Name key Date_____ Hour_____

Section 5.6 - the quadratic formula and the discriminant
Algebra 2 Trig G

Standard Form of a Quadratic Equation – $\boxed{ax^2+bx+c=0}$

The Discriminant – $\boxed{d=b^2-4ac}$

If the discriminant is POSITIVE, then there are 2 real roots

If the discriminant is ZERO, then there is 1 root

If the discriminant is NEGATIVE, then there are 2 complex roots (imaginary)

Find the value of the discriminant for each quadratic equation, and describe the solutions:

1) $x^2-11x+10=0$

$a=1, b=-11, c=10$

$(-11)^2-4(1)(10)$

$121-40$ 81

2 real roots

2) $x^2+8x+16=0$

$a=1, b=8, c=16$

$(8)^2-4(1)(16)$

$64-64$ 0

1 real root

3) $x^2+3x+1=0$

$(3)^2-4(1)(1)$

$9-4$ 5

2 real roots

4) $x^2+2x+7=0$

$(2)^2-4(1)(7)$

$4-28$ -24

2 complex roots

The Quadratic Equation – $\boxed{x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}}$

Solving quadratic equations using the quadratic equation:

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

$(4)^2-4(1)(-12)$

$16+48$

$\boxed{64}$

2 real solutions

$\dfrac{-4\pm\sqrt{64}}{2(1)}=\dfrac{-4\pm8}{2}$ → $\dfrac{-4+8}{2}=2$; $\dfrac{-4-8}{2}=-6$

6) $x^2+3x+1=0$

$(3)^2-4(1)(1)$

$9-4$

$\boxed{5}$ 2 real solutions

$\frac{-3\pm\sqrt{5}}{2(1)} = \frac{-3\pm\sqrt{5}}{2}$

7) $x^2-34x=-289$

$(-34)^2-4(1)(289)$

$1156-1156$

$\boxed{0}$ 1 real solution

$\frac{34\pm\sqrt{0}}{2(1)} = \frac{34}{2} = 17$

8) $x^2+13=6x$

$(-6)^2-4(1)(13)$

$36-52$

$\boxed{-16}$ 2 imaginary solutions

$\frac{6\pm\sqrt{-16}}{2(1)} = \frac{6\pm 4i}{2} = 3\pm 2i$

Try one on your own!

9) $x^2-4x=-5$

$(-4)^2-4(1)(5)$

$16-20$

$\boxed{-4}$ 2 imaginary solutions

$\frac{4\pm\sqrt{-4}}{2(1)} = \frac{4\pm 2i}{2} = 2\pm i$