real: $b^2-4ac \geq 0$
imaginary: $b^2-4ac < 0$
equal: $b^2-4ac = 0$

Name Schlansky
Mr. Schlansky

Date
Pre-Calculus

Using the Nature of the Roots

1. For what values of k is the roots of $kx^2 - 4x + 2 = 0$ real? ≥ 0

$b^2-4ac \geq 0$
$(-4)^2-4(k)(2) \geq 0$
$16-8k \geq 0$
$+8k \quad +8k$

$\frac{16}{8} \geq \frac{8k}{8}$
$2 \geq k$
$\boxed{k \leq 2}$

2. For what value of k are the roots of $x^2 - 3x + k = 0$ equal? $=0$

$b^2-4ac=0$
$(-3)^2-4(1)(k)=0$
$9-4k=0$
$+4k \quad +4k$

$\frac{9}{4}=\frac{4k}{4}$
$\frac{9}{4}=k$

3. For what values of k are the roots of $kx^2 - 4x + 7 = 0$ imaginary? <0

$b^2-4ac<0$
$(-4)^2-4(k)(7)<0$
$16-28k<0$
$-16 \quad\quad -16$

$\frac{-28k}{-28} < \frac{-16}{-28}$
$k > \frac{4}{7}$

4. For what value of k are the roots of $y = x^2 + 10x + k = 0$ equal? $=0$

$b^2-4ac=0$
$(10)^2-4(1)(k)=0$
$100-4k=0$
$-100 \quad\quad -100$

$\frac{-4k}{-4}=\frac{-100}{-4}$
$k=25$

5. For what values of k are the roots of $x^2 + 5x + k = 0$ are real? ≥ 0

$b^2-4ac \geq 0$

$(5)^2-4(1)(k) \geq 0$

$25-4k \geq 0$

$-25 \qquad -25$

$-4k \geq -25$

$\frac{-4k}{-4} \quad \frac{-25}{-4}$

$k \leq \frac{25}{4}$

6. For what value of k are the roots of $-2x^2 + kx - 6 = 0$ imaginary? <0

1) 7 2) -7 3) 3.5 4) 9

$b^2-4ac < 0$

$(k)^2-4(-2)(-6) < 0$

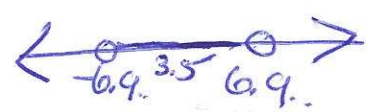
$k^2-48 < 0$

$+48 \quad +48$

$\sqrt{k^2} = \sqrt{48}$

$k = \pm 6.9\ldots$

convergent



7. The roots of $x^2 + kx + 7 = 0$ are real when k is equal to: ≥ 0

1) 1 2) -4 3) 10 4) -5

$b^2-4ac \geq 0$

$(+k)^2-4(1)(7) \geq 0$

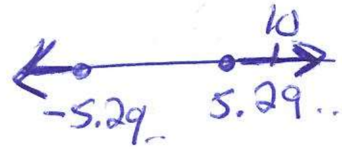
$k^2-28 \geq 0$

$+28 \quad +28$

$\sqrt{k^2} = \sqrt{28}$

$k = \pm 5.29\ldots$

divergent



8. The roots of $x^2 + bx + 8 = 0$ are imaginary when b is equal to: <0

1) -6 2) 1 3) 6 4) 10

$b^2-4ac < 0$

$b^2-4(1)(8) < 0$

$b^2-32 < 0$

$+32 \quad +32$

$\sqrt{b^2} = \sqrt{32}$

$b = \pm 5.65\ldots$

convergent