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HOMWORK: THE DISCRIMINANT

Name: _____

Date: Jan. 2 Alg. 1 H - glue on page 80

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Aim:

- Find the Discriminant ($b^2 - 4ac$)
- Determine the number of the roots (2 roots, 1 root, or NO roots)
- Use the Quadratic formula to find the EXACT Roots

1.) $x^2 + 3x - 4 = 0$ $a = \underline{1}$ $b = \underline{3}$ $c = \underline{-4}$

Discriminant:

$$b^2 - 4ac$$
$$(3)^2 - 4(1)(-4)$$
$$25$$

Number of Roots: 2

Type (Nature) of the Roots: 2 rational roots

Use the Quadratic Formula to find the roots, use page 81.

2.) $2x^2 + 4x + 1 = 0$ $a = \underline{2}$ $b = \underline{4}$ $c = \underline{1}$

Discriminant:

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

Number of Roots: 2

Type (Nature) of the Roots: 2 irrational roots

Use the Quadratic Formula to find the roots, use page 81

3.) $5x^2 - 3 = 0$ $a = 5$ $b = 0$ $c = -3$

Discriminant: (write out the formula and show the substitutions)

$b^2 - 4ac$

$(0)^2 - 4(5)(-3)$

$60 \leftarrow$ positive discriminant means

Number of Roots: 2

Type (Nature) of the Roots: 2 irrational roots

Use the Quadratic Formula to find the roots, use page 81

4.) $3x^2 + 10x = 0$ $a = 3$ $b = 10$ $c = 0$

Discriminant: (write out the formula and show the substitutions)

$b^2 - 4ac$

$(-10)^2 - 4(3)(0)$

$100 \leftarrow$ discriminant is a perfect sq

Number of Roots: 2

Type (Nature) of the Roots: 2 rational roots

Use the Quadratic Formula to find the roots, use page 82

5.) $2x^2 + 7x + 50 = 0$ $a = 2$ $b = 7$ $c = 50$

Discriminant: (write out the formula and show the substitutions)

$b^2 - 4ac$

$(7)^2 - 4(2)(50)$

$-351 \leftarrow$ negative discriminant means

Number of Roots: 0

Type (Nature) of the Roots: imaginary roots

Use the Quadratic Formula to find the roots, use page 82

6.) $4x^2 - 5x = 11$ $a = 4$ $b = -5$ $c = -11$

$\frac{-11 - 11}{4}$

$4x^2 - 5x - 11 = 0$

Discriminant: (write out the formula and show the substitutions)

$b^2 - 4ac$

$(-5)^2 - 4(4)(-11)$

201

Number of Roots: 2

Type (Nature) of the Roots: 2 irrational roots

Use the Quadratic Formula to find the roots, use page 82

$$1.) x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-3 \pm \sqrt{25}}{2} \text{ discriminant}$$

$$x = \frac{-3 \pm 5}{2} = \begin{cases} \frac{-3+5}{2} = \frac{2}{2} = 1 \\ \frac{-3-5}{2} = \frac{-8}{2} = -4 \end{cases}$$

2 roots rational b/c discriminant is a perfect sq

roots/zeros $x = \{1, -4\}$

$$* 2.) x = \frac{-4 \pm \sqrt{8}}{2(2)} \text{ simplify } \frac{\sqrt{8}}{\sqrt{4} \cdot 2} = \frac{2\sqrt{2}}{4}$$

$$x = \frac{-4 \pm 2\sqrt{2}}{4}$$

zeros in decimal form

roots/zeros $x = -1 \pm \frac{1}{2}\sqrt{2} = \begin{cases} -0.2928... \\ -1.70710... \end{cases}$ 2 roots irrational b/c the discriminant is a positive #

$$3.) x = \frac{\pm \sqrt{100}}{2(5)} \text{ simplify } \frac{\sqrt{100}}{\sqrt{4} \cdot 5} = \frac{2\sqrt{15}}{10}$$

$$x = \frac{\pm 2\sqrt{15}}{10}$$

zeros/roots $x = \pm \frac{\sqrt{15}}{5}$ 2 irrational roots

4.)

$$x = \frac{-10 \pm \sqrt{100}}{2(3)}$$

$$x = \frac{-10 + 10}{6} = 0$$

$$x = \frac{-10 - 10}{6} = \frac{-20}{6} = \frac{-10}{3}$$

zeros/roots $x = \{0, -\frac{10}{3}\}$

2 rational roots
b/c discriminant
is a perfect sq

5.) $x = \frac{-7 \pm \sqrt{-35}}{2(2)}$

negative discriminant
means no real
roots

6.) $x = \frac{-(-5) \pm \sqrt{201}}{8}$

zeros/roots $x = \frac{5 \pm \sqrt{201}}{8}$

2 irrational
roots