

五專數學(二)

2.1 指數

2.2 指數函數與圖形

2.3 對數

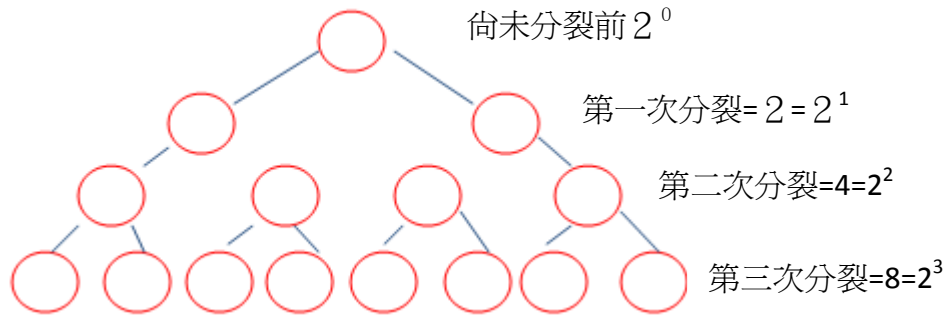
2.4 對數函數與圖形

2.5 常用對數

班級：_____ 姓名：_____ 學號：_____

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
| | | | | | | | |

2.1 指數



細胞分裂時，一個變 2 個，兩個又變 4 個，分裂第三次成為 8 個，第四次 16 個，紀錄為

$$2^0=1 \quad \text{讀作 2 的 0 次方}$$

$$2^1=2 \quad \text{讀作 2 的 1 次方}$$

$$2^2=2 \times 2 = 4 \quad \text{讀作 2 的 2 次方}$$

$$2^3=2 \times 2 \times 2 = 8 \quad \text{讀作 2 的 3 次方}$$

$$2^4=2 \times 2 \times 2 \times 2 \quad \text{讀作 2 的 4 次方}$$

細胞尚未分裂前為 $2^0=1$ ，任何數的零次方 $=1$ ，除了 0^0 無意義

討論：

$$3^0=1, \quad 3^1=3, \quad 3^2=9, \quad 3^3=27$$

$$5^0=1, \quad 5^1=5, \quad 5^2=25, \quad 5^3 =$$

$$10^0=1, \quad 10^1=10, \quad 10^2=100, \quad 10^3=1000$$

$$(-2)^0=, \quad (-2)^1=-2, \quad (-2)^2=(-2) \cdot (-2)=4,$$

$$(-2)^3=(-2) \cdot (-2) \cdot (-2)=-16$$

$$\left(\frac{1}{2}\right)^0= \quad \left(\frac{1}{2}\right)^1=\frac{1}{2}, \quad \left(\frac{1}{2}\right)^2=\frac{1}{2}\cdot\frac{1}{2}=\frac{1}{4}, \quad \left(\frac{1}{2}\right)^3=\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}=\frac{1}{8}$$

$$(0.9)^0=1 \quad (0.9)^1=0.9 \quad (0.9)^2=0.81$$

練習：

$$2^0=, \quad 2^1=, \quad 2^2=, \quad 2^3=, \quad 2^4=,$$

$$2^5=, \quad 2^6=, \quad 2^7=, \quad 2^8=, \quad 2^9=,$$

$$99^0= \quad 1357^0=$$

$$7^0= \quad 7^1= \quad 7^2= \quad (-7)^1= \quad (-7)^2=$$

$$\left(\frac{1}{7}\right)^0= \quad \left(\frac{1}{7}\right)^2= \quad \left(\frac{1}{10}\right)^0= \quad \left(\frac{1}{10}\right)^1=$$

$$\left(\frac{1}{10}\right)^2= \quad \left(\frac{1}{10}\right)^3= \quad \left(\frac{1}{10}\right)^4=$$

負指數次方

$$x^{-n}=\frac{1}{x^n}$$

討論：

$$2^{-1}=\frac{1}{2}, \quad 2^{-2}=\frac{1}{2^2}, \quad 2^{-3}=\frac{1}{2^3}, \quad 2^{-4}=\frac{1}{2^4}$$

練習：

$$3^{-1}= \quad 3^{-2}= \quad 3^{-3}= \quad 5^{-1}= \quad 5^{-2}=$$

$$5^{-3}= \quad 10^{-1}= \quad 10^{-2}= \quad 10^{-3}= \quad 7^{-1}=$$

$$(-3)^{-1}=\frac{1}{(-3)^1} \quad (-3)^{-2}=\frac{1}{(-3)^2}=\frac{1}{9} \quad (-3)^{-3}=$$

$$x^{-1}= \quad x^{-2}= \quad x^{-3}=$$

討論：
$$\frac{1^{-2}}{5} = \frac{1}{\left(\frac{1}{5}\right)^2} = \frac{1}{\frac{1}{25}} = 25$$

練習：

$$\left(\frac{1}{6}\right)^{-2} =$$

$$\left(\frac{1}{10}\right)^{-3} =$$

$$\left(\frac{1}{8}\right)^{-2}$$

指數的運算

一、 指數相乘次方相加 $X^a \cdot X^b = X^{a+b}$

討論： $2^3 \cdot 2^2 = (2 \cdot 2 \cdot 2)(2 \cdot 2) = 2^5$

$$2^{10} \cdot 2^3 = 2^{10+3} = 2^{13}$$

$$3^5 \cdot 3^2 = 3^{5+2} = 3^7$$

討論： $X \cdot X = X^2$ $X \cdot X \cdot X = X^3$ $X^2 \cdot X^3 = X \cdot X \cdot X \cdot X \cdot X = X^5$

練習：

$$10^2 \cdot 10^3 = \quad 10^{23} \cdot 10^{13} = \quad X^5 \cdot X^{13} =$$

二、 次方再次方則指數相乘 $(X^a)^b = X^{a \cdot b}$

$$(2^3)^2 = (2^3) \cdot (2^3) = 2^{3 \cdot 2} = 2^6$$

討論：

$$(2^3)^5 = 2^{15} \quad \left(5^{\frac{1}{2}}\right)^2 = \quad \left(5^{\frac{1}{3}}\right)^6 =$$

練習：

$$(5^{13})^2 =$$

$$(6^3)^4 =$$

$$(10^4)^{-3} =$$

$$(6^{-3})^4 =$$

$$(7^5)^{\frac{1}{5}} =$$

$$(6^{\frac{3}{2}})^4 =$$

$$\left(5^{\frac{-2}{5}}\right)^5 =$$

$$\left(6^{\frac{1}{4}}\right)^4 =$$

$$(125^{\frac{1}{3}})^3 =$$

$$(81^{\frac{1}{4}})^2 =$$

根號~分數指數

$$1^{\frac{1}{2}} = \sqrt{1} \quad 1^2 = 1 \Leftrightarrow \sqrt{1} = 1^{\frac{1}{2}} = 1$$

$$2^{\frac{1}{2}} = \sqrt{2} \quad 2^2 = 4 \Leftrightarrow \sqrt{4} = 4^{\frac{1}{2}} = (2^2)^{\frac{1}{2}} = 2$$

$$3^{\frac{1}{2}} = \sqrt{3} \quad 3^2 = 9 \Leftrightarrow \sqrt{9} = 9^{\frac{1}{2}} = \quad = 3$$

$$4^{\frac{1}{2}} = \sqrt{4} \quad 4^2 = 16 \Leftrightarrow \sqrt{16} = 16^{\frac{1}{2}} = \quad = 4$$

$$x^{\frac{1}{n}} = \sqrt[n]{x}$$

討論

$$\sqrt{100} =$$

$$\sqrt{81} =$$

$$\sqrt{49} =$$

$$\sqrt{36} =$$

$$\sqrt{25} =$$

$$\sqrt[3]{27} = 27^{\frac{1}{3}} = (3^3)^{\frac{1}{3}} = 3$$

練習

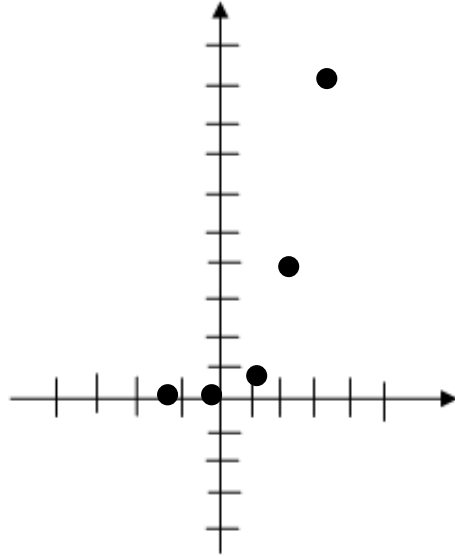
- | | | |
|----------------|-------------------------|--------------------------|
| 1. $2^0 =$ | 19. $4^2 =$ | 38. $(-2)^2 =$ |
| 2. $2^1 =$ | 20. $5^2 =$ | 39. $(-2)^3 =$ |
| 3. $2^2 =$ | 22. $7^2 =$ | 40. $(-2)^4 =$ |
| 4. $2^3 =$ | 23. $8^2 =$ | 41. $(-2)^5 =$ |
| 5. $2^4 =$ | 24. $9^2 =$ | 42. $(-1)^0 =$ |
| 6. $2^5 =$ | 25. $10^2 =$ | 43. $(-1)^1 =$ |
| 7. $2^6 =$ | 26. $11^2 =$ | 44. $(-1)^2 =$ |
| 8. $2^7 =$ | 27. $12^2 =$ | 45. $(-1)^3 =$ |
| 9. $2^8 =$ | 28. $13^2 =$ | 46. $(-1)^4 =$ |
| 10. $2^9 =$ | 29. $14^2 =$ | 47. $(\frac{1}{3})^0$ |
| 11. $2^{10} =$ | 30. $10^3 =$ | 48. $(\frac{1}{3})^1$ |
| 12. $3^0 =$ | 31. $10^4 =$ | 49. $(\frac{1}{3})^2$ |
| 13. $3^1 =$ | 32. $10^5 =$ | 50. $(\frac{2}{3})^3$ |
| 14. $3^2 =$ | 33. $10^6 =$ | 51. $(-\frac{1}{2})^0$ |
| 15. $3^3 =$ | 34. $(\frac{1}{2})^2 =$ | 52. $(-\frac{1}{5})^1$ |
| 16. $3^4 =$ | 35. $(\frac{1}{2})^3 =$ | 53. $(\frac{1}{-5})^2$ |
| 17. $4^0 =$ | 36. $(\frac{1}{2})^4 =$ | 54. $(-\frac{1}{5})^3$ |
| 18. $4^1 =$ | 37. $(-2)^1 =$ | 55. $(\frac{1}{-5})^4$ |
| 1. $5^{-1} =$ | 21. $(3X)^{-3} =$ | 41. $16^{\frac{1}{2}} =$ |

- | | | |
|-----------------------------|----------------------------|------------------------------|
| 2. $5^{-2} =$ | 22. $(3X)^{-1} =$ | 42. $16^{\frac{3}{2}} =$ |
| 3. $5^{-3} =$ | 23. $1^2 =$ | 43. $16^{-\frac{3}{2}} =$ |
| 4. $(-5)^{-1} =$ | 24. $2^2 =$ | 44. $27^{\frac{1}{3}} =$ |
| 5. $(-5)^{-2} =$ | 25. $3^2 =$ | 45. $27^{-\frac{1}{3}} =$ |
| 6. $(\frac{3}{5})^{-1} =$ | 26. $4^2 =$ | 46. $27^{\frac{2}{3}} =$ |
| 7. $(\frac{3}{5})^{-2} =$ | 27. $5^2 =$ | 47. $27^{-\frac{2}{3}} =$ |
| 8. $(-\frac{1}{5})^{-1} =$ | 28. $6^2 =$ | 48. $(-27)^{\frac{2}{3}} =$ |
| 9. $(-\frac{1}{5})^{-2} =$ | 29. $7^2 =$ | 49. $(-27)^{-\frac{2}{3}} =$ |
| 10. $5^{-2} \cdot 5^{-3} =$ | 30. $8^2 =$ | 50. $\sqrt{1} =$ |
| 11. $(5^2)^3 =$ | 31. $9^2 =$ | 51. $\sqrt{4} =$ |
| 12. $(5^{-2})^3 =$ | 32. $10^2 =$ | 52. $\sqrt{9} =$ |
| 13. $(5^2)^{-3} =$ | 33. $11^2 =$ | 53. $\sqrt{16} =$ |
| 14. $(\frac{2}{5})^{-3} =$ | 34. $4^{\frac{1}{2}} =$ | 54. $\sqrt{25} =$ |
| 15. $(-\frac{2}{5})^{-3} =$ | 35. $9^{\frac{1}{2}} =$ | 55. $\sqrt{36} =$ |
| 16. $(\frac{9}{16})^{-1} =$ | 36. $16^{\frac{1}{2}} =$ | 56. $\sqrt{49} =$ |
| 17. $X^{-3} \cdot X^{-4} =$ | 37. $8^{\frac{1}{3}} =$ | 57. $\sqrt{64} =$ |
| 18. $X^3 \cdot X^4 =$ | 38. $16^{\frac{1}{4}} =$ | 58. $\sqrt{81} =$ |
| 19. $(X^3)^4 =$ | 39. $27^{\frac{1}{3}} =$ | 59. $\sqrt{100} =$ |
| 20. $(3X)^{-3} =$ | 40. $(-8)^{\frac{1}{3}} =$ | 60. $\sqrt{121} =$ |

2.2 指數函數的圖形

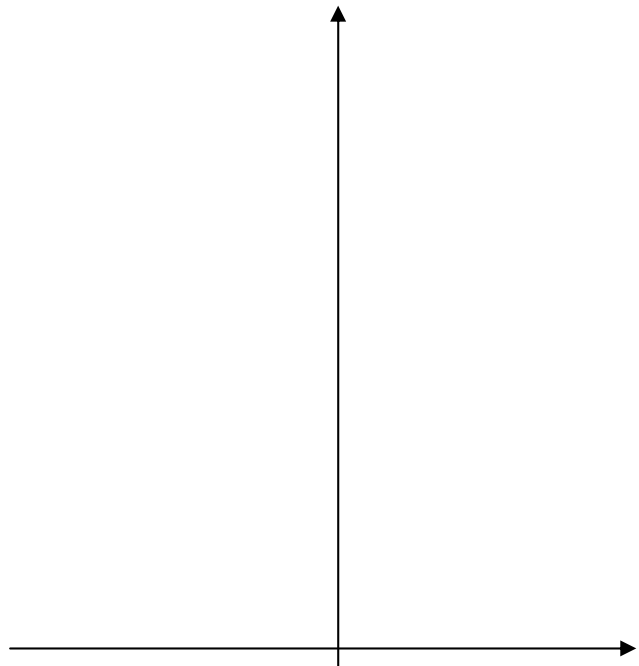
討論： $f(x)=3^x$

| x | $y=3^x$ |
|-----|------------------------------------|
| -2 | $3^{-2}=\frac{1}{3^2}=\frac{1}{9}$ |
| -1 | $3^{-1}=\frac{1}{3}$ |
| 0 | $3^0=1$ |
| 1 | $3^1=3$ |
| 2 | $3^2=9$ |



練習：作 $f(x)=2^x$ 之圖

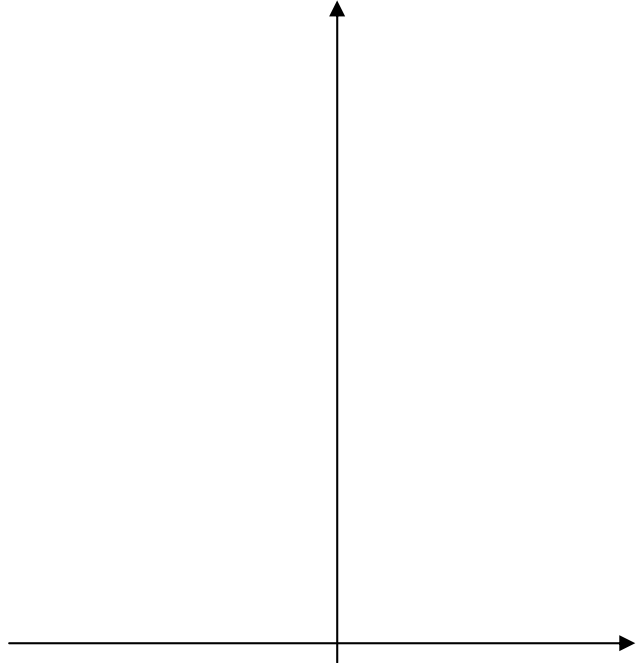
| x | $Y=2^x$ |
|-----|---------|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



練習： $f(x)=1^x$ 的圖形

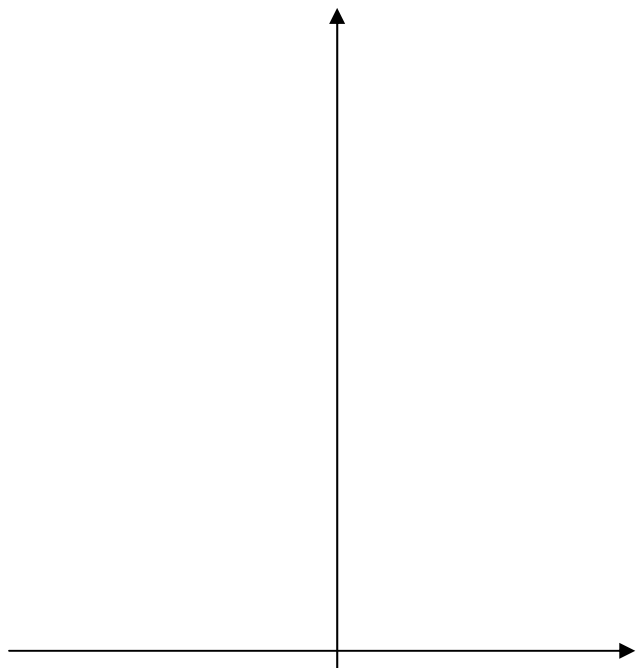
練習：作 $f(x) = \left(\frac{1}{2}\right)^x$ 之圖

| x | $Y = \left(\frac{1}{2}\right)^x$ |
|----|----------------------------------|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



練習：作 $f(x) = \left(\frac{1}{3}\right)^x$ 之圖

| x | $Y = \left(\frac{1}{3}\right)^x$ |
|----|----------------------------------|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



結論

指數函數 $f(x) = a^x$ 一定通過 $(0, 1)$ 的點

當 $a > 1$ $f(x)$ 為遞增函數，x 值越大函數值越大

當 $a = 1$ $f(x)$ 為常數函數

當 $a < 1$ $f(x)$ 為遞減函數，x 值越大函數值越小

2.3 對數函數

$$2^3 = 8 \Leftrightarrow \log_2 8 = 3 = \log_2 2^3 \quad \text{讀作以 2 為底 8 的對數} = 3$$

討論：

$$(1) \log_2 2 = 1$$

$$(2) \log_2 4 = \log_2 2^2 = 2$$

$$(3) \log_2 16 =$$

$$(4) \log_2 1 =$$

$$(5) \log_2 \frac{1}{4} =$$

$$(6) \log_{10} 10 = 1$$

$$(7) \log_{10} 100 =$$

$$(8) \log_{10} \frac{1}{10} =$$

$$(9) \log_{10} \frac{1}{100} = \text{在這裡鍵入方程式。}$$

$$(10) \log_2 \sqrt{2} =$$

$$(11) \log_3 1 =$$

$$(12) \log_3 3 =$$

$$(13) \log_3 9 =$$

$$(14) \log_3 27 =$$

$$(15) \log_3 \frac{1}{3} =$$

$$(16) \log_{10} 1 =$$

(17) $\log_5 25 =$

(18) $\log_5 125 =$

(19) $\log_5 \frac{1}{5} =$

(20) $\log_5 \sqrt{5} =$

(21) $\log_{10} 0.1 = \log_{10} \frac{1}{10} = \log_{10} 10^{-1} =$

(22) $\log_{10} 0.01 =$

(23) $\log_{10} \sqrt{10} =$

(24) $\log_7 \sqrt{7} =$

指數與對數的練習

1. $3^0 =$

21. $\log_3 81 =$

41. $5^{\frac{1}{2}} =$

2. $3^1 =$

22. $\log_3 \frac{1}{9} =$

42. $5^{\frac{1}{3}} =$

3. $3^2 =$

23. $\log_3 \frac{1}{27} =$

43. $5^{\frac{1}{-2}} =$

4. $3^3 =$

24. $\log_{(-3)}(-27) =$

44. $5^{\frac{1}{3}} =$

5. $3^4 =$

25. $\log_{-3} 9 =$

45. $(-5)^2 =$

6. $3^{-1} =$

26. $\log_{\frac{1}{3}} \frac{1}{9} =$

46. $(-5)^3 =$

7. $3^{-2} =$

27. $\log_{\frac{1}{3}} 9 =$

47. $(-5)^{-1} =$

8. $3^{-3} =$

28. $\log_3 \sqrt{3} =$

48. $(-5)^2 =$

9. $(-3)^1 =$

29. $\log_{-3}(-\frac{1}{27}) =$

49. $(-5)^{-2} =$

10. $(-3)^2 =$

11. $(-3)^3 =$

12. $(-3)^{-1} =$

13. $(-3)^{-2} =$

14. $(-3)^{-3} =$

15. $(-3)^{-4} =$

16. $3^{\frac{1}{2}} =$

17. $3^{-\frac{1}{2}} =$

18. $3^{\frac{1}{3}}$

19. $3^{-\frac{1}{3}}$

20. $\log_3 27 =$

30. $\log_{-\frac{1}{3}}(-27) =$

31. $\log_3 \sqrt[3]{3} =$

32. $\log_3 \frac{1}{\sqrt{3}} =$

33. $\log_{\frac{1}{10}} \sqrt{10} =$

34. $5^0 =$

35. $5^1 =$

36. $5^2 =$

37. $5^3 =$

38. $5^{-1} =$

39. $5^{-2} =$

40. $5^{-3} =$

50. $\log_5 1 =$

51. $\log_5 25 =$

52. $\log_5 125 =$

53. $\log_5 \frac{1}{25} =$

54. $\log_5 \frac{1}{125} =$

55. $\log_{(-5)} 25 =$

56. $\log_{(-5)}(-125) =$

57. $\log_{-5} \frac{1}{-5} =$

58. $\log_{\frac{1}{5}} 25 =$

59. $\log_{\frac{1}{5}} \sqrt{5} =$

60. $\log_{\frac{1}{5}} \frac{1}{\sqrt{5}} =$

2.4 對數函數的圖形

討論： $f(x) = \log_3 x$

| x | $y = \log_3 x$ |
|---|----------------|
| | |
| | |
| | |
| | |

練習：作 $y=\log_2 x$ 圖形

練習：作 $y=\log_{10} x$ 圖形

結論

$f(x) = \log_a x$ 一定通過 $(1, 0)$

2.5 常用對數

$$10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001$$

$$\log_{10} 0.001 = \log_{10} 10^{-3} = -3$$

$$10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01$$

$$\log_{10} 0.01 = \log_{10} 10^{-2} = -2$$

$$10^{-1} = \frac{1}{10^1} = \frac{1}{10} = 0.1$$

$$\log_{10} 0.1 = \log_{10} 10^{-1} = -1$$

$$10^0 = 1$$

$$\log_{10} 1 = 0$$

$$10^1 = 10$$

$$\log_{10} 10 = 1$$

$$10^2 = 100$$

$$\log_{10} 100 = \log_{10} 10^2 = 2$$

$$10^3 = 1000$$

$$\log_{10} 1000 = \log_{10} 10^3 = 3$$

練習：

練習：

1. $10^5 =$

1. $\log_{10} 10000 =$

2. $10^6 =$

2. $\log_{10} 100000 =$

3. $10^{-7} =$

3. $\log_{10} 1000000 =$

4. $10^{-6} =$

4. $\log_{10} 0.0001 =$

5. $10^{-5} =$

5. $\log_{10} 0.001 =$

6. $10^{-4} =$

6. $\log_{10} 0.00001 =$

以 10 為底的對數函數稱為常用對數函數，常用對數函數將

$10^{-n} \sim 10^n$ 的數字對應到 $[-n, n]$

例如：

$$\log_{10} 10000 < \log_{10} 12345 < \log_{10} 100000$$

$$\rightarrow 4 < \log_{10} 12345 < 5 \quad \text{所以 } \log_{10} 12345 \cong 4.1$$

例如：

$$\log_{10} x = 4.6 \quad \log_{10} 10000 < \log_{10} x < \log_{10} 100000 \quad \text{則 } x \text{ 為 } 5 \text{ 位數}$$

$$\log_{10} x = 5.3 \quad \text{則 } x \text{ 為 } 6 \text{ 位數}$$

$$\log_{10} x = 6.8 \quad \text{則 } x \text{ 為 } 7 \text{ 位數}$$

$$\log_{10} x = 4.6 \quad \text{則 } x \text{ 為 } 5 \text{ 位數}$$

練習

$$1. \log_{10} x = 2.3 \quad \text{則 } x \text{ 為 } (\quad) \text{ 位數}$$

$$2. \log_{10} x = 3.8 \quad \text{則 } x \text{ 為 } (\quad) \text{ 位數}$$

$$3. \log_{10} x = 7.6 \quad \text{則 } x \text{ 為 } (\quad) \text{ 位數}$$

對數的性質

$$1. \log_a 1 = 0$$

$$\text{例：} \log_{10} 1 = 0$$

$$2. \log_a b = \frac{\log_{10} b}{\log_{10} a}$$

$$\log_2 5 = \frac{\log_{10} 5}{\log_{10} 2}$$

$$3. \log_{10}(a \times b) = \log_{10} a + \log_{10} b \quad \log_{10} 6 = \log_{10} 2 + \log_{10} 3$$

$$4. \log_{10} a^n = n \log_{10} a \quad \log_{10} 2^3 = 3 \log_{10} 2$$

以 10 為底的對數稱為常用對數，以 $\log x$ 表示 $\log_{10} x$

討論：

$$\log 2 = 0.3010, \quad \log 3 = 0.4771, \quad \log 5 = 0.6990$$

$$\log_2 5 = \frac{\log_{10} 5}{\log_{10} 2} = \frac{\log 5}{\log 2} = \frac{0.6990}{0.3010} = 2.322$$

$$\log_{10} 6 = \log_{10} 2 + \log_{10} 3 = 0.3010 + 0.4771 = 0.7781$$

$$\begin{aligned}\log_{10} 2^3 &= \log(2 \times 2 \times 2) = \log 2 + \log 2 + \log 2 = 3 \log_{10} 2 \\ &= 3 \times 0.3010 = 0.9030\end{aligned}$$

$$\log 32 = \log 2^5 = 5 \log 2 = 5 \times 0.3010 = 1.5050$$

練習：

1. $\log_3 5 =$

2. $\log_3 6 =$

3. $\log_5 2 =$

4. $\log_6 5 =$

5. $\log 16 =$

6. $\log 15 =$

7. $\log 12 =$

8. $\log 18 =$

9. $\log 60 = \log(10 \times 2 \times 3) = \log 10 + \log 2 + \log 3 =$

10. $\log 9 =$

11. $\log 27 =$

12. $\log 81 =$

13. $\log 25 =$

使用常用對數表求對數

例如： $\log 1.35 = 0.1303$

| log | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|------|------|------|------|------|------|------|------|------|------|
| 10 | 0000 | 0043 | 0086 | 0128 | 0170 | 0212 | 0253 | 0294 | 0334 | 0374 |
| 11 | 0414 | 0453 | 0492 | 0531 | 0569 | 0607 | 0645 | 0682 | 0719 | 0755 |
| 12 | 0792 | 0828 | 0864 | 0899 | 0934 | 0969 | 1004 | 1038 | 1072 | 1106 |
| 13 | 1139 | 1173 | 1206 | 1239 | 1271 | 1303 | 1335 | 1367 | 1399 | 1430 |
| 14 | 1461 | 1492 | 1523 | 1553 | 1584 | 1614 | 1644 | 1673 | 1703 | 1732 |
| 15 | 1761 | 1790 | 1818 | 1847 | 1875 | 1903 | 1931 | 1959 | 1987 | 2014 |
| 16 | 2041 | 2068 | 2095 | 2122 | 2148 | 2175 | 2201 | 2227 | 2253 | 2279 |

練習：

$$\log 1.07 =$$

$$\log 1.23 =$$

$$\log 1.48 =$$

$$\log 1.54 =$$

$$\log 1.6 =$$

常用對數表可以查詢 1.00~9.99 的對數，

$$1 \leq x < 10, \quad \text{則 } \log 1 \leq \log x < \log 10,$$

所以 $0 \leq \log x < 1$ ，對數表的值介於 0 與 1 之間。

如果 $x > 10$ 則須將 x 化為科學記號 $a \times 10^n$, $1 \leq a < 10$, 再用對數的性質及對數表來求對數。

討論：將下列各數化為科學記號

$$1350 = 1.350 \times 1000 = 1.350 \times 10^3$$

$$324 = 3.24 \times 100 = 3.24 \times 10^2$$

$$53.2 = 5.32 \times 10 = 5.32 \times 10^1$$

$$6391 =$$

$$976000 =$$

$$21500 =$$

討論：

求 $\log 1350$

$$1350 = 1.350 \times 10^3$$

$$\begin{aligned}\log 1350 &= \log(1.35 \times 10^3) \\ &= \log 1.350 + \log 10^3 \\ &= 0.1303 + 3 \\ &= 3.1303\end{aligned}$$

練習：

求 $\log 324$

練習：

求 $\log 69300$

練習：

求 $\log 693$

練習：

求 $\log 532$

練習：

求 $\log 976000$

練習：

求 $\log 21500$

討論：將下列各數化為科學記號

$$0.1350 = 1.350 \times 0.1 = 1.350 \times 10^{-1}$$

$$0.0135 = 1.35 \times 0.01 = 1.35 \times 10^{-2}$$

$$0.00135 = 1.35 \times 0.001 = 1.35 \times 10^{-3}$$

$$0.00324 = 3.24 \times 0.001 = 3.24 \times 10^{-3}$$

$$0.6391 =$$

$$0.00976 =$$

$$0.532 = 5.32 \times 0.1 = 5.32 \times 10^{-1}$$

$$0.0215 =$$

討論：

求 $\log 0.532$

$$0.532 = 5.32 \times 10^{-1}$$

$$\begin{aligned} \log 0.532 &= \log(5.32 \times 10^{-1}) \\ &= \log 5.32 + \log 10^{-1} \\ &= 0.7259 + (-1) \end{aligned}$$

$$= -0.2741$$

練習：

求 $\log 0.0215$

練習：

求 $\log 0.639$

練習：

求 $\log 0.00976$

練習：

求 $\log 0.00324$