y(x^3 - 4y^2)$

   2) $\frac{1}{2}x^2 - x = 11$
   $x^2 - 2x = 22$
   $x^2 - 2x - 22 = 0$

4.) Factor: (follow L1, ex 2)

   a.) $a^4 - 100b^2$
   $(a^2 - 10b)(a^2 + 10b)$

   b.) $4x^2 - 25y^2$
   $(2x - 5y)(2x + 5y)$

   $x = \dfrac{2 \pm \sqrt{92}}{2}$

5.) Factor: (follow L1, ex 4)

   $4x^2 - 13x + 9 \qquad (x - 1)(4x - 9)$

   $x = \dfrac{2 \pm \sqrt{4 \cdot 23}}{2}$

6.) Solve: (follow L3, ex 1)

   $5x^2 + 13x - 6 = 0$

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

   $x = \dfrac{2 \pm 2\sqrt{23}}{2}$

   $x = 1 \pm \sqrt{23}$

Extra Practice: Pg. 218 #7c, d, 11c, d
                   Checkpoint pg. 197