

Honors Algebra 2
Solving Quadratics by Completing the Square

Name: key
Date: _____ Period: _____

Solve each Quadratic by Completing the Square. Provide answer in simplified radical form, if possible.

1.) $x^2 + 6x - 10 = 0$

$$x^2 + 6x = 10$$

$$x^2 + 6x + 9 = 10 + 9$$

$$x^2 + 6x + 9 = 19$$

$$(x+3)^2 = 19$$

$$\sqrt{(x+3)^2} = \sqrt{19}$$

$$\boxed{x+3 = \pm \sqrt{19}}$$

2.) $p^2 - 10p + 17 = 0$

$$p^2 - 10p = -17$$

$$p^2 - 10p + 25 = -17 + 25$$

$$p^2 - 10p + 25 = 8$$

$$(p-5)^2 = 8$$

$$\sqrt{(p-5)^2} = \sqrt{8}$$

$$p-5 = \pm 2\sqrt{2}$$

$$\boxed{p = 5 \pm 2\sqrt{2}}$$

3.) $m^2 - 12m + 3 = 8m + 15$

$$m^2 - 20m = 12$$

$$m^2 - 20m + 100 = 12 + 100$$

$$m^2 - 20m + 100 = 112$$

$$(m-10)^2 = 112$$

$$\sqrt{(m-10)^2} = \sqrt{112}$$

$$m-10 = \pm 4\sqrt{7}$$

$$\boxed{m = 10 \pm 4\sqrt{7}}$$

4.) $k^2 - 8k = 20 - 2k$

$$k^2 - 6k = 20$$

$$k^2 - 6k + 9 = 20 + 9$$

$$k^2 - 6k + 9 = 29$$

$$(k-3)^2 = 29$$

$$\sqrt{(k-3)^2} = \sqrt{29}$$

$$k-3 = \pm \sqrt{29}$$

$$\boxed{k = 3 \pm \sqrt{29}}$$

5.) $n^2 + 6n - 10 = 2n - 2$

$$n^2 + 4n = 8$$

$$n^2 + 4n + 4 = 8 + 4$$

$$n^2 + 4n + 4 = 12$$

$$(n+2)^2 = 12$$

$$\sqrt{(n+2)^2} = \sqrt{12}$$

$$n+2 = \pm 2\sqrt{3}$$

$$\boxed{n = -2 \pm 2\sqrt{3}}$$

6.) $x^2 - 6x + 18 = 29$

$$x^2 - 6x = 11$$

$$x^2 - 6x + 9 = 11 + 9$$

$$x^2 - 6x + 9 = 20$$

$$(x-3)^2 = 20$$

$$\sqrt{(x-3)^2} = \sqrt{20}$$

$$x-3 = \pm 2\sqrt{5}$$

$$\boxed{x = 3 \pm 2\sqrt{5}}$$

Solve each quadratic. Provide answers in simplified radical form if necessary. Choose most appropriate method.

7.) $n^2 + 8n = -20$

$$n^2 + 8n + 16 = -20 + 16$$

$$n^2 + 8n + 16 = -4$$

$$(n+4)^2 = -4$$

$$\sqrt{(n+4)^2} = \sqrt{-4}$$

$$n+4 = \pm 2i$$

$$\boxed{n = -4 \pm 2i}$$

8.) $-4k^2 - 8k - 3 = -3 - 5k^2$

$$k^2 - 8k = 0$$

$$k(k-8) = 0$$

$$\boxed{k=0}$$

$$\boxed{k=8}$$

9.) $3r^2 + 7 = -17$

$$3r^2 = -24$$

$$r^2 = -8$$

$$\sqrt{r^2} = \sqrt{-8}$$

$$\boxed{r = 2i\sqrt{2}}$$

10.) $5r^2 - 44r + 120 = -30 + 11r$

$$5r^2 - 55r + 150 = 0$$

$$5(r^2 - 11r + 30) = 0$$

$$5(r-6)(r-5) = 0$$

$$r-6=0$$

$$\boxed{r=6}$$

$$r-5=0$$

$$\boxed{r=5}$$

11.) $2(c+3)^2 - 13 = -53$

$$2(c+3)^2 = -40$$

$$(c+3)^2 = -20$$

$$\sqrt{(c+3)^2} = \sqrt{-20}$$

$$c+3 = \pm 2i\sqrt{5}$$

$$\boxed{c = -3 \pm 2i\sqrt{5}}$$

12.) $7x^2 + 2x = 0$

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

$$\boxed{x=0}$$

$$7x+2=0$$

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

13.) $15 - 3(a-4)^2 = 27$

$$-3(a-4)^2 = 12$$

$$(a-4)^2 = -4$$

$$\sqrt{(a-4)^2} = \sqrt{-4}$$

$$a-4 = \pm 2i$$

$$\boxed{a = 4 \pm 2i}$$

14.) $6n^2 - 18n - 18 = 6$

$$6n^2 - 18n - 24 = 0$$

$$6(n^2 - 3n - 4) = 0$$

$$6(n-4)(n+1) = 0$$

$$n-4=0 \quad n+1=0$$

$$\boxed{n=4}$$

$$\boxed{n=-1}$$

0	+6
-4	-3
-4	1