Algebra 1-2 Key Name_____

Unit 9A Study Guide - Solving Quadratics

Date_____ Period____

Solve each equation by factoring.

1) $x^2 - 10x = -21$

$x^2 - 10x + 21 = 0$

$(x - 7)(x - 3) = 0$

$x - 7 = 0$ $\quad +7 \quad +7$ → $\boxed{x = 7}$

$x - 3 = 0$ $\quad +3 \quad +3$ → $\boxed{x = 3}$

2) $b^2 - 5b - 14 = 0$

$(b - 7)(b + 2) = 0$

$b - 7 = 0$ $\quad +7 \quad +7$ → $\boxed{b = 7}$

$b + 2 = 0$ $\quad -2 \quad -2$ → $\boxed{b = -2}$

3) $v^2 - 2v - 43 = -8$

$v^2 - 2v - 35 = 0$

$(v - 7)(v + 5) = 0$

$v - 7 = 0$ $\quad +7 \quad +7$ → $\boxed{v = 7}$

$v + 5 = 0$ $\quad -5 \quad -5$ → $\boxed{v = -5}$

4) $4m^2 - 19m - 33 = -3$

$+3 \quad +3$

$4m^2 - 19m - 30 = 0$

$m^2 - 19m - 120 = 0$

$(m - 24)(m + 5) = 0$

$\frac{}{4} \quad \frac{}{4}$

$\boxed{m = 6}$ $\quad \boxed{m = -5/4}$

Solve each equation by taking square roots.

5) $6a^2 + 10 = 490$

$-10 \quad -10$

$\frac{6a^2}{6} = \frac{480}{6}$

$\sqrt{a^2} = \sqrt{80}$

$80 = 8 \cdot 10 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5$

$= \pm 4\sqrt{5}$

$\boxed{a = 4\sqrt{5}, -4\sqrt{5}}$

6) $9n^2 + 8 = 89$

$-8 \quad -8$

$\frac{9n^2}{9} = \frac{81}{9}$

$\sqrt{n^2} = \sqrt{9}$

$\boxed{n = \pm 3}$

7) $(x - 2)^2 = 36$

$\sqrt{(x-2)^2} = \sqrt{36}$

$x - 2 = \pm 6$

$x = +6 + 2$ $\quad = 8$

$x = -6 + 2$ $\quad = -4$

$\boxed{x = 8, -4}$

8) $\frac{2(x+4)^2}{2} = \frac{40}{2}$

$\sqrt{(x+4)^2} = \sqrt{20}$ $\quad 20 = 4 \cdot 5$ $\quad \sqrt{4} \cdot \sqrt{5}$

$x + 4 = \pm 2\sqrt{5}$

$\boxed{x = -4 + 2\sqrt{5}, -4 - 2\sqrt{5}}$

Solve each equation by completing the square.

9) $p^2 - 6p - 55 = 10$

$+55 \quad +55$

$p^2 - 6p + (9) = 65 + (9)$

$\left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

$\sqrt{(p-3)^2} = \sqrt{74}$ $\quad 74 = 2 \cdot 37$

$p - 3 = \pm\sqrt{74}$

$+3 \quad +3$

$\boxed{p = 3 \pm \sqrt{74}}$

10) $x^2 + 4x - 20 = -8$

$+20 \quad +20$

$x^2 + 4x + (4) = 12 + (4)$

$\left(\frac{4}{2}\right)^2 = (2)^2 = 4$

$\sqrt{(x+2)^2} = \sqrt{16}$

$x + 2 = 4$ or -4

$-2 \quad -2$

$\boxed{x = 2, \; x = -6}$

11) $p^2 - 2p - 11 = 6$

$p^2 - 2p + 1 = 17 + 1$

$\left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$

$\sqrt{(p-1)^2} = \sqrt{18} < \frac{9}{2} < \frac{3}{3}$

$p - 1 = \pm 3\sqrt{2}$

$+1 \quad +1$

$p = 1 \pm 3\sqrt{2}$

Solve each equation with the quadratic formula.

12) $x^2 + 12x - 26 = 2$

$x^2 + 12x - 28 = 0$

A B C

$x = \frac{-(12) \pm \sqrt{12^2 - 4(1)(-28)}}{2(1)}$

$= \frac{-12 \pm \sqrt{144 + 112}}{2}$

$= \frac{-12 \pm \sqrt{256}}{2}$

$= \frac{-12 \pm 16}{2}$

$x = 2, -14$

13) $-5p^2 + 11p + 3 = 7$

$-5p^2 + 11p - 4 = 0$

A B C

$x = \frac{-(11) \pm \sqrt{11^2 - 4(-5)(-4)}}{2(-5)}$

$= \frac{-11 \pm \sqrt{121 - 80}}{-10}$

$= \frac{-11 \pm \sqrt{41}}{-10}$

$x = \frac{11 - \sqrt{41}}{10}, \frac{11 + \sqrt{41}}{10}$

14) $3n^2 - 12n - 12 = -8$

$3n^2 - 12n - 4 = 0$

A B C

$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(3)(-4)}}{2(3)}$

$= \frac{12 \pm \sqrt{144 + 48}}{6}$

$= \frac{12 \pm \sqrt{192}}{6}$

192 = 2 · 96 = 2 · 2 · 48 = 2 · 2 · 6 · 8 = 2 · 2 · 3 · 2 · 4 = 2 · 2 · 2 · 2 · 3

$x = \frac{12 \pm 8\sqrt{3}}{6}$

$x = 2 \pm \frac{4\sqrt{3}}{3}$

Solve the word problem.

15) You are extending your rectangular backyard by x feet on both sides. The current length of the backyard is 14 feet and the current width is 10 feet. If you want the new, larger backyard to have an area of 320 square feet, how many feet did you add to both sides?

$14 + x$

$A = 320 ft^2$

$10 + x$

$A = L \cdot w$

$320 = (14 + x)(10 + x)$

$320 = 140 + 14x + 10x + x^2$

$320 = 140 + 24x + x^2$

$-320 \quad -320$

$0 = x^2 + 24x - 180$

$0 = (x + 30)(x - 6)$

$x = -30 \quad x = 6$

You added 6 ft to both sides

16) The volume of a cubed container is 150 cubic inches. If the width is half the length, and the height is 4 inches, what is the approximate length of the container (round to the nearest hunderdth place).

$V = L \cdot w \cdot h$

$150 = L \cdot \frac{1}{2}L \cdot 4$

$\frac{150}{2} = \frac{2}{2}L^2$

$\sqrt{75} = \sqrt{L^2}$

75 = 25 · 3 = 5 · 5 · 3

$L = +5\sqrt{3}$

$L = -5\sqrt{3}$

≈ 8.66 in