Algebra II Sem. 1 Review Key on Solving

2016

1. $3(x-5) = 6 - 2(x+1) + x$

   $3x - 15 = 6 - 2x - 2 + x$

   $4x = 19$

   $\boxed{x = \dfrac{19}{4}}$

2. $x^2 - 6x - 72 = 0$

   $(x-12)(x+6) = 0$

   $\boxed{x = -6, 12}$

3. $x^2 + 10 = 0$

   $x^2 = -10$

   $\boxed{x = \pm i\sqrt{10}}$

4. $x^2 = 8$

   $\boxed{x = \pm 2\sqrt{2}}$

5. $x^2 + 2x = 4$

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

   $\boxed{x = -1 \pm \sqrt{5}}$

   $\dfrac{-2 \pm \sqrt{4+16}}{2} = \dfrac{-2 \pm 2\sqrt{5}}{2}$

6. $x^3 - 8 = 0$

   $(x-2)(x^2 + 2x + 4)$

   $\boxed{x = 2, \quad -1 \pm i\sqrt{3}}$

   $\dfrac{-2 \pm \sqrt{4-16}}{2} = \dfrac{-2 \pm 2i\sqrt{3}}{2}$

7. $x^2 + 4x + 15$ $\dfrac{-4 \pm \sqrt{-44}}{2} = \dfrac{-4 \pm 2i\sqrt{11}}{2}$

$\boxed{x = -2 \pm i\sqrt{11}}$

8. $\dfrac{x-4}{3} = \dfrac{2x-5}{2}$

$6x - 15 = 2x - 8$

$4x = 7$

$\boxed{x = \dfrac{7}{4}}$

9. $2(x-3)^2 - 10 = 80$ OR $2(x^2 - 6x + 9) - 10 = 80$

$2(x-3)^2 = 90$ $2x^2 - 12x + 18 - 10 - 80 = 0$

$(x-3)^2 = 45$ $2x^2 - 12x - 72 = 0$

$\boxed{x = 3 \pm 3\sqrt{5}}$ Use Quad Formula

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

$x^2(x+4) - 1(x+4) = 0$

$(x^2 - 1)(x+4) = 0$

$\boxed{x = \pm 1, \ -4}$

11. $12x^3 - 8x^2 - 3x + 2 = 0$

$-\dfrac{1}{2} \Big|\ \ 12 \quad -8 \quad -3 \quad 2$
$\phantom{-\dfrac{1}{2} \Big|\ \ 12 \quad } -6 \quad\ 7 \quad -2$
$\overline{\phantom{-\dfrac{1}{2} \Big|\ \ } 12 \quad -14 \quad 4 \quad\ 0}$

$(x + \tfrac{1}{2})(12x^2 - 14x + 4)$

$(2x + 1)(6x^2 - 7x + 2)$ $\dfrac{7 \pm \sqrt{49 - 48}}{12} = \dfrac{7 \pm 1}{12}$

$\boxed{x = -\tfrac{1}{2}, \ \tfrac{2}{3}, \ \tfrac{1}{2}}$

Algebra II Sem. 1 Review Key on Solving P.2
(2016)

12. $x^3 + 9x^2 + 19x + 10 = 0$

$$-2 \,\vert\, 1 \quad 9 \quad 19 \quad 10$$
$$ -2 \quad -14 \quad -10$$
$$ 1 \quad 7 \quad 5 \quad 0$$

$(x+2)(x^2 + 7x + 5) = 0$

$\boxed{x = -2, \dfrac{-7 \pm \sqrt{29}}{2}}$

$$\dfrac{-7 \pm \sqrt{49-20}}{2} = \dfrac{-7 \pm \sqrt{29}}{2}$$

13. $3x^4 - 10x^3 - 24x^2 - 6x + 5 = 0$

$\dfrac{p}{q}: \pm 1, \pm 5, \pm \frac{1}{3}, \pm \frac{5}{3}$

$$1 \,\vert\, 3 \quad -10 \quad -24 \quad -6 \quad 5$$
$$ \quad 3 \quad -7 \quad -31$$
$$ 3 \quad -7 \quad -31 \quad -37\,x$$

$(x+1)(x+1)(3x^2 - 16x + 5) = 0$

$(x+1)(x+1)(3x-1)(x-5) = 0$

$$\boxed{x = -1 \text{ (mult. of 2)}; \frac{1}{3}, 5}$$

$$\underline{-1} \,\vert\, 3 \quad -10 \quad -24 \quad -6 \quad 5$$
$$ \quad -3 \quad 13 \quad 11 \quad -5$$
$$ 3 \quad -13 \quad -11 \quad 5 \quad 0$$

$$\underline{-1} \,\vert\, 3 \quad -13 \quad -11 \quad 5$$
$$ \quad -3 \quad 16 \quad -5$$
$$ 3 \quad -16 \quad 5 \quad 0$$

14. $2x - 4y = -8$
$3x - y = 12$

$\boxed{(23/5, \; 24/5)}$

$2x - 4y = -8$
$-12x + 4y = -43$
$-10x = -56$
$x = \dfrac{28}{5}$

$y = 3x - 12$
$y = 3\left(\dfrac{28}{5}\right) - 12$
$y = \dfrac{84}{5} - \dfrac{60}{5}$
$y = \dfrac{24}{5}$

15. $x^2 + y^2 = 16$
$y = x$

$x^2 + x^2 = 16$
$2x^2 = 16$
$x^2 = 8$
$x = \pm 2\sqrt{2}$

$y^2 + y^2 = 16$
$2y^2 = 16$
$y = \pm 2\sqrt{2}$

$\boxed{(2\sqrt{2}, \; 2\sqrt{2}) \;\&\; (-2\sqrt{2}, \; -2\sqrt{2})}$

16. $(2x - 3y = 16) 4$

$(5x - 4y = 7) -3$

$\boxed{\left(\dfrac{-43}{7}, \dfrac{-66}{7}\right)}$

$8x - 12y = 64$

$-15x + 12y = -21$

$\overline{-7x = 43}$

$x = \dfrac{-43}{7}$

$2\left(\dfrac{-43}{7}\right) - 3y = 16$

$\dfrac{-86}{7} - 3y = 16$

$-86 - 21y = 112$

$-21y = 198$

$y = \dfrac{198}{-21} = \dfrac{66}{-7}$

17. ① $-4x + 4y + 4z = -16$

② $-2x + 5y + 5z = -14$

③ $-3x - 2y + z = -5$

① $-4x + 4y + 4z = -16$

③ $12x + 8y - 4z = 20$

$\overline{8x + 12y = 4}$

② $-2x + 5y + 5z = -14$

$15x + 10y - 5z = 25$

$\overline{13x + 15y = 11}$

$13 (8x + 12y = 4)$

$-8 (13x + 15y = 11)$

$104x + 166y = 52$

$-104x - 120y = -88$

$\overline{36y = -36}$

$y = -1$

$\boxed{(2, -1, -1)}$

$8x - 12 = 4$

$8x = 16$

$x = 2$

$-8 - 4 + 4z = -16$

$-12 + 4z = -16$

$z = -1$