 Name_____

Solving Quadratic Equations By Completing the Square Date_____ Period____

Solve each equation by completing the square.

1) $p^2 + 14p - 38 = 0$

$\{-7 + \sqrt{87}, -7 - \sqrt{87}\}$

2) $v^2 + 6v - 59 = 0$

$\{-3 + 2\sqrt{17}, -3 - 2\sqrt{17}\}$

3) $a^2 + 14a - 51 = 0$

$\{3, -17\}$

4) $x^2 - 12x + 11 = 0$

$\{11, 1\}$

5) $x^2 + 6x + 8 = 0$

$\{-2, -4\}$

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

$\{3, -1\}$

7) $x^2 + 14x - 15 = 0$

$\{1, -15\}$

8) $k^2 - 12k + 23 = 0$

$\{6 + \sqrt{13}, 6 - \sqrt{13}\}$

9) $r^2 - 4r - 91 = 7$

$\{2 + \sqrt{102}, 2 - \sqrt{102}\}$

10) $x^2 - 10x + 26 = 8$

$\{5 + \sqrt{7}, 5 - \sqrt{7}\}$

11) $k^2 - 4k + 1 = -5$

$\{2 + i\sqrt{2}, 2 - i\sqrt{2}\}$

12) $b^2 + 2b = -20$

$\{-1 + i\sqrt{19}, -1 - i\sqrt{19}\}$

13) $v^2 - 6v = -91$

$\{3 + i\sqrt{82}, 3 - i\sqrt{82}\}$

14) $n^2 = 18n + 40$

$\{20, -2\}$

15) $5k^2 = 60 - 20k$

$\{2, -6\}$

16) $6x^2 - 48 = -12x$

$\{2, -4\}$

17) $8x^2 + 16x = 42$

$\left\{\frac{3}{2}, -\frac{7}{2}\right\}$

18) $9n^2 + 79 = -18n$

$\left\{\frac{-3 + i\sqrt{70}}{3}, \frac{-3 - i\sqrt{70}}{3}\right\}$

19) $2a^2 = -6 + 8a$

$\{3, 1\}$

20) $2x^2 - 5x + 67 = 0$

$\left\{\frac{5 + i\sqrt{511}}{4}, \frac{5 - i\sqrt{511}}{4}\right\}$

21) $4n^2 + 4n + 36 = 0$

$\left\{\frac{-1 + i\sqrt{35}}{2}, \frac{-1 - i\sqrt{35}}{2}\right\}$

22) $7k^2 - 16k + 100 = 0$

$\left\{\frac{8 + 2i\sqrt{159}}{7}, \frac{8 - 2i\sqrt{159}}{7}\right\}$

23) $10p^2 + 4p + 77 = 9$

$\left\{\frac{-1 + 13i}{5}, \frac{-1 - 13i}{5}\right\}$

24) $3x^2 = -4 + 8x$

$\left\{2, \frac{2}{3}\right\}$

Name_____

Using the Quadratic Formula

Date_____ Period____

Solve each equation with the quadratic formula.

1) $v^2 + 2v - 8 = 0$

$\{2, -4\}$

2) $k^2 + 5k - 6 = 0$

$\{1, -6\}$

3) $2v^2 - 5v + 3 = 0$

$\left\{\frac{3}{2}, 1\right\}$

4) $2a^2 - a - 13 = 2$

$\left\{3, -\frac{5}{2}\right\}$

5) $2n^2 - n - 4 = 2$

$\left\{2, -\frac{3}{2}\right\}$

6) $b^2 - 4b - 14 = -2$

$\{6, -2\}$

7) $8n^2 - 4n = 18$

$\left\{\frac{1+\sqrt{37}}{4}, \frac{1-\sqrt{37}}{4}\right\}$

8) $8a^2 + 6a = -5$

$\left\{\frac{-3+i\sqrt{31}}{8}, \frac{-3-i\sqrt{31}}{8}\right\}$

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

$\left\{\frac{1+i\sqrt{359}}{20}, \frac{1-i\sqrt{359}}{20}\right\}$

10) $n^2 = 9n - 20$

$\{5, 4\}$

11) $3a^2 = 6a - 3$

$\{1\}$

12) $x^2 = -3x + 40$

$\{5, -8\}$

13) $9x^2 - 11 = 6x$

$\left\{\frac{1+2\sqrt{3}}{3}, \frac{1-2\sqrt{3}}{3}\right\}$

14) $4a^2 - 8 = a$

$\left\{\frac{1+\sqrt{129}}{8}, \frac{1-\sqrt{129}}{8}\right\}$

15) $14m^2 + 1 = 6m^2 + 7m$

$\left\{\frac{7+\sqrt{17}}{16}, \frac{7-\sqrt{17}}{16}\right\}$

16) $4x^2 + 4x - 8 = 1$

$\left\{\frac{-1+\sqrt{10}}{2}, \frac{-1-\sqrt{10}}{2}\right\}$

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Understanding the Discriminant

Date_____ Period____

Find the value of the discriminant of each quadratic equation.

1) $6p^2 - 2p - 3 = 0$

76

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

−7

3) $-4m^2 - 4m + 5 = 0$

96

4) $5b^2 + b - 2 = 0$

41

5) $r^2 + 5r + 2 = 0$

17

6) $2p^2 + 5p - 4 = 0$

57

Find the discriminant of each quadratic equation then state the numberof real and imaginary solutions.

7) $9n^2 - 3n - 8 = -10$

−63; two imaginary solutions

8) $-2x^2 - 8x - 14 = -6$

0; one real solution

9) $9m^2 + 6m + 6 = 5$

0; one real solution

10) $4a^2 = 8a - 4$

0; one real solution

11) $-9b^2 = -8b + 8$

−224; two imaginary solutions

12) $-x^2 - 9 = 6x$

0; one real solution

13) $-4r^2 - 4r = 6$

−80; two imaginary solutions

14) $8b^2 - 6b + 3 = 5b^2$

0; one real solution

Find the discriminant then state the number of rational, irrational, and imaginary solutions.

15) $-6x^2 - 6 = -7x - 9$

121; two rational solutions

16) $4k^2 + 5k + 4 = -3k$

0; one rational solution

17) $-7n^2 + 16n = 8n$

64; two rational solutions

18) $2x^2 = 10x + 5$

140; two irrational solutions

19) $-10n^2 - 3n - 9 = -2n$

−359; two imaginary solutions

20) $-9r^2 - 8r - 1 = r - r^2 - 9$

337; two irrational solutions

21) $-3p^2 + 10p + 5 = -8p^2$

0; one rational solution

22) $m^2 + 5m = 2m^2$

25; two rational solutions

Critical thinking questions:

23) Write a quadratic equation that has two imaginary solutions.

Many answers. Ex: $x^2 + x + 1 = 0$

24) In your own words explain why a quadratic equation can't have one imaginary solution.

Answers vary.