Worksheet #17   **Answers**

1) $x^2 + 8x = -14$
    $x^2 + 8x + 16 = -14 + 16$
       $(x + 4)^2 = 2$
          $x + 4 = \pm\sqrt{2}$
             $x = -4 \pm\sqrt{2}$

2) $4x^2 - 4x = 99$
    $4(x^2 - x) = 99$
       $x^2 - x = \dfrac{99}{4}$
    $x^2 - x + \dfrac{1}{4} = \dfrac{99}{4} + \dfrac{1}{4}$
       $(x - \tfrac{1}{2})^2 = \dfrac{100}{4}$
       $(x - \tfrac{1}{2})^2 = 25$
          $x - \tfrac{1}{2} = \pm 5$
             $x = \tfrac{1}{2} \pm 5$

3) $x^2 - 10x = -22$
    $x^2 - 10x + 25 = -22 + 25$
       $(x - 5)^2 = 3$
          $x - 5 = \pm\sqrt{3}$
             $x = 5 \pm\sqrt{3}$

4) $x^2 + 12x = 0$
    $x^2 + 12x + 36 = 36$
       $(x + 6)^2 = 36$
          $x + 6 = \pm 6$
             $x = \{0, -12\}$

5) $9x^2 - 18x = -3$
    $9(x^2 - 2x) = -3$
       $x^2 - 2x = -\tfrac{1}{3}$
    $x^2 - 2x + 1 = 1 - \tfrac{1}{3}$
       $(x - 1)^2 = \tfrac{2}{3}$
          $x - 1 = \pm\sqrt{\tfrac{2}{3}}$
             $x = 1 \pm\sqrt{\tfrac{2}{3}} = 1 \pm (\sqrt{6})/3$

6) $x^2 + 3x = 1$
    $x^2 + 3x + \dfrac{9}{4} = 1 + \dfrac{9}{4}$
       $(x + \tfrac{3}{2})^2 = \dfrac{4}{4} + \dfrac{9}{4}$
          $x + \tfrac{3}{2} = \pm\sqrt{\dfrac{13}{4}}$
             $x = \dfrac{-3}{2} \pm \dfrac{\sqrt{13}}{2}$

7) $-\sqrt{26 - 11x} = x - 4$
    $26 - 11x = x^2 - 8x + 16$
       $0 = x^2 + 3x - 10$
    $(x + 5)(x - 2) = 0$
       $x = \{-5, 2\}$
    ch: $-\sqrt{26 + 55} + 4 = -5$
       $-\sqrt{81} + 4 = -5$
          $-9 + 4 = -5$
             $-5 = -5$
    $-\sqrt{26 - 22} + 4 = 2$
       $-\sqrt{4} + 4 = 2$
          $-2 + 4 = 2$
             $2 = 2$

8) $|x - 10| = x^2 - 10x$
$x - 10 = x^2 - 10x$ $-x + 10 = x^2 - 10x$
$x^2 - 11x + 10 = 0$ $x^2 - 9x - 10 = 0$
$(x - 10)(x - 1) = 0$ $(x - 10)(x + 1) = 0$
$x = \{10, 1\}$. $x = \{10, -1\}$
    ch: $|10 - 10| = 100 - 100$
          $0 = 0$
       $|1 - 10| = 1 - 10$
          $9 \ne -9$
       $|-1 - 10| = 1 + 10$
          $11 = 11$
          $x = \{10, -1\}$

9) $y = \dfrac{4x + 7}{5}$
    inv: $x = \dfrac{4y + 7}{5}$
       $5x = 4y + 7$
       $5x - 7 = 4y$
    $f^{-1}(x) = \dfrac{5x - 7}{4}$

10) $y = x^3 + 5$ $x - 5 = y^3$
    inv: $x = y^3 + 5$ $f^{-1}(x) = \sqrt[3]{x - 5}$