Name_____ Date_____

8A; Algebra 1 Period_____

Extra Review for Quad II Test

I. Find the value of c that completes the square

1) $x^2 + 6x + c$

2) $z^2 - 10z + c$

3) $r^2 + 32r + c$

4) $r^2 + 20r + c$

II Solve the following by completing the square

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

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

3) $x^2 = 6x + 9$

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

5) $n^2 - 10n = -33$

6) $a^2 = 2a - 1$

7) $m^2 + 4m + 6 = 8$

8) $n^2 - 8n - 8 = -8$

III. Solve the following using the Quadratic Formula

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

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

IV. Find the discriminant of each quadratic equation and then describe the nature of the roots.

1) $-4r^2 - 4r = 6$

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

3) $-6x^2 - 6 = -7x - 9$

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

Name Key

8A; Algebra 1

Date_____

Period_____

Extra Review for Quad II Test

I. Find the value of c that completes the square

1) $x^2 + 6x + c$

$b=6$

$x^2+6x+\left(\frac{b}{2}\right)^2$

$x^2+6x+\left(\frac{6}{2}\right)^2$

x^2+6x+9

$c=9$

2) $z^2 - 10z + c$

$b=-10$

$z^2-10z+\left(\frac{b}{2}\right)^2$

$z^2-10z+\left(\frac{-10}{2}\right)^2$

$z^2-10z+25$

$c=25$

3) $r^2 + 32r + c$

$b=32$

$r^2+32r+\left(\frac{b}{2}\right)^2$

$r^2+32r+\left(\frac{32}{2}\right)^2$

$r^2+32r+256$

$c=256$

4) $r^2 + 20r + c$

$b=20$

$r^2+20r+\left(\frac{b}{2}\right)^2$

$r^2+20r+\left(\frac{20}{2}\right)^2$

$r^2+20r+100$

$c=100$

II Solve the following by completing the square → must be = to Constant

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

$+51 \quad +51$

$b=14$

$a^2+14a=51$

$a^2+14a+\left(\frac{b}{2}\right)^2=51+\left(\frac{b}{2}\right)^2$

$a^2+14a+\left(\frac{14}{2}\right)^2=51+\left(\frac{14}{2}\right)^2$

$a^2+14a+49=51+49$

$a^2+14a+49=100$

$\sqrt{(a+7)^2}=\sqrt{100}$

$a+7=\pm 10$

$a+7=10 \quad | \quad a+7=-10$

$-7 \quad -7 \quad | \quad -7 \quad -7$

$a=3 \quad | \quad a=-17$

$\{-17, 3\}$

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

$-11 \quad -11$

$b=-12$

$x^2-12x=-11$

$x^2-12x+\left(\frac{b}{2}\right)^2=-11+\left(\frac{b}{2}\right)^2$

$x^2-12x+\left(\frac{-12}{2}\right)^2=-11+\left(\frac{-12}{2}\right)^2$

$x^2-12x+36=-11+36$

$x^2-12x+36=25$

$\sqrt{(x-6)^2}=\sqrt{25}$

$x-6=\pm 5$

$x-6=5 \quad | \quad x-6=-5$

$+6 \quad +6 \quad | \quad +6 \quad +6$

$x=11 \quad | \quad x=1$

$\{1, 11\}$

3) $x^2 = 6x + 9$

$-6x \quad -6x$

$b=-6$

$x^2-6x=9$

$x^2-6x+\left(\frac{b}{2}\right)^2=9+\left(\frac{b}{2}\right)^2$

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

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

$x^2-6x+9=18$

$\sqrt{(x-3)^2}=\sqrt{18}$

$\sqrt{18}=\sqrt{9}\sqrt{2}$

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

$x-3=3\sqrt{2} \quad | \quad x-3=-3\sqrt{2}$

$+3 \quad +3 \quad | \quad +3 \quad +3$

$x=3+3\sqrt{2} \quad | \quad x=3-3\sqrt{2}$

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

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

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

$+3 \quad +3$

$b=-2$

$n^2-2n=3$

$n^2-2n+\left(\frac{b}{2}\right)^2=3+\left(\frac{b}{2}\right)^2$

$n^2-2n+\left(\frac{-2}{2}\right)^2=3+\left(\frac{-2}{2}\right)^2$

$n^2-2n+1=3+1$

$n^2-2n+1=4$

$\sqrt{(n-1)^2}=\sqrt{4}$

$n-1=\pm 2$

$n-1=2 \quad | \quad n-1=-2$

$+1 \quad +1 \quad | \quad +1 \quad +1$

$n=3 \quad | \quad n=-1$

$\{-1, 3\}$

5) $n^2 - 10n = -33$

$b=-10$

$n^2-10n+\left(\frac{b}{2}\right)^2=-33+\left(\frac{b}{2}\right)^2$

$n^2-10n+\left(\frac{-10}{2}\right)^2=-33+\left(\frac{-10}{2}\right)^2$

$n^2-10n+25=-33+25$

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

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

$n-5=\pm\sqrt{-8}$ ← No negative radicands!

$n-5=\sqrt{-8} \quad | \quad n-5=-\sqrt{-8}$

$+5 \quad +5 \quad | \quad +5 \quad +5$

$n=5+\sqrt{-8} \quad | \quad n=5-\sqrt{-8}$

or (can't simplify)

$n=5\pm\sqrt{-8}$

or

$\{5+\sqrt{-8},\ 5-\sqrt{-8}\}$

NO Real roots B/c it is imaginary

6) $a^2 = 2a - 1$

$-2a \quad -2a$

$b=-2$

$a^2-2a=-1$

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

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

$a^2-2a+1=-1+1$

$a^2-2a+1=0$

$\sqrt{(a-1)^2}=\sqrt{0}$

$a-1=0$

$a-1=0$

$+1 \quad +1$

$a=1$

$\{1\}$

$a-1=0$ ← NO 1 B/c 0 is neutral only 1 equation

7) $m^2 + 4m + 6 = 8$

$-6 \quad -6$

$m^2 + 4m = 2$

$b = 4$

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

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

$m^2 + 4m + 4 = 2 + 4$

$m^2 + 4m + 4 = 6$

$\sqrt{(m+2)^2} = \sqrt{6}$

$m + 2 = \pm\sqrt{6}$

$m + 2 = \sqrt{6} \quad | \quad m + 2 = -\sqrt{6}$

$-2 \quad -2 \quad | \quad -2 \quad -2$

$m = -2 + \sqrt{6} \quad | \quad x = -2 - \sqrt{6}$

$m = -2 \pm \sqrt{6}$

$\{-2 + \sqrt{6}, -2 - \sqrt{6}\}$

8) $n^2 - 8n - 8 = -8$

$+8 \quad +8$

$b = -8$

$n^2 - 8n = 0$

$n^2 - 8n + \left(\frac{b}{2}\right)^2 = 0 + \left(\frac{b}{2}\right)^2$

$n^2 - 8n + \left(\frac{-8}{2}\right)^2 = 0 + \left(\frac{-8}{2}\right)^2$

$n^2 - 8n + 16 = 0 + 16$

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

$\sqrt{(n-4)^2} = \sqrt{16}$

$n - 4 = \pm 4$

$n - 4 = 4 \quad | \quad n - 4 = -4$

$+4 \quad +4 \quad | \quad +4 \quad +4$

$n = 8 \quad | \quad n = 0$

$\{0, 8\}$

III. Solve the following using the Quadratic Formula must be $= 0$

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

$-8 \quad -8$

$x^2 - 10x + 18 = 0$

$a = 1 \quad b = -10 \quad c = 18$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(18)}}{2(1)}$

$x = \frac{10 \pm \sqrt{100 - 4(1)(18)}}{2(1)}$

$x = \frac{10 \pm \sqrt{100 - 72}}{2}$

$x = \frac{10 \pm \sqrt{28}}{2}$

$\sqrt{28}$

$\sqrt{4}\sqrt{7}$

$2\sqrt{7}$

$x = \frac{10 \pm 2\sqrt{7}}{2}$

2 real rational roots

$x = \frac{10 + 2\sqrt{7}}{2} \quad | \quad x = \frac{10 - 2\sqrt{7}}{2}$

$x = \frac{5 + 1\sqrt{7}}{1} \quad | \quad x = \frac{5 - 1\sqrt{7}}{1}$

$x = 5 + \sqrt{7} \quad | \quad x = 5 - \sqrt{7}$

$x = 5 \pm \sqrt{7}$

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

$-8x \quad +4 \quad +4 \quad -8x$

$3x^2 - 8x + 4 = 0$

$a = 3 \quad b = -8 \quad c = 4$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(3)(4)}}{2(3)}$

$x = \frac{8 \pm \sqrt{64 - 4(3)(4)}}{2(3)}$

$x = \frac{8 \pm \sqrt{64 - 48}}{6}$

$x = \frac{8 \pm \sqrt{16}}{6}$

2 real rational roots

$x = \frac{8 \pm 4}{6}$

$x = \frac{8 + 4}{6} \quad | \quad x = \frac{8 - 4}{6}$

$x = \frac{12}{6} \quad | \quad x = \frac{4}{6}$

$x = 2 \quad | \quad x = \frac{2}{3}$

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

IV. Find the discriminant of each quadratic equation and then describe the nature of the roots. must be $= 0$

1) $-4r^2 - 4r = 6$ (NW $-x^2$)

$+4r^2 \quad +4r \quad +4r^2 \quad +4r$

$4r^2 + 4r + 6 = 0$

$a = 4 \quad b = 4 \quad c = 6$

$b^2 - 4ac$

$(4)^2 - 4(4)(6)$

$16 - 4(4)(6)$

$16 - 96$

-80

2 complex roots or 2 imaginary solutions/roots

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

$-5b^2 \quad -5b^2$

$3b^2 - 6b + 3 = 0$

$a = 3 \quad b = -6 \quad c = 3$

$b^2 - 4ac$

$(-6)^2 - 4(3)(3)$

$36 - 4(3)(3)$

$36 - 36$

0 → perfect square

1 real rational solution/Root

3) $-6x^2 - 6 = -7x - 9$ (NW $-x^2$)

$+6x^2 \quad +6 \quad +6x^2 \quad +6$

$6x^2 - 7x - 3 = 0$

$a = 6 \quad b = -7 \quad c = -3$

$b^2 - 4ac$

$(-7)^2 - 4(6)(-3)$

$49 - 4(6)(-3)$

$49 + 72$

121 → perfect square

2 real rational solutions/roots

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

$+3k \quad +3k$

$k^2 + 8k + 4 = 0$

$a = 1 \quad b = 8 \quad c = 4$

$b^2 - 4ac$

$(8)^2 - 4(1)(4)$

$64 - 4(1)(4)$

$64 - 16$

48 → NON-perfect square

2 real irrational solutions/roots