

GRE数学

3.3 二次方程

M A K E I T E A S Y

3.3.1 二次方程特性

1. 标准式 (Standard form)

$$y = ax^2 + bx + c$$

$a > 0$, 开口向上, 有最低点 (minimum value) ;

$a < 0$, 开口向下, 有最高点 (maximum value)

a 越大, 开口越小, 向上增长越迅速

a 越小, 开口越大, 向上增长越缓慢

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2. Factorization (因式分解)

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

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3. Quadratic Formula (万能公式)

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

3.3.1 二次方程特性

4. Number of solutions (解的数量) :

$$\Delta = b^2 - 4ac$$

$\Delta > 0$ *two distinct real solutions* (方程有两个解)

$\Delta = 0$ *one distinct real solution* (方程有一个解)

$\Delta < 0$ *no real solution* (方程没有解)

3.3.1 二次方程特性

5. Vieta theorem 韦达定理

$$ax^2 + bx + c = 0$$

The sum of the solutions of is $-\frac{b}{a}$

The product of the solutions of is $\frac{c}{a}$

3.3.2 练习

1. The equation $ax^2=bx^2+1$, where a and b are constants, has two real solutions.

Quantity A: a

Quantity B: b

2. If a and b are the two solutions of the equation $x^2 - 5x + 4 = 0$, what is the value of $\frac{1+a}{a} \cdot \frac{1+b}{b}$?
Give your answer as a fraction.

$$3. \frac{x(x-2)}{(x+3)(x-4)} = 0$$

Quantity A: x

Quantity B: -2

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