$$\pm\sqrt{b^2-4ac} \rightarrow \text{discriminant}$$

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Pre-Calculus

Nature of the Roots

For each of the following, find the discriminant, the nature of the roots, and the number of x-intercepts.

1. $x^2 - 5x + 1 = 0$ *discriminant: 21*

$$\pm\sqrt{b^2-4ac}$$

2 x-intercepts

$$\pm\sqrt{(-5)^2-4(1)(1)}$$

$$\pm\sqrt{21}$$

real, irrational, unequal

2. $x^2 - 3x - 10 = 0$ *discriminant: 49*

2 x-intercepts

$$\pm\sqrt{b^2-4ac}$$

$$\pm\sqrt{(-3)^2-4(1)(-10)}$$

$$\pm\sqrt{49}$$

real, rational, unequal

3. $2x^2 - 5x = -6$ imaginary
   $+6$ $+6$

$2x^2 - 5x + 6 = 0$ discriminant: -23

$$\pm\sqrt{b^2-4ac}$$ 0 x-intercepts

$$\pm\sqrt{(-5)^2-4(2)(6)}$$

$$\pm\sqrt{-23}$$

4. $x^2 + 9 = 6x$ real, rational, equal
   $-6x$ $-6x$

$x^2 - 6x + 9 = 0$ discriminant: 0

$$\pm\sqrt{b^2-4ac}$$ 1 x-intercept

$$\pm\sqrt{(-6)^2-4(1)(9)}$$

$$\pm\sqrt{0}$$

5. If the discriminant of a quadratic equation is 47, what is the nature of the roots?
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$$\pm\sqrt{47}$$

6. If the discriminant of a quadratic equation is -8, what is the nature of the roots?
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$$\pm\sqrt{-8}$$

7. If the discriminant of a quadratic equation is 0, what is the nature of the roots?
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$$\pm\sqrt{0}$$

8. The nature of the roots of $3x^2 + 9x = -27$ are:
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$\pm\sqrt{(9)^2-4(3)(27)}$

$+27 \quad +27$

$3x^2+9x+27=0$

$\pm\sqrt{-243}$

9. The nature of the roots of $-2x^2 + x = 6$ are:
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$-2x^2+x-6=0 \qquad \pm\sqrt{(1)^2-4(-2)(-6)}$

$-6 \quad -6$

$\pm\sqrt{-47}$

10. The nature of the roots of $2x^2 = 3x + 1$ are:
1) real, rational, and equal
2) real, rational, and unequal
3) real, irrational, and unequal
4) imaginary

$-3x-1 \quad -3x-1$

$2x^2-3x-1=0$

$\pm\sqrt{b^2-4ac}$

$\pm\sqrt{(-3)^2-4(2)(-1)}$

$\pm\sqrt{17}$

11. Which number is the discriminant of a quadratic equation whose roots are real, unequal, and irrational? pos non perfect square
1) 0 $\pm\sqrt{0}$
2) -5 $\pm\sqrt{-5}$
3) 7 $\pm\sqrt{7}$
4) 4 $\pm\sqrt{4}$

12. Which graph represents a quadratic function with a negative discriminant?

0 x-intercepts

(1)

(3)

(2)

(4)