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湖南师大附中  
The High School Attached To Hunan Normal University

# 7.1.1 数系的扩充和复数的概念



$$x^3 - 15x + 4 = 0.$$

1545

“ ”

.





# 创设情境



$$x^3 - 15x + 4 = 0.$$

$$x = 2 - \sqrt{3} \quad x = \sqrt[3]{2} - \sqrt{121} \quad x = \sqrt[3]{2} + \sqrt{121}.$$

$$(x - 2)(x^2 - 4x + 1) = 0,$$

$$x = 2 - \sqrt{3} \quad x = 4.$$

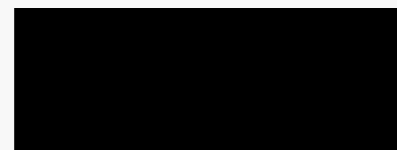
$$\sqrt[3]{2} + \sqrt{121} \quad \sqrt[3]{2} - \sqrt{121} = 4$$



1

$$\begin{aligned}x^4 - 3, x \in N; & \quad 2x^5, x \in Z; \\x^7, x \in Q; & \quad x^2 - 1, x \in R.\end{aligned}$$

# 数系扩充

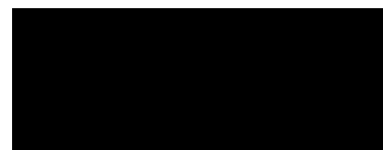


# 数系扩充



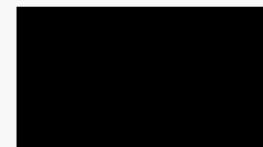
8844 米

珠穆朗玛峰



海平面

-155 米  
吐鲁番盆地



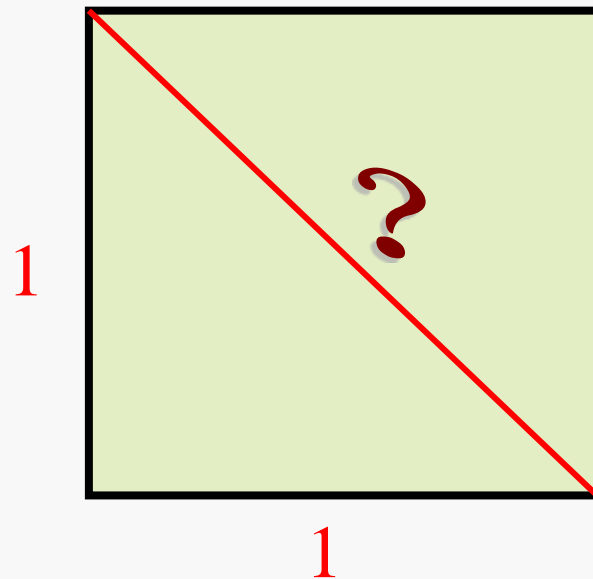


# 数系扩充



1

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## 数系的扩充

计数的需要



自然数（正整数与零）

表示相反意义的量



整数

解方程  $x+4=3$

解方程  $2x=5$

解方程  $2x=5$

度量的需要

解方程  $x^2=2$

解方程  $x^2=-1$

有理数

实数



# 虚数单位



$$2x^2 + 1 = 0$$

1637

“

”



# 虚数单位



1777

,

-1

i

J

C

5

5

5

1



# 虚数单位



1801

E

555

33

$i$

# 虚数单位



**i**

,

(1)  $i^2 = -1$

(2)

**i**

,

,

•

**i**

,

$$a + bi \quad (a, b \in \mathbb{R})$$

**C**

$$\mathbb{C} = \{a + bi \mid a, b \in \mathbb{R}\}.$$

3

(1)  $a + bi$  ( $a, b \in R$ )

(2)

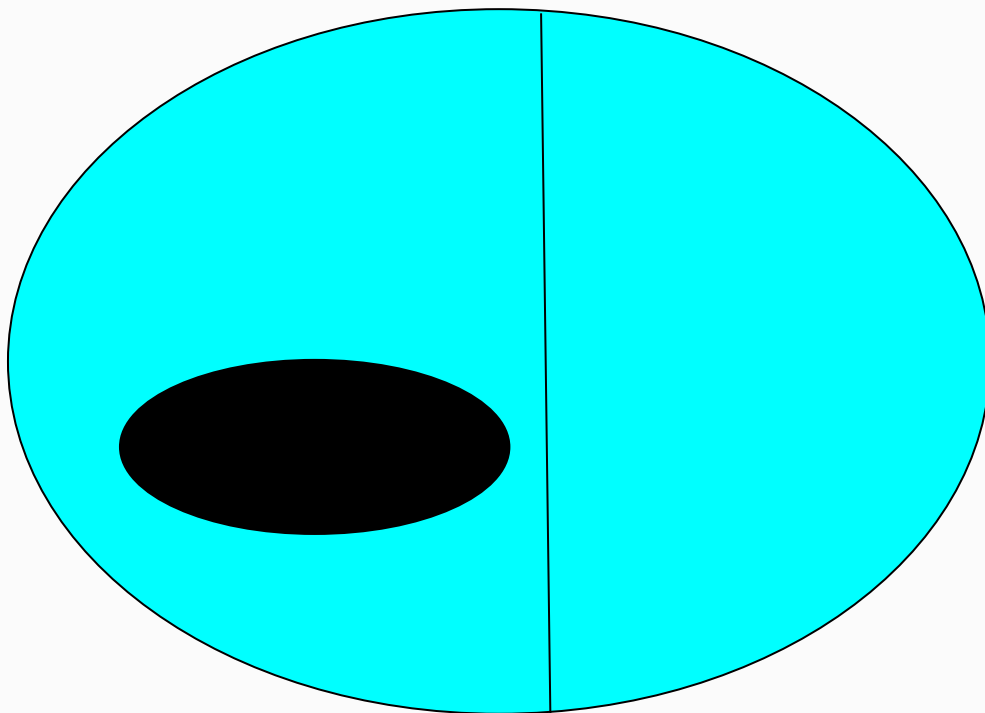
(3)  $a + bi$  ( $a, b \in R$ )  $c + di$  ( $c, d \in R$ )

4

$C$

$R$

Venn







# 典型例题



1

$$0, i, 2 \quad \sqrt{7}, \quad \sqrt{3}i, 5 \quad 2i, (1 - \sqrt{3})i$$

2

$$m \quad z \quad m - 1 \quad (m - 1)i$$

3

$$z_2, \quad z_1 \quad (x - y) \quad (x - 3)i, z_2 \quad (3x - 2y) \quad yi, \quad z_1$$

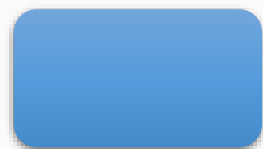
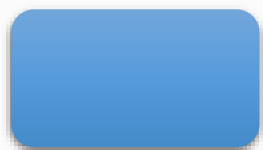
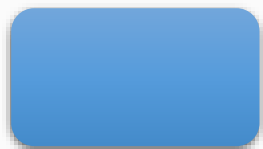
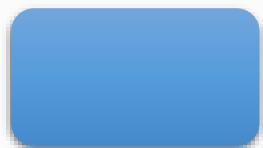
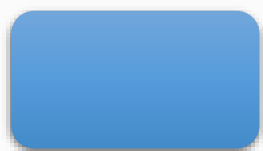
$$x, y \quad \cdot$$



# 课堂小结



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# 作业布置



## 作业

练习

1 2 3  
70

预习

7.1.2

探究



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