Name: _____ Date: _____

1. Define Rational number and give an example.

Any # that can be written   Ex: $5, -7, 3.1, 4.7, \frac{15}{4}$
as a ratio of 2 integers

2. Define irrational number and give an example.

Any # that can NOT be written   Ex: $\pi, \sqrt{31}, \sqrt[3]{20}, \frac{6\pi}{5}$
as a ratio of 2 integers

3. Decide if each of the following is rational, irrational, or imaginary.

a) $\sqrt{-4}$	b) $\sqrt{25}$	c) $\sqrt{68}$	d) $\sqrt{-12}$	e) $\sqrt{32}$
im.	Q	Q'	im	Q'

For the following problems, find the discriminant, then check the appropriate column. (You may do the work on the back or on your own paper. (next pages)

#	Function	Discriminant	2 rational real solutions	2 irrational real solutions	1 repeated real solution	2 complex solutions
4	$f(x) = x^2 + 5x + 4$	9	X			
5	$g(x) = x^2 + 10x + 25$	0			X	
6	$h(d) = d^2 - 3d - 2$	17		X		
7	$v(t) = -3t^2 + 5t - 2$	1	X			
8	$s(t) = -2t^2 + 4t - 3$	-8				X
9	$j(x) = 4x^2 - 12x + 9$	0			X	
10	$v(x) = 2x^2 - 9x + 13$	-23				X
11	$p(m) = 6m^2 - 11m - 21$	625	X			
12	$d(x) = \frac{1}{2}x^2 + 3x + 8$	-7				X
13	$r(t) = -t^2 - 4t$	20		X		

HW #67

discriminant $b^2 - 4ac$

④ $a=1$ $\quad$ $5^2 - 4(1)(4)$ $\quad$ $9 > 0$ so [real]
$b=5$ $\qquad$ $25 - 16$ $\qquad$ 9 is a perfect sq. so [rational]
$c=4$ $\qquad$ 9

⑤ $a=1$ $\qquad$ $10^2 - 4(1)(25)$ $\qquad$ $0 = 0$ so [repeated]
$b=10$ $\qquad$ $100 - 100$
$c=25$ $\qquad$ 0

⑥ $a=1$ $\qquad$ $(-3)^2 - 4(1)(-2)$ $\qquad$ $17 > 0$ so [real]
$b=-3$ $\qquad$ $9 + 8$ $\qquad$ 17 is not a prft sq. so [irrational]
$c=-2$ $\qquad$ 17

⑦ $a=-3$ $\qquad$ $5^2 - 4(-3)(-2)$ $\qquad$ $1 > 0$ so [real]
$b=5$ $\qquad$ $25 - 24$ $\qquad$ 1 is a prft sq so [rational]
$c=-2$ $\qquad$ 1

⑧ $a=-2$ $\qquad$ $4^2 - 4(-2)(-3)$ $\qquad$ $-8 < 0$ so imaginary
$b=4$ $\qquad$ $16 - 24$
$c=-3$ $\qquad$ -8

⑨ $a=4$ $\qquad$ $(-12)^2 - 4(4)(9)$ $\qquad$ $0 = 0$ so [repeated]
$b=-12$ $\qquad$ $144 - 144$
$c=9$ $\qquad$ 0

⑩ $a=2$ $\qquad$ $(-9)^2 - 4(2)(13)$ $\qquad$ $-23 < 0$ so [complex]
$b=-9$ $\qquad$ $81 - 104$
$c=13$ $\qquad$ -23

⑪ $a = 6$ $(-11)^2 - 4(6)(-21)$ $625 > 0$ so (real)

$b = -11$ $121 + 504$ 625 is a prft sq so (Rational)

$c = -21$ 625

⑫ $a = \frac{1}{2}$ $3^2 - 4(\frac{1}{2})(8)$ $-7 < 0$ so (complex)

$b = 3$ $9 - 16$

$c = 8$ -7

⑬ $a = -1$ $(-4)^2 - 4(-1)(0)$ $20 > 0$ so (real)

$b = -4$ $16 + 4$ 20 is not a prft sq. so (irrat)

$c = 0$ 20