Name: Key

Date: 12/11/17

CC ALGEBRA 2

TROICI

LESSON #7: DISCRIMINANT (DAY 2)

Do Now:

1) The roots of the equation $4x^2 + 14x = 0$ are (1) real, rational, and equal (2) real, rational, and unequal (3) real, irrational, and unequal (4) imaginary $a=4$ $b=14$ $c=0$ b^2-4ac $(14)^2-4(4)(0)$	2) Which statement must be true if a parabola represented by the equation $y=ax^2+bx+c$ does *not* intersect the *x*-axis? (1) $b^2-4ac=0$ (2) $b^2-4ac<0$ (3) $b^2-4ac>0$, and b^2-4ac is a perfect square. (4) $b^2-4ac>0$, and b^2-4ac is not a perfect square.

DISCRIMINANT: b^2-4ac

If the roots are **REAL** and **EQUAL** $b^2-4ac=0$	If the roots are **IMAGINARY** $b^2-4ac<0$
If the roots are **REAL** $b^2-4ac\geq 0$	

Recall Properties of Inequalities:

Less Than	Greater Than	Less Than or Equal to	Greater Than or Equal to
$<$	$>$	$\leq$	$\geq$

- Solve like equations (Add and Subtract before you Multiply and Divide)
- WHEN DIVIDING BY A **NEGATIVE**- FLIP THE SIGN!
- $3 > x$ is equivalent to $x<3$
- $3 < x$ is equivalent to $x>3$
- Always check your answers!

1 - D - 7 Discriminant day 2

Name: _____ **Date:** _____

1. For which value of k will the roots of $2x^2 + kx + 1 = 0$ be real?

A. 1 B. 2 C. 3 D. 0

$a = 2$
$b = K$
$c = 1$

$b^2 - 4ac \geq 0$
$(K)^2 - 4(2)(1) \geq 0$
$K^2 - 8 \geq 0$
$\sqrt{K^2} \geq \sqrt{8}$
$K \geq 2.8$

check: $(3)^2 - 4(2)(1) =$
$9 - 8 = \boxed{1}$ ✓

2. The roots of $2x^2 - 3x + c = 0$ are imaginary if c equals

A. 1 B. 2 C. −1 D. 0

$a = 2$
$b = -3$
$c = c$

$(-3)^2 - 4(2)(c) < 0$
$9 - 8c < 0$
$-9 \quad -9$
$-8c < -9$
$c > 1.125$

check
$(-3)^2 - 4(2)(2)$
$9 - 16 = \boxed{-7}$ ✓

3. The roots of the equation $ax^2 + 4x = -2$ are real, rational, and equal when a has a value of

A. 1 B. 2 C. 3 D. 4

$ax^2 + 4x + 2 = 0$

$a = a$
$b = 4$
$c = 2$

$(4)^2 - 4(a)(2) = 0$
$16 - 8a = 0$
$16 = 8a$
$a = 2$

check: $(4)^2 - 4(2)(2)$
$16 - 16 = \boxed{0}$ ✓

4. If one solution of the equation $x^2 - 5x + c = 0$ is $x = 7$, then c must equal

A. 14 B. 2 C. −14 D. −2

$x = 7 = $ root
$(x - 7) =$ factor

$(7)^2 - 5(7) + C = 0$
$49 - 35 + C = 0$
$14 + C = 0$
$C = -14$

5. Which value of c would make the roots of the equation $x^2 + 6x + c = 0$ real, rational, and equal?

A. 9 B. −9 C. 18 D. −18

$a = 1$
$b = 6$
$c = c$

$(6)^2 - 4(1)(c) = 0$
$36 - 4c = 0$
$36 = 4c$
$9 = c$

Check: $(6)^2 - 4(1)(9) =$
$36 - 36 = 0$ ✓

6. In the equation $ax^2 + 6x - 9 = 0$, imaginary roots will be generated if

A. $-1 < a < 1$ B. $a < 1$, only
C. $a > -1$, only D. $a < -1$

$a = a$
$b = 6$
$c = -9$

$(6)^2 - 4(a)(-9) < 0$
$36 + 36a < 0$
$\frac{36}{36}a < \frac{-36}{36}$
$a < -1$

7. Find all values of k such that the equation $3x^2 - 2x + k = 0$ has imaginary roots.

$a = 3$
$b = -2$
$c = k$

$(-2)^2 - 4(3)(k) < 0$
$4 - 12k < 0$
$-4 \quad -4$
$-12k < -4$
$k > .3$

8. For which positive value of m will the equation $4x^2 + mx + 9 = 0$ have roots that are real, equal, and rational?

A. 12 B. 9 C. 3 D. 4

$a = 4$
$b = m$
$c = 9$

$(m)^2 - 4(4)(9) = 0$
$m^2 - 144 = 0$
$m = \pm 12$

$36 \times 4 = 144$

9. If 3 is a root of the equation $x^2 - 4x + k = 0$, find k.

$(3)^2 - 4(3) + K = 0$

$9 - 12 + K = 0$

$-3 + K = 0$

$K = 3$

10. The roots of the equation $2x^2 - 4x + k = 0$ are real and equal if k is equal to

A. -2 B. 2 C. -4 D. 4

$a = 2$
$b = -4$
$c = K$

$(-4)^2 - 4(2)(K) = 0$

$16 - 8K = 0$

$16 = 8K$

$2 = K$

Check:

$(-4)^2 - 4(2)(2) = 0$

$16 - 16 = 0$ ✓

11. If the equation $x^2 - kx - 36 = 0$ has $x = 12$ as one root, what is the value of k?

A. 9 B. -9 C. 3 D. -3

$(12)^2 - K(12) - 36 = 0$

$144 - 12K - 36 = 0$

$108 - 12K = 0$

$-12K = -108$

$K = 9$

12. For which value of c will the roots of the equation $4x^2 - 4x + c = 0$ be real numbers?

A. 1 B. 2 C. 3 D. 4

$a = 4$
$b = -4$
$c = c$

$(-4)^2 - 4(4)(c) \geq 0$

$16 - 16c \geq 0$

$16 \geq 16c$

$1 \geq c$

$c \leq 1$

Check:

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

$16 - 16 = 0$ ✓

13. The roots of the equation $ax^2 + 4x + 2 = 0$ are real and equal when a is equal to

A. 1 B. 2 C. 3 D. 4

$a = a$
$b = 4$
$c = 2$

$(4)^2 - 4(a)(2) = 0$

$16 - 8a = 0$

$16 = 8a$

$a = 2$

Check:

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

$16 - 16$

0 ✓