

中國秦發集團有限公司  
(Incorporated in the Cayman Islands)

中國秦發集團有限公司 2022年中期報告

OF

China Qifa Group Limited

中國秦發集團有限公司

(Incorporated in the Cayman Islands with limited liability)  
(Incorporated in the People's Republic of China with limited liability)





**B EC**

**A**

.....	1 2
.....	1, 2
.....	1,
.....	1, 1,
.....	1,
.....	1, 1 1
.....	1 2 1
.....	1, 1 0
.....	1 1
.....	1 2 1
.....	1,
.....	1
.....	1,
.....	1,

ECOA EAC (A RE ED)  
COA L EDB ARE

A E DEDA D RE A ED A R CLE OFA OCA O

OF

C a Q a G L

中國秦發集團有限公司

(Company Law of the People's Republic of China, 2005 (amended in 2013, 2018 and 2022), and the Company Law of the Hong Kong Special Administrative Region, Chapter 622 (enacted in 2022,))

ABLE A

1. The company shall be a legal entity with limited liability, established in accordance with the laws of the People's Republic of China and the laws of the Hong Kong Special Administrative Region.

ENRE A O

2. (1) The company shall be a public company. The registered capital of the company shall be RMB1,000,000,000. The company shall be established by the following persons:

ORD

EA G

1. The company shall be established in accordance with the laws of the People's Republic of China, the laws of the Hong Kong Special Administrative Region, and the laws of the United Kingdom.

2. The company shall be a public company. The registered capital of the company shall be RMB1,000,000,000. The company shall be established by the following persons:

ORD

The company shall be established in accordance with the laws of the People's Republic of China, the laws of the Hong Kong Special Administrative Region, and the laws of the United Kingdom.

ORD

The company shall be established in accordance with the laws of the People's Republic of China, the laws of the Hong Kong Special Administrative Region, and the laws of the United Kingdom.











- (f)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the first moment, which is 0 because the function is symmetric about  $x=0$ .
- (g)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^2 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the second moment, which is 0 because the function is symmetric about  $x=0$ .
- (h)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^3 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the third moment, which is 0 because the function is symmetric about  $x=0$ .
- (i)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^4 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the fourth moment, which is 0 because the function is symmetric about  $x=0$ .
- (j)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^5 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the fifth moment, which is 0 because the function is symmetric about  $x=0$ .
- (k)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^6 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the sixth moment, which is 0 because the function is symmetric about  $x=0$ .
- (l)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^7 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the seventh moment, which is 0 because the function is symmetric about  $x=0$ .
- (m)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^8 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the eighth moment, which is 0 because the function is symmetric about  $x=0$ .
- (n)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^9 \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the ninth moment, which is 0 because the function is symmetric about  $x=0$ .
- (o)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  and  $\int_{-\infty}^{\infty} x^{10} \delta(x) dx = 0$ . The first integral is the total area under the Dirac delta function, which is 1. The second integral is the tenth moment, which is 0 because the function is symmetric about  $x=0$ .



$\lambda$  is a limit point of  $\{\lambda_n\}$  if and only if  $\lambda$  is a limit point of  $\{\lambda_n\}$  or  $\lambda$  is a limit point of  $\{\lambda_n\}$ .

(i) Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ . (The converse is also true.) Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ .

(ii) Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ .

Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ .

Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ .

Let  $\lambda$  be a limit point of  $\{\lambda_n\}$ . Then there exists a subsequence  $\{\lambda_{n_k}\}$  of  $\{\lambda_n\}$  such that  $\lambda_{n_k} \rightarrow \lambda$ .





ARECEN FCA E

1. ~~...~~ <sup>2(1)</sup> ~~...~~

1. (1) ~~...~~

(2) ~~...~~

1/ ~~...~~

1. ~~...~~

20. (1) ~~...~~ (2) ~~...~~

(2)  $\dots$  (1)  $\dots$

21.  $\dots$

**E**

22.  $\dots$

23.  $\dots$



2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

**CALL 6 ARE**

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (The Dirac delta function is defined as a function that is zero everywhere except at  $x=0$ , where it is infinite, and its integral over the entire real line is 1.)

0.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition).  
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$  (sifting property).  
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition).  
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$  (sifting property).  
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition).  
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$  (sifting property).

1.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$   
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$

2.  $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$   
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$   
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$   
 $\int_{-\infty}^{\infty} \delta(x) dx = 1$   
 $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$

**FOUR RE OF ARE**

- (1)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$
- (2)  $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$
- (3)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$
- (4)  $\int_{-\infty}^{\infty} \delta(x) f(x) dx = f(0)$



... ..

- , 0. ... ..
- , 1. ... ..
- , 2. ... ..

**REG EROF E BEN**

- , . (1) ... ..
- (2) ... ..

... (0) ...

RECORD DA E

- (1) ...
(2) ...

RA FEN OF ARE

- (1) ...
(2) ...













(1)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition)

(2)  $\int_{-\infty}^{\infty} x \delta(x) dx = 0$  (center of mass condition)

(3)  $\int_{-\infty}^{\infty} x^2 \delta(x) dx = 0$  (second moment condition)

(4)  $\int_{-\infty}^{\infty} x^n \delta(x) dx = 0$  for  $n > 2$

(2)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition)

2. (0)  $\int_{-\infty}^{\infty} \delta(x) dx = 1$  (normalization condition)

(1)  $\int_{-\infty}^{\infty} x \delta(x) dx = 0$  (center of mass condition)

1.  $\int_0^1 x^2 dx = \frac{1}{3}$  (using the power rule for integration)

- (2)  $\int_0^1 x^2 dx = \frac{1}{3}$  (using the power rule for integration)

- (c)  $\int_0^1 \int_0^1 \frac{1}{1+x^2+y^2} dx dy$  is a double integral over the unit square  $[0, 1] \times [0, 1]$ . The integrand is a function of  $x$  and  $y$ . The region of integration is a square in the  $xy$ -plane. The integrand is symmetric about the line  $y=x$ . The integral can be evaluated by iterated integration. First, integrate with respect to  $x$  from 0 to 1, and then with respect to  $y$  from 0 to 1. The result is  $\frac{1}{2} \ln 2$ .
- (d)  $\int_0^1 \int_0^1 \frac{1}{1+x^2+y^2} dx dy$  is a double integral over the unit square  $[0, 1] \times [0, 1]$ . The integrand is a function of  $x$  and  $y$ . The region of integration is a square in the  $xy$ -plane. The integrand is symmetric about the line  $y=x$ . The integral can be evaluated by iterated integration. First, integrate with respect to  $x$  from 0 to 1, and then with respect to  $y$  from 0 to 1. The result is  $\frac{1}{2} \ln 2$ .
- (e)  $\int_0^1 \int_0^1 \frac{1}{1+x^2+y^2} dx dy$  is a double integral over the unit square  $[0, 1] \times [0, 1]$ . The integrand is a function of  $x$  and  $y$ . The region of integration is a square in the  $xy$ -plane. The integrand is symmetric about the line  $y=x$ . The integral can be evaluated by iterated integration. First, integrate with respect to  $x$  from 0 to 1, and then with respect to  $y$  from 0 to 1. The result is  $\frac{1}{2} \ln 2$ .

The integral  $\int_0^1 \int_0^1 \frac{1}{1+x^2+y^2} dx dy$  is a double integral over the unit square  $[0, 1] \times [0, 1]$ . The integrand is a function of  $x$  and  $y$ . The region of integration is a square in the  $xy$ -plane. The integrand is symmetric about the line  $y=x$ . The integral can be evaluated by iterated integration. First, integrate with respect to  $x$  from 0 to 1, and then with respect to  $y$  from 0 to 1. The result is  $\frac{1}{2} \ln 2$ .

1)  $\lambda \in \mathbb{R}$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A - \lambda I) = 0$ .

- (a)  $\lambda = 0$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A) = 0$ .  
 (b)  $\lambda = 1$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A - I) = 0$ .  
 (c)  $\lambda = -1$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A + I) = 0$ .  
 (d)  $\lambda = 2$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A - 2I) = 0$ .  
 (e)  $\lambda = -2$  ist ein Eigenwert von  $A$  genau dann, wenn  $\det(A + 2I) = 0$ .

2) Sei  $A \in \mathbb{R}^{n \times n}$  eine Matrix. Zeige, dass  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$  ist, genau dann, wenn  $\det(A - \lambda I) = 0$ .  
 Lösung: Sei  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$ . Dann existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $Av = \lambda v$ .  
 Das bedeutet  $(A - \lambda I)v = 0$ . Da  $v \neq 0$ , ist  $A - \lambda I$  nicht invertierbar, also  $\det(A - \lambda I) = 0$ .  
 Umgekehrt: Sei  $\det(A - \lambda I) = 0$ . Dann ist  $A - \lambda I$  nicht invertierbar, also existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $(A - \lambda I)v = 0$ ,  
 d.h.  $Av = \lambda v$ . Somit ist  $\lambda$  ein Eigenwert von  $A$ .

3) Sei  $A \in \mathbb{R}^{n \times n}$  eine Matrix. Zeige, dass  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$  ist, genau dann, wenn  $\det(A - \lambda I) = 0$ .  
 Lösung: Sei  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$ . Dann existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $Av = \lambda v$ .  
 Das bedeutet  $(A - \lambda I)v = 0$ . Da  $v \neq 0$ , ist  $A - \lambda I$  nicht invertierbar, also  $\det(A - \lambda I) = 0$ .  
 Umgekehrt: Sei  $\det(A - \lambda I) = 0$ . Dann ist  $A - \lambda I$  nicht invertierbar, also existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $(A - \lambda I)v = 0$ ,  
 d.h.  $Av = \lambda v$ . Somit ist  $\lambda$  ein Eigenwert von  $A$ .

4) Sei  $A \in \mathbb{R}^{n \times n}$  eine Matrix. Zeige, dass  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$  ist, genau dann, wenn  $\det(A - \lambda I) = 0$ .  
 Lösung: Sei  $\lambda \in \mathbb{R}$  ein Eigenwert von  $A$ . Dann existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $Av = \lambda v$ .  
 Das bedeutet  $(A - \lambda I)v = 0$ . Da  $v \neq 0$ , ist  $A - \lambda I$  nicht invertierbar, also  $\det(A - \lambda I) = 0$ .  
 Umgekehrt: Sei  $\det(A - \lambda I) = 0$ . Dann ist  $A - \lambda I$  nicht invertierbar, also existiert ein Vektor  $v \in \mathbb{R}^n$ ,  $v \neq 0$ , mit  $(A - \lambda I)v = 0$ ,  
 d.h.  $Av = \lambda v$ . Somit ist  $\lambda$  ein Eigenwert von  $A$ .



$\mathbb{R}^n$  上のベクトル空間  $V$  上の線形変換  $T$  が  $T^2 = T$  を満たすとき、 $T$  を  $\mathbb{R}^n$  上の射影変換と呼ぶ。このとき、 $V$  を  $T$  の像  $W = \text{Im } T$  と核  $N = \text{Ker } T$  の直和  $V = W \oplus N$  と見ることが出来る。

$T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

### 6 G

(1)  $\mathbb{R}^n$  上の射影変換  $T$  が  $T^2 = T$  を満たすとき、 $T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。このとき、 $T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

$T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。このとき、 $T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

$T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。このとき、 $T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

$T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。このとき、 $T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

$T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。このとき、 $T$  は  $W$  上の恒等変換であり、 $N$  上の零変換である。したがって、 $T$  は  $W$  と  $N$  を基底とする基底に対して、対角成分が 1 と 0 の対角行列で表される。

(2)  $\mathbb{R}^n$  上の射影変換  $T$  が  $T^2 = T$  を満たすとき、 $T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。

(a)  $T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。

(b)  $T$  の像  $W$  と核  $N$  の直和  $V = W \oplus N$  と見ることが出来る。







... ..

## PROE

... ..

... ..

$\mathbb{R}^n$  is a vector space over  $\mathbb{R}$  with the usual addition and scalar multiplication. The set of all linear transformations from  $\mathbb{R}^n$  to  $\mathbb{R}^n$  is denoted by  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$ .

- (2) Let  $T_1, T_2 \in \mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$ . Then  $(T_1 + T_2)(v) = T_1(v) + T_2(v)$  and  $(cT_1)(v) = cT_1(v)$  for all  $v \in \mathbb{R}^n$  and  $c \in \mathbb{R}$ . Thus  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is a vector space over  $\mathbb{R}$  with the usual addition and scalar multiplication. The dimension of  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is  $n^2$ . (12)

Let  $T_1, T_2 \in \mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$ . Then  $(T_1 + T_2)(v) = T_1(v) + T_2(v)$  and  $(cT_1)(v) = cT_1(v)$  for all  $v \in \mathbb{R}^n$  and  $c \in \mathbb{R}$ . Thus  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is a vector space over  $\mathbb{R}$  with the usual addition and scalar multiplication. The dimension of  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is  $n^2$ .

Let  $T_1, T_2 \in \mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$ . Then  $(T_1 + T_2)(v) = T_1(v) + T_2(v)$  and  $(cT_1)(v) = cT_1(v)$  for all  $v \in \mathbb{R}^n$  and  $c \in \mathbb{R}$ . Thus  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is a vector space over  $\mathbb{R}$  with the usual addition and scalar multiplication. The dimension of  $\mathcal{L}(\mathbb{R}^n, \mathbb{R}^n)$  is  $n^2$ . (2)

0.  $\mathbb{Z}[\sqrt{2}] = \mathbb{Z}[\sqrt{2} + \sqrt{3}]$  (to show, suppose  $a + b\sqrt{2} = c + d(\sqrt{2} + \sqrt{3})$ , then  $a + b\sqrt{2} = c + d\sqrt{2} + d\sqrt{3}$ , so  $(a - c) + (b - d)\sqrt{2} = d\sqrt{3}$ . If  $d \neq 0$ , then  $\sqrt{3} = \frac{(a - c) + (b - d)\sqrt{2}}{d}$ , which is impossible since  $\sqrt{3} \notin \mathbb{Q}[\sqrt{2}]$ . Thus  $d = 0$ , and  $a + b\sqrt{2} = c$ , so  $a = c$  and  $b = 0$ . Hence  $\mathbb{Z}[\sqrt{2}] \subseteq \mathbb{Z}[\sqrt{2} + \sqrt{3}]$ . Conversely,  $\mathbb{Z}[\sqrt{2} + \sqrt{3}] \subseteq \mathbb{Z}[\sqrt{2}]$  is clear since  $\sqrt{2} + \sqrt{3} \in \mathbb{Z}[\sqrt{2}]$ .

**CONGRUENCE AC GB RE RE E A E**

1. (1)  $\mathbb{Z}[\sqrt{2}] = \mathbb{Z}[\sqrt{2} + \sqrt{3}]$  (to show, suppose  $a + b\sqrt{2} = c + d(\sqrt{2} + \sqrt{3})$ , then  $a + b\sqrt{2} = c + d\sqrt{2} + d\sqrt{3}$ , so  $(a - c) + (b - d)\sqrt{2} = d\sqrt{3}$ . If  $d \neq 0$ , then  $\sqrt{3} = \frac{(a - c) + (b - d)\sqrt{2}}{d}$ , which is impossible since  $\sqrt{3} \notin \mathbb{Q}[\sqrt{2}]$ . Thus  $d = 0$ , and  $a + b\sqrt{2} = c$ , so  $a = c$  and  $b = 0$ . Hence  $\mathbb{Z}[\sqrt{2}] \subseteq \mathbb{Z}[\sqrt{2} + \sqrt{3}]$ . Conversely,  $\mathbb{Z}[\sqrt{2} + \sqrt{3}] \subseteq \mathbb{Z}[\sqrt{2}]$  is clear since  $\sqrt{2} + \sqrt{3} \in \mathbb{Z}[\sqrt{2}]$ .

(2)  $\mathbb{Z}[\sqrt{2}] = \mathbb{Z}[\sqrt{2} + \sqrt{3}]$  (to show, suppose  $a + b\sqrt{2} = c + d(\sqrt{2} + \sqrt{3})$ , then  $a + b\sqrt{2} = c + d\sqrt{2} + d\sqrt{3}$ , so  $(a - c) + (b - d)\sqrt{2} = d\sqrt{3}$ . If  $d \neq 0$ , then  $\sqrt{3} = \frac{(a - c) + (b - d)\sqrt{2}}{d}$ , which is impossible since  $\sqrt{3} \notin \mathbb{Q}[\sqrt{2}]$ . Thus  $d = 0$ , and  $a + b\sqrt{2} = c$ , so  $a = c$  and  $b = 0$ . Hence  $\mathbb{Z}[\sqrt{2}] \subseteq \mathbb{Z}[\sqrt{2} + \sqrt{3}]$ . Conversely,  $\mathbb{Z}[\sqrt{2} + \sqrt{3}] \subseteq \mathbb{Z}[\sqrt{2}]$  is clear since  $\sqrt{2} + \sqrt{3} \in \mathbb{Z}[\sqrt{2}]$ .

BOARD OF DIRECTORS

(1) [Redacted] (2) [Redacted]

(2) [Redacted]

(1) [Redacted] (2) [Redacted]

(2) [Redacted]

(1) [Redacted] (2) [Redacted]

(1) [Redacted] (2) [Redacted]

(1) [Redacted] (2) [Redacted]

RE RE E OFD REC OR

(1) [Redacted] 1.2

(2) [Redacted]

[Redacted] 1.0

D Q ALF CA O OFD REC OR

(1) [Redacted]

(2) [Redacted]

( ) ~~\_\_\_\_\_~~ \_\_\_\_\_

( ) \_\_\_\_\_

( ) ~~\_\_\_\_\_~~ \_\_\_\_\_

( ) \_\_\_\_\_

**EXECUTED RECORD**

\_\_\_\_\_ ( ) \_\_\_\_\_





D REC OR ' FEE A DE E E

[REDACTED] ( ) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

D REC OR ' FEE A DE E E

( ) [REDACTED]



100. (1)  $\frac{1}{2} \int_0^1 x^2 dx = \frac{1}{2} \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$

(2)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

(3)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

101. (1)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

100. (1)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

(2)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

(3)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

(4)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

(5)  $\int_0^1 x^2 dx = \left[ \frac{x^3}{3} \right]_0^1 = \frac{1}{3}$

- (1) *[Faint, mostly illegible text]*
- (2) *[Faint, mostly illegible text]*
- (3) *[Faint, mostly illegible text]*
- (4) *[Faint, mostly illegible text]*

- (2) *[Faint, mostly illegible text]*

**GENERAL CONCLUSION**

101. (1) *[Faint, mostly illegible text]*



...),  $\mathbb{R}^n$  中的点  $x$  到  $\mathbb{R}^n$  中的点  $y$  的距离  $d(x, y)$  定义为  $d(x, y) = \|x - y\|$ 。这里  $\|x\|$  表示  $x$  的范数。在  $\mathbb{R}^n$  中，点  $x$  到点  $y$  的距离  $d(x, y)$  满足三角不等式：对任意  $x, y, z \in \mathbb{R}^n$ ，有  $d(x, z) \leq d(x, y) + d(y, z)$ 。

10. 设  $\mathbb{R}^n$  中的点  $x$  到  $\mathbb{R}^n$  中的点  $y$  的距离  $d(x, y)$  定义为  $d(x, y) = \|x - y\|$ 。这里  $\|x\|$  表示  $x$  的范数。在  $\mathbb{R}^n$  中，点  $x$  到点  $y$  的距离  $d(x, y)$  满足三角不等式：对任意  $x, y, z \in \mathbb{R}^n$ ，有  $d(x, z) \leq d(x, y) + d(y, z)$ 。

10. 设  $\mathbb{R}^n$  中的点  $x$  到  $\mathbb{R}^n$  中的点  $y$  的距离  $d(x, y)$  定义为  $d(x, y) = \|x - y\|$ 。这里  $\|x\|$  表示  $x$  的范数。在  $\mathbb{R}^n$  中，点  $x$  到点  $y$  的距离  $d(x, y)$  满足三角不等式：对任意  $x, y, z \in \mathbb{R}^n$ ，有  $d(x, z) \leq d(x, y) + d(y, z)$ 。

10. 设  $\mathbb{R}^n$  中的点  $x$  到  $\mathbb{R}^n$  中的点  $y$  的距离  $d(x, y)$  定义为  $d(x, y) = \|x - y\|$ 。这里  $\|x\|$  表示  $x$  的范数。在  $\mathbb{R}^n$  中，点  $x$  到点  $y$  的距离  $d(x, y)$  满足三角不等式：对任意  $x, y, z \in \mathbb{R}^n$ ，有  $d(x, z) \leq d(x, y) + d(y, z)$ 。

10. (1) 设  $\mathbb{R}^n$  中的点  $x$  到  $\mathbb{R}^n$  中的点  $y$  的距离  $d(x, y)$  定义为  $d(x, y) = \|x - y\|$ 。这里  $\|x\|$  表示  $x$  的范数。在  $\mathbb{R}^n$  中，点  $x$  到点  $y$  的距离  $d(x, y)$  满足三角不等式：对任意  $x, y, z \in \mathbb{R}^n$ ，有  $d(x, z) \leq d(x, y) + d(y, z)$ 。

- (2) *... ..*

**BORROR GOREN**

10. *... ..*



112.

[Redacted text]

111. (1)

[Redacted text]

(2)

(2)

[Redacted text]

(2)

[Redacted text]

110.

[Redacted text]

109.

[Redacted text]

108.

[Redacted text]

11. (1)

*[Faint, illegible handwritten text]*

(2)

*[Faint, illegible handwritten text]*

117

*[Faint, illegible handwritten text]*

118

*[Faint, illegible handwritten text]*

120.

*[Faint, illegible handwritten text]*

**A AGE**

- 121. [Redacted]
- 122. [Redacted]
- 12. [Redacted]

**OFF CE**

- 12. (1) [Redacted]
- (2) [Redacted]
- (1) [Redacted]
- 12. (1) [Redacted]
- (2) [Redacted]
- (2) [Redacted]

12 . [REDACTED]

12 . [REDACTED]

REG ENCFD REC ON A D OFF CER

12 7 . [REDACTED]

E

12 . (1) [REDACTED]

(C) [REDACTED]

[REDACTED]

(C) [REDACTED]

(2) [REDACTED]

EAL

1 0 . (1) [REDACTED]

$\mathbb{R}^n$  (where  $n \geq 1$ ) is a normed space with the norm  $\|x\|_1 = |x_1| + |x_2| + \dots + |x_n|$ . Let  $A = \{x \in \mathbb{R}^n : \|x\|_1 = 1\}$ . Prove that  $A$  is a compact set in  $\mathbb{R}^n$ .

- (2)  $\mathbb{R}^n$  is a normed space with the norm  $\|x\|_1 = |x_1| + |x_2| + \dots + |x_n|$ . Let  $A = \{x \in \mathbb{R}^n : \|x\|_1 = 1\}$ . Prove that  $A$  is a compact set in  $\mathbb{R}^n$ .  $\mathbb{R}^n$  is a normed space with the norm  $\|x\|_1 = |x_1| + |x_2| + \dots + |x_n|$ . Let  $A = \{x \in \mathbb{R}^n : \|x\|_1 = 1\}$ . Prove that  $A$  is a compact set in  $\mathbb{R}^n$ .



## D E D A D O E N A E

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

(c)  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

(c)  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .

1.  $\int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$  para  $f$  contínua em  $a$ . Se  $f$  não é contínua em  $a$ , a integral é definida como o limite da integral de  $f$  multiplicada por uma função teste que se aproxima de  $\delta(x-a)$ .







(1)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .  $\int_{\mathbb{R}^n} \chi_{\Omega \cap \Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .

(2)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .

(3)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .  $\int_{\mathbb{R}^n} \chi_{\Omega \cap \Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .

(4)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .

(5)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .  $\int_{\mathbb{R}^n} \chi_{\Omega \cap \Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .

(2) (1)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .  $\chi_{\Omega} \chi_{\Omega'} = \chi_{\Omega \cap \Omega'}$ .  $\int_{\mathbb{R}^n} \chi_{\Omega \cap \Omega'} dx = \int_{\Omega \cap \Omega'} dx$ .





- (2)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega^c} dx = 0$ .  $\chi_{\Omega} \chi_{\Omega^c} = 0$  because  $\chi_{\Omega} \chi_{\Omega^c} = 0$  on  $\Omega$  and  $\chi_{\Omega} \chi_{\Omega^c} = 0$  on  $\Omega^c$ .  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega^c} dx = \int_{\Omega} 0 dx + \int_{\Omega^c} 0 dx = 0$ .

1.  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega} dx = \int_{\Omega} 1 dx = |\Omega|$ .  $\chi_{\Omega} \chi_{\Omega} = \chi_{\Omega}$  because  $\chi_{\Omega} \chi_{\Omega} = 1$  on  $\Omega$  and  $\chi_{\Omega} \chi_{\Omega} = 0$  on  $\Omega^c$ .  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega} dx = \int_{\Omega} 1 dx + \int_{\Omega^c} 0 dx = |\Omega|$ .

## B C H O F F I N G R E E N E

1.  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega} dx = \int_{\Omega} 1 dx = |\Omega|$ .

- (1)  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega} dx = \int_{\Omega} 1 dx = |\Omega|$ .  $\chi_{\Omega} \chi_{\Omega} = \chi_{\Omega}$  because  $\chi_{\Omega} \chi_{\Omega} = 1$  on  $\Omega$  and  $\chi_{\Omega} \chi_{\Omega} = 0$  on  $\Omega^c$ .  $\int_{\mathbb{R}^n} \chi_{\Omega} \chi_{\Omega} dx = \int_{\Omega} 1 dx + \int_{\Omega^c} 0 dx = |\Omega|$ .











1.  $\int_0^1 x^2 dx = \frac{1}{3}$

## 6 CE

17. (1)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (a)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (b)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (c)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (d)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (e)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (f)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (g)  $\int_0^1 x^2 dx = \frac{1}{3}$
- (h)  $\int_0^1 x^2 dx = \frac{1}{3}$





## D G

- 1.2. (1)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$  (2)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$
- (2)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$  21
- 1.3. (1)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$  (2)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$
- (2)  $\int_{\mathbb{R}^n} f(x) dx = \int_{\mathbb{R}^n} f(x) dx$

DE

1. (1)

Handwritten text, mostly illegible due to blurring and redaction. Some words like "The" and "is" are visible.

(2)

Handwritten text, mostly illegible due to blurring and redaction. Some words like "The" and "is" are visible.

F A C T E A R

1.

Handwritten text, mostly illegible due to blurring and redaction.

A E D E    O E O R A D    A D A N    C L E    O F A    O C A    O  
A D A E O F C O    A

1.    *[Faint, illegible text]*

F O R    A    O

1.    *[Faint, illegible text]*