Mathematics

Chapter 1 Rate and Ratio

Nouns	Verbs	Adjectives	Usages
Rate 率			The rate of typing is 50 words per minute.
Ratio 比			A is 30, B is 25. The ratio of A to B = 30:25 = 6:5
Comparison	Compare 比較		x = 35, y=25. Compare x with y. x is greater than y by 10.
Value 數值			a = 82. The value of a is 82.
Unit 單位			AB = 5km km is the unit.
Quantity 數量			0.001 second is only a small quantity of time.
Distance 距離			The distance between A and B is 8km.
Speed 速度			The speed of a car is 50km per hour.
Similar Triangles 相似三角形			△ABC and △PQR are similar triangles.
		Corresponding 對應的	△ABC is similar to △PQR. AB and PQ are corresponding sides.

Nouns	Verbs	Adjectives	Usages
Price 價值			Find the price of the table.
Expression	Express 表達		Express your answer in terms of x and y.
Continued Ratio 連比			a:b:c = 1:2:3 is a continued ratio.
	Simplify 化簡		Simplify $2x^2 – x + x^2 – 3x^2$
	Refer to 參考		Refer to the figure. Refer to question 8.
Scale 比例尺			The scale of the map is 1:1000.
Reduction	Reduce 縮小	Reduced	Reduce a number by 10.
Enlargement	Enlarge 放大		Enlarge a figure to 200% of its original size.
		Actual 真實的	What is the actual length? Find the actual area.
Dimensions 平面圖指長、闊 立體圖指長闊高			The dimensions of a rectangle is 6m x 4m. The dimensions of a cube is 8m x 6m x 2m.
Unknown 未知數			Find the value of the unknown in the equation $3x – 2 = 5x + 8$
Relationship 關係			

Verbal Expressions and calculation in Mathematics

1. 4 apples cost $8. Find the rate in $/apple.

_____

2. x = 40, y = 20. Write two verbal expressions to describe the relationship between x and y.

(a)_____

(b)_____

3. Refer to the figure, what are the dimensions of the rectangle?

_____

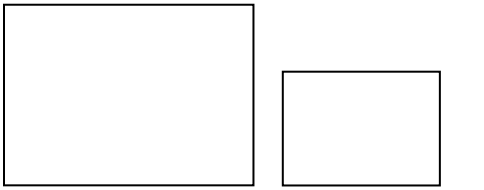
_____

4. Find the scale of the map.

_____

_____

_____



Actual length 3cm

Reduced length on a map 0.5cm

5. a : b = 2 : 3, b : c = 3 : 5
   Write down the continued ratio of a, b, c. (i.e. a:b:c)

_____

_____

Answers

1. The rate is $2 per apple.

2. x is greater than y by 20./ x is twice of y./

   x is a multiple of y./y is a factor of x.

3. The dimensions of the rectangle are 8m x 6m.

4. The scale is 0.5:3 = 1:6

5. The continued ratio is 2:3:5.

Chapter 2 Identities

Nouns	Verbs	Adjectives	Usages
Identity 恆等式			An equation that can be satisfied by ALL values of the unknown(s) is called an identity.
Proof 證明	Prove		Prove that $2(x + 1) = 2x + 2$ is an identity.
Constant 常數			If $2(3x + 1) = Ax + B$, where A and B are constants, find the values of A and B.
Coefficient 系數			In $2x + 3$, the coefficient of x is 2.
Determine 判斷			Determine whether each of the following equations is an identity.
Difference of two squares 兩平方之差			$a^2 - b^2 = (a + b)(a - b)$ is the identity of the difference of two squares.
Perfect Squares 完全平方			$(a - b)^2 = a^2 - 2ab + b^2$ and $(a + b)^2 = a^2 + 2ab + b^2$ are the identities of perfect squares.
Expand 展開			Expand the following expressions.
Evaluate 計算			Evaluate the following without using a calculator.
Factorization 因式分解	Factorize		The process of expressing an algebraic expression as a product of its factors is called factorization.
Taking out the common factors 抽取公因式			$3x + 6y$ can be factorized by taking out the common factors.
Grouping terms 併項			$ax + bx + ay + by$ can be factorized by the grouping terms method.

Verbal Expressions and calculation in Mathematics

1. Expand the following expressions by using the identity of the difference of two squares or the identities of the perfect square.

a. $(2a + 7)(2a - 7) =$ _____

b. $(6x - 5y)^2 =$ _____

2. Determine whether $(x + 2y)(x - y) = x^2 - 2xy + y^2$ is an identity.

_____

3. Factorize $9t^2 - 16$.

_____

4. Find the values of A and B in the following identities.

$(x + 3)(Ax - 2) = 2x^2 + Bx - 6$

_____

Answers

1. a. $4a^2 - 49$

   b. $36x^2 - 60xy + 25y^2$

2. No, it is not an identity.

3. $(3t + 4)(3t - 4)$

4. The value of A is 2, the value of B is 4.

Chapter 3 Formulae

Nouns	Verbs	Adjectives	Usages
Numerators 分子			In ½ , 1 is the numerators.
Denominators 分母			In ⅔, 3 is the denominators.
Algebraic fractions 代數分式			If both the numerators and the denominators contain non-constant term, these expressions are called algebraic fractions.
Simplify 化簡			Simplify the following expressions.
Multiplication 乘法	Multiply		In multiplication of fractions, we multiply the numerators and denominators separately to get the product.
Lowest Common Multiple (L. C. M.) 最小公倍數			In addition and subtraction of algebraic fractions, we need to find the L.C.M. of the denominators first.
Formula 公式			An equality relating two or more variables is called a formula.
Change of subject 變換主項			The techniques in change of subject are similar to those used in solving literal equations.
Method of substitution 代入法	Substitute		Substitute the given values into the formula.

Verbal Expressions and calculation in Mathematics

1. Simplify the following algebraic fractions.

   $(2a - 5) / (4a - 10)$

2. Find the values of the unknowns in the following formulas.

   $T = a + 2b + 3c$

   Find the value of T when $a = 1$, $b = 2$ and $c = 3$.

3. Consider the formula $v = u + at$.

   Make t the subject of the formula.

Answers

1. ½

2. T = 14

3. (v - u) / a

Chapter 4 Factorization of Simple Polynomials

Nouns	Verbs	Adjectives	Usages
Quadratic Polynomial 二次多項式			Quadratic polynomial is a polynomial of degree two.
cross-method 十字相乘法			Some polynomials in the form of $ax^2 + bx + c$ can be factorized by the cross-method.
Sum of two cubes 兩立方之和			$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ is the identity of sum of two cubes.
Difference of two cubes 兩立方之差			$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ is the identity of difference of two cubes.

Verbal Expressions and calculation in Mathematics

1. Factorize the following expressions.

   $t^2 - 3t - 18 =$ _____

Answers

1. $(t - 6)(t + 3)$

Chapter 5 Approximation and Errors

Nouns	Verbs	Adjectives	Usages
Digit 數字			243 "3"is the units digit. "4" is the tens digit. "2" is the hundreds digit.
Significant figure 有效數字			Significant figure has the meaning of important digit. 62548 = 63000 (correct to 2 sig. fig.)
Place value 位值			In the number 2457, the place value of "5"is 10 , the place value of "4"is 100 and the place value of "2"is 1000.
	Round off 四捨五入		Round off the number 3147 to the nearest hundred figures. 3147 = 3100 (correct to nearest hundred) .
		Nearest 最接近的	
Average 平均		Average 平均的	The average of x and y is $\frac{x+y}{2}$.
Estimation	Estimate 估算		Estimate the value of 10.55+7.427 by rounding off each number in it correct to 2 sig. fig. $10.55 + 7.427 \approx 11 + 7.5 = 18.5$
Approximation 近似值		Actual 真實的	Write 5.1=5 (correct to 1 sig. fig.) 5.1 is the actual value. 5 is the approximation.
Difference 差別			Difference of two numbers = the larger value – the smaller value Difference of 48 and 51 =51- 48=3

Nouns	Verbs	Adjectives	Usages
Absolute error 絕對誤差			Absolute error = difference of the actual value and the approximation Actual value = 4.8 Approximation = 4.5 Absolute error = 4.8 – 4.5 = 0.3
Maximum absolute error 最大絕對誤差			x=3.5 (correct to 1 d.p.) Place value of 5=0.1 Max. absolute error = $\frac{0.1}{2}$ = 0.05 Lower limit = 3.5 - 0.05 = 3.45 Upper limit = 3.5 + 0.05 = 3.55
Relative error 相對誤差			Relative error = $\frac{absolute\quad error}{actual\quad value}$ or $(\frac{\max.\quad absolute\quad error}{measured\quad value})$ x = 4.23 (correct to 3 sig. fig.) Relative error = $\frac{(0.01)\div 2}{4.23}$ =0.01182
Percentage error 百分誤差			Percentage error = Relative error × 100% x = 4.23 (correct to 3 sig. fig.) Percentage error = $\frac{0.01\div 2}{4.23}\times 100\%$ = 0.118%

Verbal Expressions and calculation in Mathematics

1. Round off 34512 to the nearest hundred.

_____

2. What is the place value of 2 in the number 3218?

_____

3. How many significant figures are there in the approximation **4370** (correct to the nearest ten) ?

_____

4. Find the maximum absolute error of the approximation **3.562** (correct to 3 d. p.) .

_____

5. Find the lower limit and upper limit of the approximation 1800 (correct to 2 sig. fig.) .

_____

6. The speed of a car is 80km/h (correct to 2 sig. fig.) .
   Find the percentage error.

_____

Answers

1. 34512 = 34500 (correct to the nearest hundred) .

2. The place value of 2 in 3218 is hundred.

3. There are 3 significant figures.

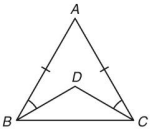
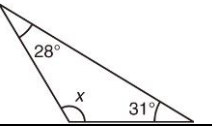
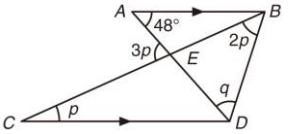
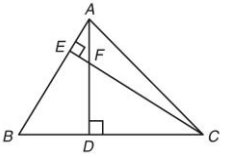
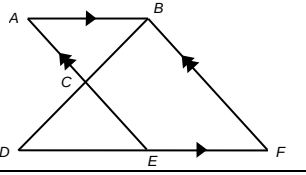
4. Maximum absolute error = $\frac{0.001}{2}$ = 0.0005

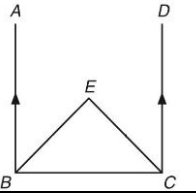
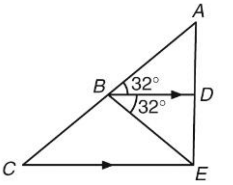
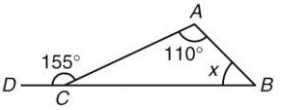
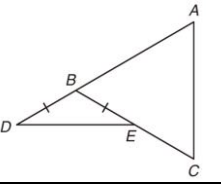
5. Lower limit = 1800 - $\frac{100}{2}$ = 1750 .

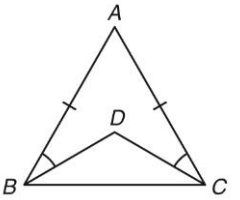
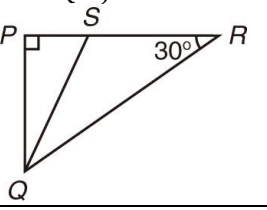
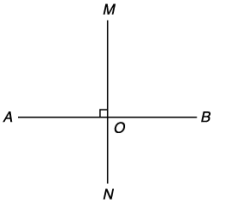
   Upper limit = 1800 + $\frac{100}{2}$ = 1850.

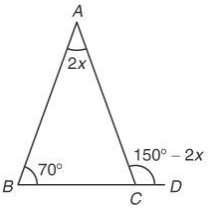
6. Percentage error = $\frac{0.5}{80} \times 100\%$ = 0.625% .

Chapter 6 Angles related to Rectilinear Figures

Nouns	Verbs	Adjectives	Usages
	Given 已知		Given that $AB = AC$ and $\angle ABD = \angle ACD$. 
		following 以下的	In the following figure , find x . 
unknown 未知量			Given that $AB \parallel CD$, find the unknowns . (i.e. p and q) 
size 大小			If AD BC, CE AB and AB CF , find the size of $\angle CAD$. 
	intersect 相交		Given that AE and BD intersect at C , $AB \parallel DF$ and $AE \parallel BF$. 

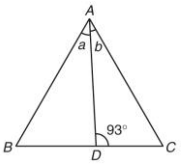
Nouns	Verbs	Adjectives	Usages
	bisect 平分		In the figure, *BE* bisects $\angle ABC$ (i.e. $\angle ABE = \angle EBC$) and *CE* bisects $\angle BCD$, (i.e. $\angle DCE = \angle ECB$) , find $\angle BEC$. 
	determine 判斷. Determine whether... 判斷.... 是否....		If *BD* // *CE* and $\angle ABD = \angle DBE = 32°$, determine whether *BC* = *BE* . 
straight line 直線			Given that *DCB* is a straight line , find *x* . 
equilateral triangle 等邊三角形			In the figure, $\triangle ABC$ is an equilateral triangle and *BD* = *BE* , find $\angle DEC$. 

Nouns	Verbs	Adjectives	Usages
isosceles triangle 等腰三角形			Given $\triangle ABC$ is an <u>isosceles triangle</u> with $AB = AC$ and $\angle ABD = \angle ACD$. 
angle bisector 角平分線			In the figure, SQ is the <u>angle bisector</u> of $\angle PQR$. (i.e. $\angle PQS = \angle SQR$) 
perpendicular bisector 垂直平分線			MN is the <u>perpendicular bisector</u> of AB .  (i.e. $AO = OB$ and $\angle AOM = 90^\circ$)
interior angle sum 內角和 sum of interior angles			The <u>interior angle sum</u> of a triangle is 180° .

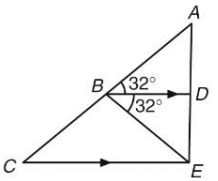
Nouns	Verbs	Adjectives	Usages
Exterior angle 外角			In the figure, $\angle ACD$ is an exterior angle of $\triangle ABC$. 
polygon 多邊形 quadrilateral 四邊形 pentagon 五邊形 hexagon 六邊形 heptagon 七邊形 octagon 八邊形 nonagon 九邊形 Decagon 十邊形 12-sided polygon 十二邊形 n-sided polygon n 邊形			Find the sum of interior angles of a 14-sided polygon .
number of sides 邊數			Find the number of sides of the polygon if its sum of the interior angles is 3240° .
convex polygon 凸多邊形			Every interior angle of convex polygon must be less than 180° .

Verbal Expressions and calculation in Mathematics

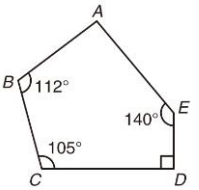
1. The figure shows an equilateral triangle *ABC*.
   If $\angle ADC = 93°$, find *a* and *b*.



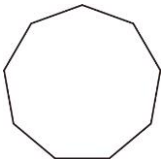
2. If *BD* // *CE* and $\angle ABD = \angle DBE = 32°$,
   determine whether $\triangle BCE$ is an isosceles triangle .



3. In the figure, ABCDE is a pentagon, find $\angle BAE$.



4. Find the size of each exterior angle of a regular nonagon.



5. Find the number of sides of the polygon if its sum of the interior angles is 1260° .

Answers

1. $a = 33^\circ$
   $b = 27^\circ$

2.
$\angle BCE = \angle ABD$ (corr. $\angle$s, CE // BD)
$= 32°$

$\angle BEC = \angle DBE$ (alt. $\angle$s, CE // BD)
$= 32°$

$\therefore$ $\angle BCE = \angle BEC$
$\therefore$ $BE = BC$ (sides opp. equal $\angle$s)
i.e. $\triangle BCE$ is an isosceles triangle.

3. $\angle BAE = 93^\circ$

4. Each exterior angle of a regular nonagon = 40° .

5. Number of sides = 9 .

Chapter 7 Simple Statistical Diagrams and Graphs(II)

Nouns	Verbs	Adjectives	Usages
Conclusion 結論			What conclusion can you draw? The frequency polygon for S3 students lies to the right of that for S2 students. Therefore, S3 students are heavier than S2 students in general.
Frequency Polygon 頻數多邊形			The line segments joining the adjacent mid-points of the tops of the bars in a histogram and the x-axis form a frequency polygon.
Class Mark 組中點			The class mark of the class interval 21-31 is 26.
	According to 根據		According to the data in the above table, draw a frequency polygon in the figure.
Frequency Curve 頻數曲線			By smoothing the frequency polygon, we can obtain a frequency curve.
Cumulative Frequency 累積頻數			The cumulative frequency corresponding to 119.5 is 7. This means that there are 7 students with pulse rates less than 119.5 beats per minute after their PE lesson.
	Construct 製作		Construct a cumulative frequency table and draw a cumulative frequency polygon.
Cumulative Frequency Curve 累積頻數曲線			By smoothing a cumulative frequency polygon, we can obtain a cumulative frequency curve.

Nouns	Verbs	Adjectives	Usages
Cumulative Frequency Polygon 累積頻數多邊形			The information in a cumulative frequency table can be represented in a graph called a cumulative frequency polygon.
Percentile 百分位數			The value 142.5 cm is the 10th percentile of the distribution. 10% of the data in the distribution are below 142.5cm.
Lower quartile 下四分位數			The 25th percentile is called the lower quartile. One-fourth of the data lies below the lower quartile.
Upper Quartile 上四分位數			The 75th percentile is called the upper quartile. One-fourth of the data lies on or above the upper quartile.
Median 中位數			The 50th percentile is called the median. It lies in the middle of the distribution.
		Minimum 最低限度的	If the top 10% of students are awarded a prize, the minimum mark that allows a student to collect a prize is the 90th percentile.
Statistical Diagram 統計圖表			Which statistical diagram should he use? Bar chart should be used. It can show the actual frequency of each item.
Impression 印象			What impression does the graph give readers? It gives readers an impression that the increase of customers is significant.
	Mislead 誤導		Does the diagram mislead readers? Yes, the areas of the eggs are not proportional to the egg production.

Verbal Expressions and calculation in Mathematics

1. The following table shows the number of family members in 30 households.

No. of family members	3	4	5	6
Frequency	11	12	5	2

(a) If we want to show the frequencies of data, which statistical diagram should be used? Explain your answer.

_____

(b) Is it suitable to present the data using a pie chart?

_____

2. The following table shows the distribution of the heights of 40 students.

Height (cm)	150-154	155-159	160-164	165-169	170-174
No. of students	3	8	12	10	7

(a) Construct a cumulative frequency table for the above data.

_____

(b) Draw a cumulative frequency polygon to present the data.

_____

(c) Find (i) the lower quartile,
(ii) the median,
(iii) the 70^{th} percentile.

_____

(d) The basketball team is recruiting new members. If the minimum height requirement is 162cm, what is the percentage of students who do not meet the requirement?

_____

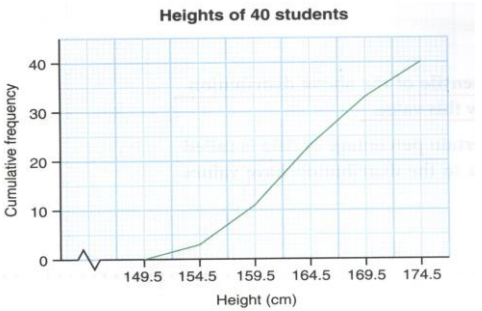
Answers

1. (a) Bar chart should be used. It can show the actual frequency of each item.
   (b) No. A pie chart is often used to show the percentage of each item.

2. (a)

Height less than (cm)	149.5	154.5	159.5	164.5	169.5	174.5
No. of students	0	3	11	23	33	40

(b)



(c)
(i) The cumulative frequency that corresponds to the lower quartile
$= 25\% \times 40 = 10$
From the graph, the height that corresponds to a cumulative frequency of 10 is 159 cm.
Thus, the lower quartile = 159 cm.

(ii) From the graph, the height that corresponds to a cumulative frequency of 20 is 163.5 cm.
Thus the median = 163.5 cm.

(iii) From the graph, the 70^{th} percentile = 167 cm.

(iv) From the graph, 17 students are shorter than 162 cm.
Percentage of students who do not meet the requirement
$= \frac{17}{40} \times 100\% = 42.5\%.$

Chapter 8 Linear Equations in Two Unknowns

Nouns	Verbs	Adjectives	Usages
Graph 圖像			(1,2) does not satisfy the equation y + x = 2. Therefore, (1,2) is not a point on the graph.
	Determine 判斷		Determine whether A(4,-1) lie on the graph of the equation x – 2y = 6. (4,-1) is a solution of the equation x – 2y = 6. Therefore, A(4,-1) lies on the graph of the equation x – 2y = 6.
		Simultaneous 聯立	x + y = 3 and x–y = 1 are called simultaneous linear equations in two unknowns.
Graphical Method 圖解法			In most cases, only approximate value of the solution is obtained by using graphical method.
Method of substitution 代入消元法			Method of substitution involves substituting one of the equations into the other equation in order to eliminate one of the unknowns.
Method of elimination 加減消元法			Method of elimination involves adding or subtracting two linear equations so as to eliminate one of the two unknowns.
		Inconsistent 不相容	A pair of simultaneous equations having no solutions is said to be inconsistent.
		Infinite 無限的	2y - x = 5 is exactly the same as 4y–2x = 10. Therefore, the simultaneous linear equations have an infinite number of solutions.

Verbal Expressions and calculation in Mathematics

1. Determine whether (1,1) lies on the graph of the equation $y + x = 1$.

_____

2. Solve the simultaneous equations $x + 3y = 10$ and $y – 2x = 1$by the method of substitution.

_____

3. Solve $4x + 2y = 1$ and $2x + y = 1$ by the method of elimination.

_____

Answers

1. Consider the point (1,1).
   By substituting x = 1 and y = 1 into the equation
   y + x = 1, we have
   L.H.S. = (1) + (1) = 2
   R.H.S. = 2
   L.H.S. $\neq$ R.H.S.
   (1,1) is not a solution of the equation y + x = 1.
   (1,1) does not lie on the graph of the equation y + x = 1.

2. x + 3y = 10, x = 10 – 3y
   y – 2x = 1, y – 2(10 – 3y) = 1, y – 20 + 6y = 1, y = 3
   x = 10 – 3(3) = 1

3. 2x + y = 1 …...(1)
   4x + 2y = 1 ……(2)
   (1)$\times$2 : 4x + 2y = 2 ……(3)
   (3) – (2) : 0 = 1 ……(4)
   Equation (4) is false, so this pair of simultaneous linear equations has no solutions,
   i.e. it is inconsistent.

Chapter 9 Laws of Integral Indices

Nouns	Verbs	Adjectives	Usages
Scientific Notation 科學記數法			Express 23400 in scientific notation. $23400 = 2.34 \times 10^4$
Numeral 數碼			Numbers in the denary system are expressed by using ten numerals, which are 0,1,2,3,4,5,6,7.8 and 9.
Expanded Form 展開式			The value of a denary number can be expressed in an expanded form. $234.7 = 2\times10^2 + 3\times10^1 + 4\times10^0 + 7\times10^{-1}$
Place Value 位值			The place value of the digit'0' in 11101_2 is 2.
Binary System 二進制 記數法			Only two numerals, 0 and 1, are used to represent numbers in the binary system.
Denary Number 十進數			In a denary number, the position of each digit has a fixed place value. The place value of each digit is ten times that of the digit on its right.
	Convert 轉換		Convert 11101_2 into a denary number. $11101_2 = 1\times2^4 + 1\times2^3 + 1\times2^2 + 1 = 29.$
Hexadecimal Number 十六進數			In a hexadecimal number, the place value of each digit is 16 times that of the digit on its right.

Verbal Expressions and calculation in Mathematics

1. Round off 2575908 correct to 3 significant figures, and express the answer in scientific notation.

_____

2. Write down the place value of each digit in 100101_2 .

_____

3. Express ABC_{16} in the expanded form.

_____

4. Convert DEF_{16} into a denary number.

_____

Answers

1. $2575908 \approx 2.58 \times 10^6$

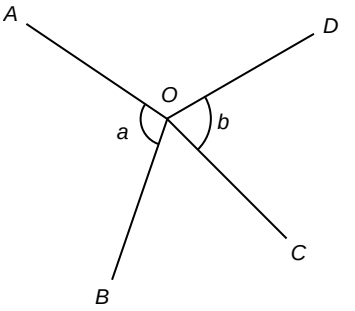
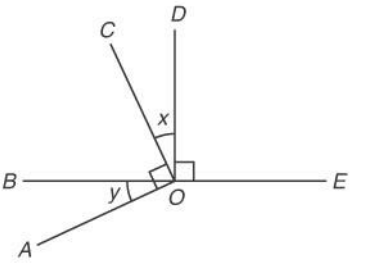
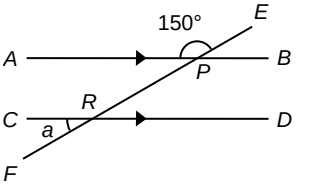
2.

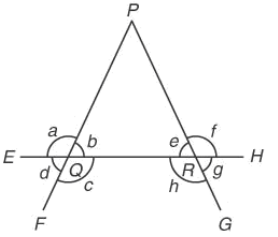
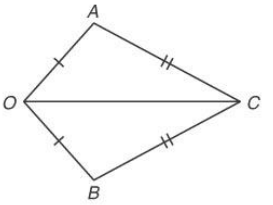
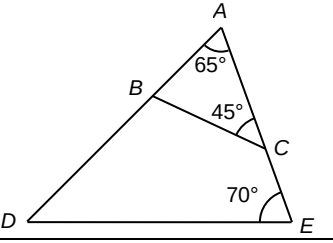
Digit	1	0	0	1	0	1
Place Value	32	16	8	4	2	1

3. $ABC_{16} = 10 \times 16^2 + 11 \times 16^1 + 12 \times 16^0$.

4. $DEF_{16} = 13 \times 16^2 + 14 \times 16^1 + 15 = 3567$

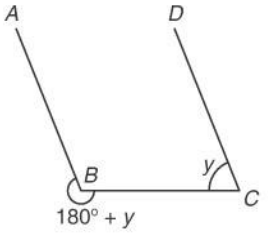
Chapter 10 Introduction to Deductive Geometry

Nouns	Verbs	Adjectives	Usages
	prove 證明		If $\angle AOD + \angle BOC = 180°$, prove that $a + b = 180°$. 
	Show 顯示		As shown in the figure, BOE is a straight line. If $\angle AOC = \angle DOE = 90°$, prove that $x = y$. 
		respective 分別的 respectively 分別地為	In the figure, AB // CD, EF intersects AB and CD at P and R respectively, find a. 

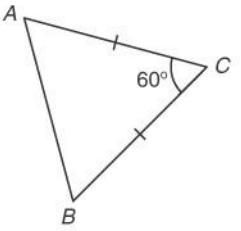
Nouns	Verbs	Adjectives	Usages
condition 條件			If *PQF*, *PRG* and *EQRH* are straight lines, which of the following is/are the condition(s) for △*PQR* to be an isosceles triangle ?  **I.** $c = h$ **II.** $a = f$ **III.** $b = g$
congruent triangle 全等 三角形			If $OA = OB$ and $AC = BC$, prove that △*AOC* and △*BOC* are congruent triangles . (i.e. △*AOC* ≅ △*BOC*) 
similar triangle 相似 三角形			As shown in the figure, ABD and ACE are straight lines, ∠BAC = 65°, ∠ACB = 45° and ∠AED = 70° , prove that △ ABC and △ AED are similar triangles . (i.e. △ ABC ~ △ AED) 

Verbal Expressions and calculation in Mathematics

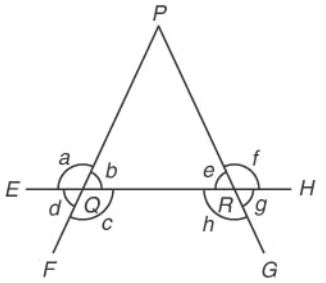
1. In the following figure, prove that AB // DC.



2. In the following figure, prove that
$\triangle ABC$ is an equilateral triangle .



3. If PQF, PRG and $EQRH$ are straight lines, which of the following is/are condition(s) for $\triangle PQR$ to be an isosceles triangle ?

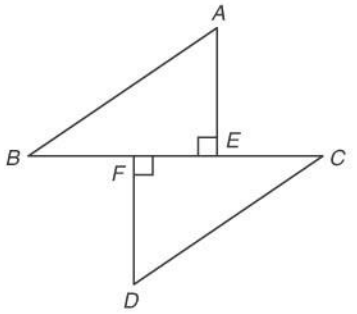


(I) $c = h$

(II) $a = f$

(III) $b = g$

4. In the figure, $AE \perp BC$, $DF \perp BC$, $AB = DC$ and $BE = CF$.



Prove that

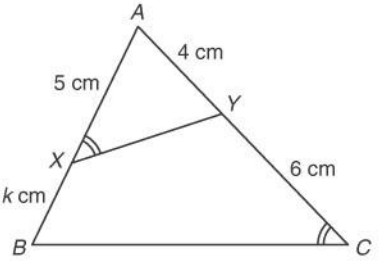
(a) $\triangle ABE$ and $\triangle DCF$ are congruent triangles

i.e. $\triangle ABE \cong \triangle DCF$ and

(b) $AB \,//\, CD$.

5. In $\triangle ABC$ as shown, $AX = 5$ cm, $AY = 4$ cm,

$YC = 6$ cm and $\angle AXY = \angle ACB$.



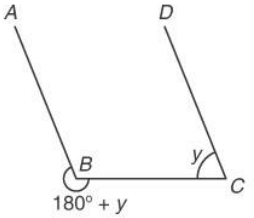
(a) Prove that $\triangle AXY$ and $\triangle ACB$ are similar triangles .

i.e. $\triangle AXY \sim \triangle ACB$.

(b) Find the value of k .

Answers

1. Proof :



$\angle ABC = 360^\circ - reflex\angle ABC$ ($\angle s$ at a pt.)

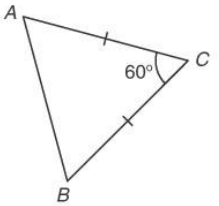
$= 360^\circ - (180^\circ + y)$

$= 180^\circ - y$

Consider $\angle ABC + \angle DCB = (180^\circ - y) + y = 180^\circ$

$\therefore$ AB // DC (int. $\angle$s supp.)

2. Proof :



$AC = BC$ (given)

$\therefore$ $\angle CAB = \angle CBA$ (base $\angle$s, isos. Δ)

Then $\angle CAB = \dfrac{180^o - 60^o}{2}$ ($\angle$ sum of Δ)

$= 60°$

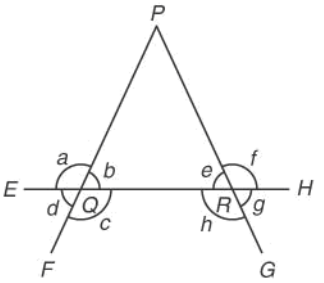
and $\angle CBA = 60^o$ (by above)

i.e. $\angle CAB = \angle ABC = \angle BCA = 60°$

$\therefore$ $BC = AC = AB$ (converse of prop. of equi. Δ)

i.e. ΔABC is equilateral .

3.



For **Condition (I),** we have ***c = h*** ---------- *(#)*

Consider $b = 180° - c$ (adj. $\angle$s on st. line) and

$e = 180° - h$ (adj. $\angle$s on st. line)

By *(#)*, $b = e$

Then, $PQ = PR$(sides opp. equal $\angle$s)

i.e. ΔPQR is isosceles .

For **Condition (II),** we have ***a = f*** ---------- *(##)*

Similar to the arguments in **Condition(I),**

ΔPQR is isosceles too .

For **Condition (III),** we have ***b = g*** ---------- *(####)*

Consider $g = e$ (vert. opp. $\angle$s)

By*(####)*, $b = e$

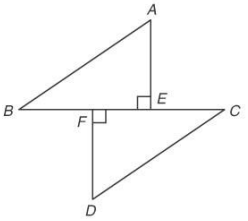
Then, $PQ = PR$ (sides opp. equal $\angle$s)

i.e. ΔPQR is isosceles .

By above, **(I), (II)** and **(III) are** also

conditions for ΔPQR to be an isosceles triangle.

4. (a) Proof :



In ΔABE and ΔDCF ,

$AB = DC$ (given)

$BE = CF$ (given)

$AE \perp BC$ and $DF \perp BC$ (given)

$\therefore \angle AEB = \angle DFC = 90°$

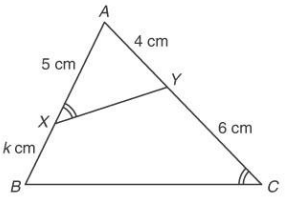
$\therefore \Delta ABE \cong \Delta DCF$ (**RHS**)

(b) Proof :

$\angle ABE = \angle DCF$ (corr. $\angle$s, $\cong\triangle$s) i.e. $\angle ABC = \angle DCB$

$\therefore AB // CD$ (alt. $\angle$s equal)

5. (a) Proof :



In $\triangle AXY$ and $\triangle ACB$,

$\angle XAY = \angle CAB$ (common angle)

$\angle AXY = \angle ACB$ (given)

$\therefore\ \triangle AXY \sim \triangle ACB$ (AA)

(b) $\dfrac{k+5}{4} = \dfrac{10}{5}$ (corr. sides, $\sim\triangle$s)

$\therefore\ \dfrac{k+5}{4} = 2$

$k + 5 = 8 \qquad k = 3$

Chapter 11 Rational and Irrational Numbers

Nouns	Verbs	Adjectives	Usages
Square 平方			The square of 3 is 3×3. $3^2 = 9$. 3 is a square root of 9. $(-3)^2 = 9$. -3 is a square root of 9. 9 has two square roots 3 and -3.
Integer 整數 Fraction 分數 Radical sign 根號 Surd 根式			Square roots that cannot be written as integers or fractions are called surds. $\sqrt{2}$, $-\sqrt{3}$, $\sqrt{5}$, $\sqrt{7}$ are surds. $\sqrt{\ }$ is the radical sign.
Like surds 同類根式		Simplest 最簡單的	Surds contain the same number inside the radical signs when expressed in their simplest forms are called like surds. $\sqrt{3}$, $-\sqrt{3}$, $\sqrt{12} = 2\sqrt{3}$ are like surds.
Unlike surds 異類根式			$\sqrt{5}$, $2\sqrt{7}$, $7\sqrt{3}$ are unlike surds.
Rational number 有理數			A rational number is a number which can be expressed as $\frac{m}{n}$ (where m, n are integers, $n \neq 0$). 2, -7, $\frac{3}{5}$, $0.\dot{6}$ are rational numbers.

Nouns	**Verbs**	**Adjectives**	**Usages**
Irrational number 無理數			$\sqrt{2}$, $3\sqrt{7}$, $-\sqrt{5}$ cannot be expressed as $\frac{m}{n}$ (where m, n are integers, $n \neq \mathbf{0}$). $\sqrt{2}$, $3\sqrt{7}$, $-\sqrt{5}$ are irrational numbers.
Operation 運作 Addition 加法	Add		Add $\sqrt{3}$ to $4\sqrt{3}$. $\sqrt{3}+4\sqrt{3}=5\sqrt{3}$.
Subtraction 減法	Subtract		Subtract $8\sqrt{2}$ from $5\sqrt{2}$. $5\sqrt{2}-8\sqrt{2}=-3\sqrt{2}$.
Multiplication 乘法	Multiply		Multiply $2\sqrt{3}$ by $\sqrt{5}$. $2\sqrt{3}\times\sqrt{5}=2\sqrt{3\times5}=2\sqrt{15}$.
Division 除法	Divide		Divide $\sqrt{6}$ by $\sqrt{2}$. $\frac{\sqrt{6}}{\sqrt{2}}=\frac{\sqrt{2\times3}}{\sqrt{2}}=\frac{\sqrt{2}\times\sqrt{3}}{\sqrt{2}}=\sqrt{3}$.
Denominators 分母			The process of changing the denominator from an irrational number to a rational number is called the rationalization of the denominator.
Rationalization 有理化	Rationalize		Rationalize the denominator of $\frac{\sqrt{3}}{\sqrt{2}}$. $\frac{\sqrt{3}}{\sqrt{2}}=\frac{\sqrt{3}\times\sqrt{2}}{\sqrt{2}\times\sqrt{2}}=\frac{\sqrt{6}}{2}$.

Verbal Expressions and calculation in Mathematics

1. Simplify the following surds.
   (a) $\sqrt{18}$
   (b) $\sqrt{50}$

_____

2. State which of the following is/are rational number(s).
   $\sqrt{3}$, -2.5, $\sqrt{49}$, 3.14

_____

3. State which of the following is/are irrational number(s).
   $\sqrt{7}-2$, $\left(\sqrt{5}\right)^2$, $\left(\sqrt{3}\right)^3$, $\sqrt{4}+\sqrt{3}$

_____

4. Simplify $-\sqrt{108}+4\sqrt{27}-5\sqrt{5}$. Give your answer in the simplest form.

_____

5. Rationalize the denominators of the following expression.
   (a) $\dfrac{1}{\sqrt{3}}$
   (b) $\dfrac{\sqrt{5}}{2\sqrt{2}}$

_____

Answers

1. (a) $\sqrt{18} = 3\sqrt{2}$.

   (b) $\sqrt{50} = 5\sqrt{2}$.

2. -2.5, $\sqrt{49}$, 3.14 are rational numbers.

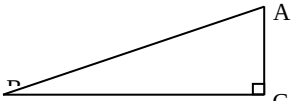
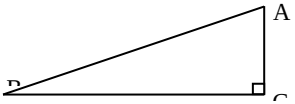
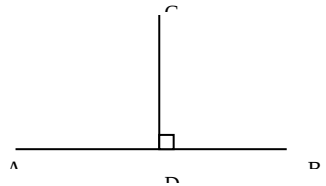
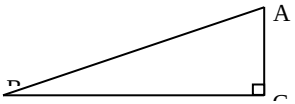
3. $\sqrt{7}-2$, $\left(\sqrt{3}\right)^3$, $\sqrt{4}+\sqrt{3}$ are irrational numbers.

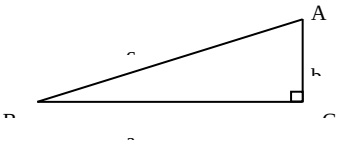
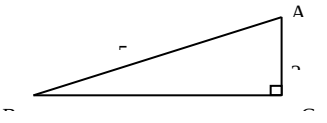
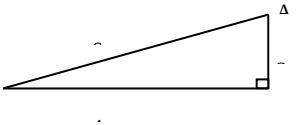
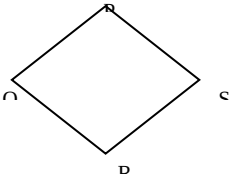
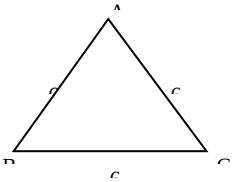
4. $-\sqrt{108}+4\sqrt{27}-5\sqrt{5} = 6\sqrt{3}-5\sqrt{5}$.

5. (a) $\dfrac{1}{\sqrt{3}} = \dfrac{\sqrt{3}}{3}$.

   (b) $\dfrac{\sqrt{5}}{2\sqrt{2}} = \dfrac{\sqrt{10}}{4}$.

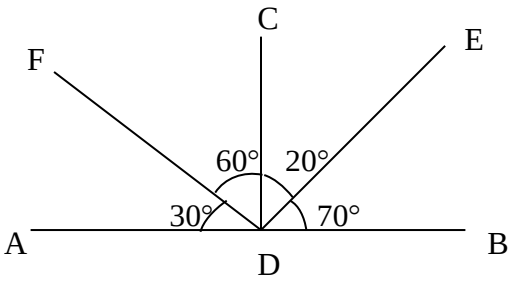
Chapter 12 Pythagoras Theorem

Nouns	**Verbs**	**Adjectives**	**Usages**
Right Angle 直角		Perpendicular 垂直的	AC is <u>perpendicular</u> to BC. $\angle$ACB is a <u>right angle</u>. 
Right-angled Triangle 直角三角形			In the figure, $\angle C = 90°$ ΔABC is a <u>right-angled triangle</u>. AC, BC are the <u>right-angled sides</u>.
Right-angled Sides 直角邊			
Hypotenuse 斜邊			AB is the <u>hypotenuse</u>. 
		Horizontal （水平的） Vertical （鉛垂的）	In the figure, AB is a <u>horizontal line</u> and CD is a <u>vertical line</u>. 
Perimeter 周界 Area 面積			Refer to the figure. <u>Perimeter</u> = AB + BC + CD . <u>Area</u> = $\frac{1}{2}$(BC)(AC) . 

Nouns	Verbs	Adjectives	Usages
Pythagoras' Theorem 畢達哥拉斯的定理 簡稱 「畢氏定理」			In the figure, $a^2+b^2=c^2$. It is called the Pythagoras' Theorem. 
Converse of Pythagoras' Theorem 畢氏定理的逆定理			In the figure, $AC^2+BC^2=3^2+4^2=25$. and $AB^2=5^2=25$. $\because AC^2+BC^2=AB^2 \quad \therefore \angle C=90°$ (converse of Pythagoras' theorem) 
	Determine 判斷		Determine whether $\angle C=90°$. 
Quadrilateral 四邊形			PQRS is a quadrilateral. 
Equilateral Triangle 等邊三角形			ABC is an equilateral triangle. 

Verbal Expressions and calculation in Mathematics

1. Determine whether $\angle BDC$ is a right angle.

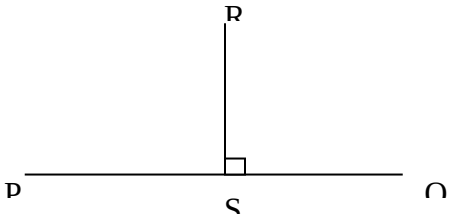


_____

_____

_____

2. PO is a horizontal line. What kind of straight line is RS?



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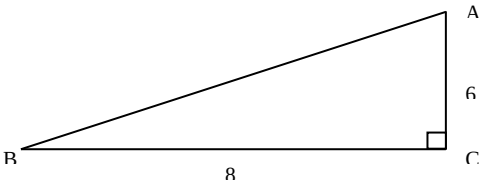
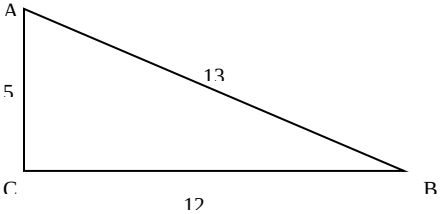
_____

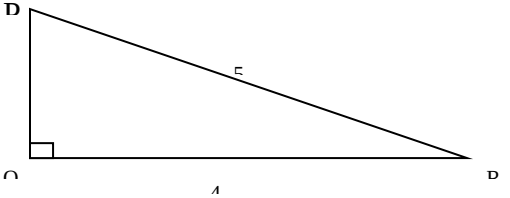
3. Find the hypotenuse of ΔABC .



4. Using the converse of Pythagoras' theorem, determine whether $\angle C = 90°$.



5. Find the perimeter and area of ΔPQR .



Answers

1. $\angle BDC = 70° + 20° = 90°$.

   Yes, $\angle BDC$ is a right angle.

2. RS is a vertical line.

3. Hypotenuse $AB = \sqrt{6^2 + 8^2} = 10$.

4. $AC^2 + BC^2 = 5^2 + 12^2 = 169$

   $AB^2 = 13^2 = 169$

   $\therefore AC^2 + BC^2 = AB^2$

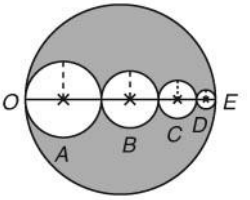
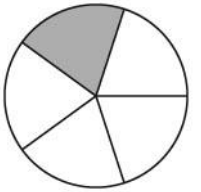
   $\therefore \angle C = 90°$ (converse of Pythagoras' theorem) .

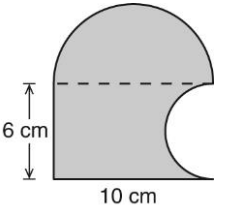
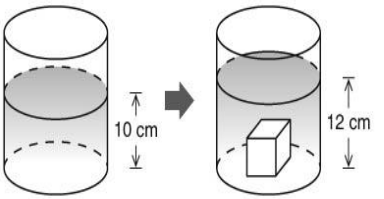
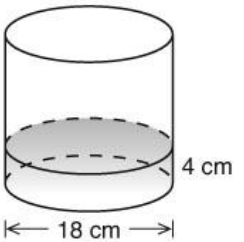
5. $PQ = \sqrt{5^2 - 4^2} = 3$.

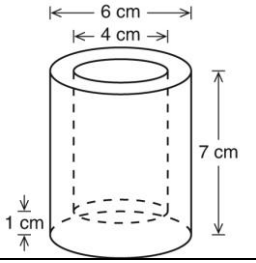
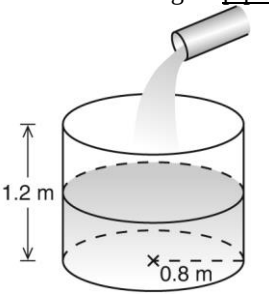
   Perimeter = 3+4+5 = 12 .

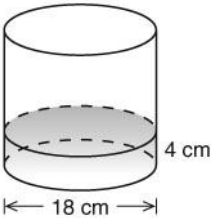
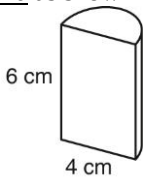
   Area = $\frac{1}{2}(3 \times 4) = 6$.

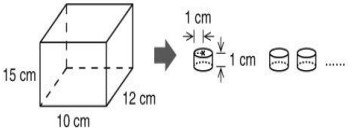
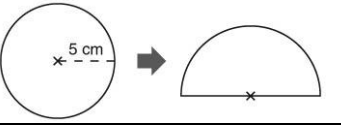
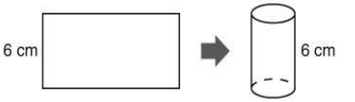
Chapter 13 Areas and Volumes (II)

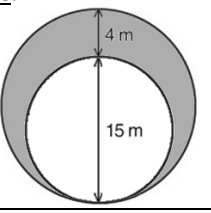
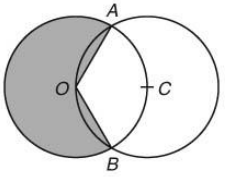
Nouns	Verbs	Adjectives	Usages
Length 長度			Find the length of BC .
perimeter 周界			The perimeter of $\triangle ABC$ is 14 cm.
		Shaded 有陰影的 non-shaded 非陰影的	The area of the shaded region is equal to that of the non-shaded region.
fraction 幾分之幾			What is the fraction of the area of the shaded region to that of the whole figure? 
	divide 分		A circle is divided into five equal parts . 
		identical 完全相同的	The total area of 4 identical circles is 16π cm^2.
wheel 車輪			A wheel has a radius of 0.5 m.
revolution 周 / 圈 / 轉			The wheel makes 18 revolutions.

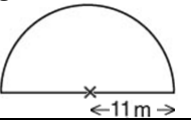
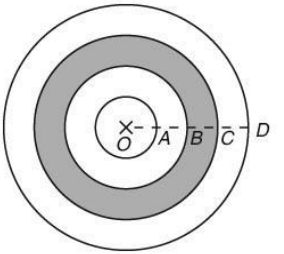
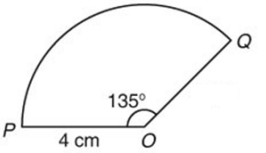
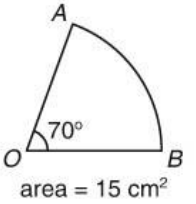
Nouns	Verbs	Adjectives	Usages
Distance 距離			The distance travelled by the bicycle is 10m.
	Consists 組成		The figure consists of a semi-circle and a rectangle from which another semi-circle is cut from it. 
	pass 過		Straight line *OE* passes through the centres of all the 4 circles.
Vessel 容器			A cube is put into the vessel. 
tank 缸 / 箱			A tank contains some water. 

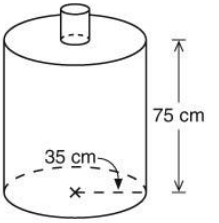
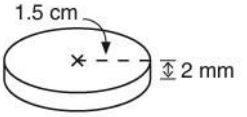
Nouns	Verbs	Adjectives	Usages
		inner 內 outer 外	Given that the inner and outer diameters are 4 cm and 6 cm respectively.
thickness 厚度			The figure shows a metal cup whose height and thickness of the base are 7 cm and 1 cm . Also, the inner and outer diameters are 4 cm and 6cm respectively. 
depth 深度			After a cube is put into the vessel, the depth of water is 12 cm.
pipe 水管			Water flows through a pipe into a tank. 

Nouns	Verbs	Adjectives	Usages
		cylindrical 圓柱形的	Consider a cylindrical tank of base diameter 18 cm.
	pour 注入		Water is poured into a tank.
	flow 流 / 注		Water flows through a pipe into a cylindrical tank.
	fill 注 / 使充滿		Please fill up the tank.
the time taken 所需的時間			Find the time taken to fill up the tank (in minutes) .
		half-filled 盛半滿的	The tank is half-filled with water.
		wet 濕的 / 接觸水的	Find the area of the wet surface of the tank. 
solid 立體			The solid as shown is a half of a cylinder. 

Nouns	Verbs	Adjectives	Usages
Dimension 尺寸			Find the volume of a rectangular wooden block of dimensions 20 cm × 30 cm × 5 cm .
Cube 正方體			Consider a cube of side 5 cm.
	melt 熔化		A metal block is melted.
	recast 重鑄		A metal block is melted and recast to form some cylinders 
		maximum 最多 / 最大	What is the maximum number of cylinder(s) that can be made?
	form 形成 / 造出 / 使.....成為		Please form a tennis club.
	Bent 屈曲		A circular wire of radius 5 cm is bent to form a semi-circle. 
	fold 摺成		A rectangular paper is folded to form a cylinder. 

Nouns	Verbs	Adjectives	Usages
circle 圓			The figure shows a shaded region formed by two circles. 
Centre 圓心			The figure shows two identical circles. Each circle passes through the centre of the other one. 
radius / radii (pl.) 半徑			The radius of the rear wheel of a toy car is 2 cm.
diameter 直徑			The length of diameter is two times length of radius.
circumference 圓周			Find the radius of a circle with circumference 88 cm. $\left(\text{Take } \pi = \frac{22}{7}.\right)$
area of a circle 圓的面積			Find the circumference of a circle with area 36π cm^2 . (answer in terms of π)

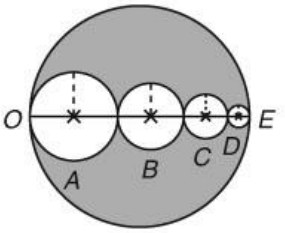
Nouns	Verbs	Adjectives	Usages
semi-circle 半圓			The figure shows a semi-circle with radius 11 m . 
concentric circles 同心圓			As shown in the figure, four concentric circles are given. 
arc length 弧長			In the figure, O is the centre of the circle, find arc length $\overset{\frown}{PQ}$. 
sector area / area of sector 扇形面積			The sector area is 15 cm^2 with $\angle AOB = 70°$, find the radius. 

Nouns	Verbs	Adjectives	Usages
cylinder 圓柱 / 圓柱體			The figure shows a solid formed by two different cylinders. 
base radius 底半徑			Find the base radius of a cylinder with volume 250π cm^3 and height 10 cm.
height 高			The height of a cylinder is 26 cm.
curved surface area 曲面面積			Find the curved surface area of a silver coin with base radius 1.5 cm and thickness 2 mm. 
total surface area 總表面面積			The total surface area of a cylinder is 44.18 cm^2.
volume 體積			The formula of the volume of a cylinder is $\pi r^2 h$.

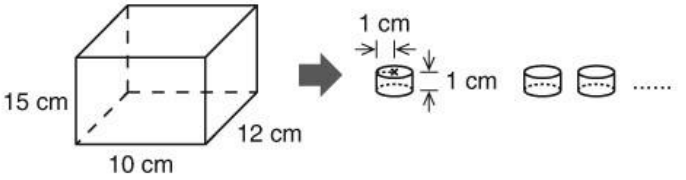
Verbal Expressions and calculation in Mathematics

1. The diameter of a wheel of a car is 0.5 m. If the wheel makes 800 complete revolutions in one minute, find the distance travelled by the car in ten minutes.

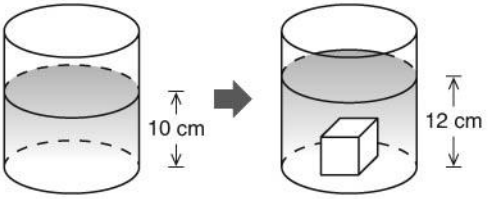
2. In the figure, the radii of circles *A*, *B*, *C* and *D* are 4 cm, 3 cm, 2 cm and 1 cm respectively. *OE* is the diameter of the largest circle, which passes through the centres of all the 4 circles *A*, *B*, *C* and *D*.
   Find the area of the shaded region, giving your answer in terms of π.



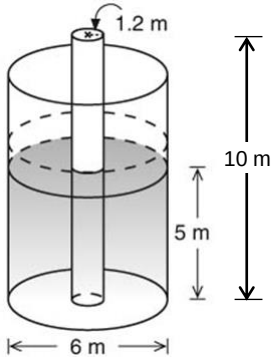
3. A metal rectangular block of dimensions 10 cm × 12 cm × 15 cm is melted and recast to form a number of cylinders of base radius 1 cm and height 1 cm.
   What is the maximum number of cylinders that can be made?



4. In the figure, a cylindrical vessel is filled with water to a depth of 10 cm. When a cube of side 5 cm is put into the vessel, the depth of water becomes 12 cm.
   Find the base radius of the vessel.
   (Give your answer correct to 2 decimal places.)



5. A cylindrical tank of base diameter 6 m is filled with water to a depth of 5 m. Then , a cylindrical metal pillar with length 10 m and base radius 1.2 m. is lowered until it stands upright on the base of the tank as shown in the figure.



   (a) Find the rise in water level.
   (b) Find the total area of the wet surfaces of the pillar (including the base).
   (Give your answers correct to 3 significant figures.)

Answers

1. Distance travelled = 12600 m

2. Area of shaded region = $70\pi\ cm^2$

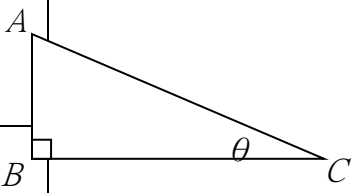
3. Maximum number of cylinders that can be made = 572

4. Base radius of the vessel = 4.46 cm

5. (a) Rise in water level = 0.952 m

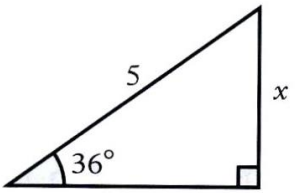
   (b) Required total area = $49.4m^2$

Chapter 14 Trigonometric Ratios

Nouns	Verbs	Adjectives	Usages
Opposite Side 對邊			In the figure, AB is the <u>opposite side</u> of θ. BC is the <u>adjacent side</u> of θ. AC is the <u>hypotenuse</u>.
Adjacent Side 鄰邊			
Hypotenuse 斜邊			
Acute Angle 銳角			In the following figures, find the <u>acute angles</u> θ.
Right-angled Triangle			<u>Right-angled triangle</u> is the triangle with a right angle.

Verbal Expressions and calculation in Mathematics

1. Find the unknowns in the following figures.
   Give your answer correct to 3 significant figures.



Answers

1. $\sin 36° = \frac{x}{5}$

$x = 5 \sin 36°$

$x = 2.94 \, (3 \, \text{sig. fig.})$

Geography

My reading record:

(Please fill in the date of reading)

Module 5 : Living with Hazards			
Unit	Content	Date	Remarks
5.1	Are we living in a hostile world?		
5.2	How can we describe the relief of Hong Kong?		
5.3	What are the causes and effects of landslides?		
5.4	Why does most of Asia suffer from strong wind in summer?		
5.5	Why do earthquakes happen?		
5.6	Why are some people at a higher risk of experiencing natural hazards than we are?		

Module 2: Food Problem			
Unit	Content	Date	Remarks
2.1	Can we produce enough food for our growing population?		
2.2	How do we farm?		
2.3	Where is the farmland in China?		
2.4	What are the major farming problems in China?		
2.5	Can the use of scientific farming methods help solve farming problems in China?		
2.6	What harmful effects do scientific farming methods bring?		
2.7	Are there other ways to solve farming problems in China?		
2.8	Do the same problems happen in the other part of the world?		

In doing activities or exercises, you often need to answer questions. Before you can answer a question, you need to first understand what it means.

Some words or phrases in a question tell us what we need to answer. The following are some examples. ***You will come across them in studying geography.***

Word or phrase	What we need to answer?	Example
Name / Identify **(寫出名稱 / 辨認)**	● Write down the name of something. 寫出某物件的名稱 ● No need to write complete sentence. 不需要以完整的句子作答 ● No need to explain. 不需解釋	**Q**: Name two examples of natural hazards in Hong Kong. **A**: Landslides and typhoons.
State / Write down **(指出 / 寫出)**	● Give a short answer. 簡短地作答 ● No need to explain. 不需解釋	**Q**: Write down the unit of temperature. **A**: Degree Celsius (°C)
List **(列出)**	● Write down a number of things that belong to the same kind. 寫出一些相類似的項目	**Q**: List two urban problems. **A**: Pollution and traffic congestion.
Explain / Why **(解釋 / 為甚麼)**	● Give reasons or the principle behind something. 寫出原因或原理 ● Usually, a detailed answer is needed. 需要詳細作答	**Q**: Explain why the Philippines is frequently hit by typhoons. **A**: It is located on warm, tropical waters. Typhoons usually hit the Philippines first in their tracks.
Suggest / Try to think of **(建議 / 試想出)**	● Give ideas. 寫出構想	**Q**: Suggest one way to protect oceans. **A**: The government can set up laws to stop overfishing.
What do you think? **(你有甚麼意見)**	● Give opinion about something. 寫出意見	**Q**: Some people think that we should stop eating shark fins (魚翅). What do you think? **A**: I agree. Sharks are hunted for their fins. We can protect sharks if we stop eating shark fins.

Describe / How … **(描述 / 怎樣)**	● Give the details of something. 寫出詳細的描述 ● No need to explain. 不需解釋	**Q**: Describe the road conditions in Central in the daytime. **A**: In the daytime, roads are congested with people and cars.
Calculate **(計算)**	● Find the value and give the correct unit. 計算出答案，並加上合適的單位	**Q**: Calculate the percentage change in average vehicle speed. **A**: % change= $\frac{\text{New value – Old value}}{\text{Old value}} \times 100\%$
Compare **(比較)**	● Give similarities and differences between different items. 找出各項相似點和不同之處	**Q**: Compare the population density of Hong Kong and Guangzhou. **A**: Hong Kong has a higher population density than Guangzhou.

Module 5: Living with Hazards

Ch. 5.1 – Are we living in a hostile world?

Vocabularies	n	v	adj.	adv.	Sentences
Natural hazards 自然災害	✓				➢ Landslides, volcanic eruptions and floods are the examples of _____ _____. They cause loss of life and _____.
Loss 損失		✓			
Property 財產	✓				
Damage 破壞	✓				
Cause 原因	✓				➢ If a place is too dry, _____ will occur.
Earthquakes 地震	✓				
Volcanic eruptions 火山爆發	✓				➢ Yuen Long Basin is a large piece of _____ _____.
Flood 氾濫	✓				
Drought 旱災	✓				
Typhoons 颱風	✓				➢ Forests will be destroyed by _____.
Landslides 山泥傾瀉	✓				
Wildfire 山火	✓				
Occur 發生		✓			
Flat land 平坦的土地	✓				
Distribution 分佈	✓				

Module 5: Living with Hazards

Ch. 5.2 – How can we describe the relief of Hong Kong?

Vocabularies	n	v	adj.	adv.	Sentences
Contour map 等高線圖	✓				➢ We can find _____ _____ on a contour map. They show the _____ of slopes. ➢ The difference in height between two contour lines is called the _____ _____. ➢ Vertical exaggeration is the _____ between the vertical scale and the horizontal scale. ➢ _____ is the ratio of the vertical distance to the horizontal distance. ➢ Spurs, cliff and saddle are the common _____ _____ in Hong Kong.
Contour lines 等高線	✓				
Height 高度	✓				
Cross-section 橫切面	✓				
Vertical interval 垂直間距	✓				
Vertical exaggeration 垂直誇大率	✓				
Vertical 垂直			✓		
Horizontal 水平			✓		
Slope 山坡	✓				
Gradient 坡度	✓				
Ratio 比例	✓				
Relief features 地形特徵	✓				
Spurs 山咀	✓				
Valleys 山谷	✓				
Ridge 山脊	✓				
Saddle 鞍形山口	✓				

Module 5: Living with Hazards					
Ch. 5.3 –What are the causes and effects of landslides?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Gravity 重力	✓				➢ Resisting force includes _____ and _____. ➢ There will be no plant roots to hold the slope materials if _____ is removed. The slope will become unstable. ➢ _____ is the breaking down or decay of rocks. ➢ Heavy traffic on slopes causes _____ and leads to the occurrence of landslides.
Slope failure 塌坡	✓				
Rapid 迅速的			✓		
Sudden 突然的			✓		
Cohesion 內聚力	✓				
Friction 摩擦力	✓				
Gravitational force 引力	✓				
Resisting Force 抗力	✓				
Vegetation 植被	✓				
Drainage channel 排水渠	✓				
Maintenance 保養	✓				
Vibration 振動	✓				
Weathering 風化	✓				
Damage 破壞	✓	✓			

Vocabularies	n	v	adj.	adv.	Sentences
Electricity cables 電纜	✓				➢ The government built _____ _____ to support the steep slopes. ➢ Setting up warning systems and providing promotion activities are the _____ used to reduce the damage caused by landslides.
Gas pipes 輸氣管道	✓				
Disrupt 中斷		✓			
Monitor 監察		✓			
Rainstorm 暴雨	✓				
Prevent 防止	✓				
Measures 措施	✓				
Strengthen 鞏固		✓			
Weephole 排水孔	✓				
Retaining wall 擋土牆	✓				
Warning system 警告系統	✓				

Module 5: Living with Hazards

Ch. 5.4 – Why does most of Asia suffer from strong wind in summer?

Vocabularies	n	v	adj.	adv.	Sentences
Air pressure 氣壓	✓				➢ Relative humidity is high when there is high amount of _____ in the air. ➢ Typhoons and rainstorms are the examples of _____ _____ _____. ➢ Winds that change direction with the seasons are called _____. ➢ _____ _____ is a low pressure system.
Precipitation 降水	✓				
Wind direction 風向	✓				
Wind speed 風速	✓				
Fog 霧	✓				
Thunderstorm 雷暴	✓				
Tropical cyclone 熱帶氣旋	✓				
Relative humidity 相對濕度	✓				
Moisture 水份	✓				
Moderate 中度的			✓		
Extreme weather conditions 極端天氣	✓				
Shelters 庇護所	✓				
Monsoons 季風	✓				

Module 5: Living with Hazards

Ch. 5.5 – Why do earthquakes happen?

Vocabularies	n	v	adj.	adv.	Sentences
Earthquakes 地震	✓				➢ The narrow zone between two plates is called _____ _____.
Crust 地殼	✓				
Mantle 地幔	✓				➢ The _____ is the innermost layer of the earth.
Core 地核	✓				
Boundary 邊界	✓				➢ The movement of plates is caused by the _____ of magma.
Convection 對流	✓				
Compress 擠壓		✓			➢ Earthquakes will cause buildings and bridges to _____.
Stretch 拉扯		✓			
Withstand 抵擋		✓			➢ Earthquakes under the sea may lead to great waves called _____.
Shaking 震動	✓				
Destruction 破壞	✓				
Collapse 倒塌		✓			
Trigger 引起		✓			
Tsunami 海嘯	✓				
Earthquake drills 地震演習	✓				
Relief work 救援工作	✓				

Module 5: Living with Hazards

Ch. 5.6 – Why are some people at a higher risk of experiencing natural hazards than we are?

Vocabularies	n	v	adj.	adv.	Sentences
Vulnerable 易受損害的			✓		➢ The effects of natural _____ vary among countries. _____ _____ _____ have more money and _____ technologies to cope with the hazards. Therefore, people's lives can be better protected. ➢ People are still living in dangerous areas as there are economic _____.
Vary 變化		✓			
Advanced 先進的			✓		
Communication 通訊	✓				
Hazards 災害	✓				
Attractions 吸引之處	✓				
Less developed countries 欠發達國家	✓				
More developed countries 較發達國家	✓				

1

Module 2: Food Problem					
Ch. 2.1 – Can we produce enough food for our growing population?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Local 本地的			✓		➢ When the food supply cannot meet the demand, _____ _____ occurs. ➢ Food is supplied by local _____ or by _____. ➢ Rice is the major _____ in South China.
Production 生產	✓				
Food shortage 糧食短缺	✓				
Demand 需求	✓				
Import 進口	✓				
Crop 農作物	✓				
Self-sufficiency 自給自足	✓				

Module 2: Food Problem					
Ch. 2.2 – do we farm?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Agriculture 農業	✓				➢ _____ includes the growing of crops and the rearing of livestock. ➢ Farmers produce food for people and _____ _____ for industries. ➢ Ploughing, sowing and harvesting are the examples of the farming _____. ➢ Rice _____ is popular in Southeast Asia. ➢ _____ farming in New Zealand is also one of the major agriculture activities in the world.
Rearing 飼養	✓				
Livestock 牲畜	✓				
Raw materials 原料	✓				
Processes 過程	✓				
Farm produce 農產品	✓				
Ploughing 犁地	✓				
Sowing 播種	✓				
Harvesting 收割	✓				
Irrigating 灌溉	✓				
Intensive 密集			✓		
Extensive 粗放			✓		
Inputs 投入	✓				
Outputs 產出	✓				
Subsistence 自給性	✓				
Commercial 商業性	✓				
Dairy 乳品業	✓				
Wheat 小麥	✓				
Cultivation 耕種	✓				

Module 2: Food Problem					
Ch. 2.3 – Where is the farmland in China?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Evenly 平均地				✓	➢ The _____ _____ is short if it is too cold in winter. ➢ Most of the large cities are found in the _____ area in China. ➢ The soil in northwest China is _____.
Growing season 生長期	✓				
Coastal 沿岸的			✓		
Plain 平原	✓				
Infertile 不肥沃			✓		
Poultry 家禽	✓				
Rubber 橡膠	✓				

Module 2: Food Problem					
Ch. 2.4 – What are the major farming problems in China?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Limitation 限制	✓				➢ There are many different types of natural hazards, such as droughts, floods and _____. ➢ Large machines cannot be used in small farmland to improve the farming _____. ➢ As vegetation is removed, _____ _____ will occur.
Pests 害蟲	✓				
Desertification 荒漠化	✓				
Efficiency 效率	✓				
Soil erosion 土壤侵蝕	✓				
Prolonged 持續			✓		
Harmful 有害的			✓		

Module 2: Food Problem					
Ch. 2.5 – Can the use of scientific farming methods help solve farming problems in China?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Scientific 科學化			✓		➢ Chemical _____ are used to provide nutrients to the crops. ➢ Machines such as _____ are used to improve farming efficiency. ➢ _____ system has to be installed if we want to grow crops in semi-arid areas.
Biotechnology 生物科技	✓				
Irrigation 灌溉	✓				
Fertilizers 肥料	✓				
Pesticides 農藥	✓				
Semi-arid 半乾旱			✓		
Tractors 拖拉機	✓				

Module 2: Food Problem					
Ch. 2.6 – What harmful effects do scientific farming methods bring?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Insects 昆蟲	✓				➢ The use of fertilizers provides nutrients for _____ in rivers. ➢ The _____ is polluted if pesticides are washed into it. ➢ Pesticides will kill pests and also the good _____. ➢ The _____ of GM crops is expensive and farmers in less developed countries cannot afford it.
Serious 嚴重			✓		
Algae 海澡	✓				
Nutrients 養分	✓				
Stream 溪流	✓				
Soil degradation 土壤退化	✓				
Pest-resistant 抗蟲			✓		
Productive 高生產力			✓		
Patent 專利	✓				
Infrastructure 基礎建設	✓				

Module 2: Food Problem					
Ch. 2.7 – Are there other ways to solve farming problems in China?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Sustainable 可持續			✓		➢ _____ _____ is used to conserve the soil as different crops need different nutrients. ➢ The _____ from livestock provides nutrients for the soil. ➢ The productivity of _____ _____ is low. Therefore, we should avoid developing these areas.
Long run 長期			✓		
Manure 糞肥	✓				
Conservation 保護、節省	✓				
Crop rotation 輪耕法	✓				
Marginal land 邊緣土地	✓				

Module 2: Food Problem					
Ch. 2.8 – Do the same problems happen in the other part of the world?					
Vocabularies	**n**	**v**	**adj.**	**adv.**	**Sentences**
Food aid 糧食援助	✓				➢ The _____ _____ and _____ _____ are low in less developed countries. ➢ If there is not enough food for the people in a country, _____ occurs. ➢ Using fertilizers can improve the _____ of the soil.
Life expectancy 預期壽命	✓				
Birth rate 出生率	✓				
Literacy rate 識字率	✓				
Citizens 人民	✓				
Fertility 肥沃度	✓				
Poverty 貧窮	✓				
Famine 饑荒	✓				

END

Integrated Science

The course includes the following elements:

1. Vocabularies: clues to pronunciation and spelling
2. Glossary
3. Useful expressions

Vocabularies: Clues to pronunciation and spelling

Chapter 7 Living things and air

• air pol·**lu**·tion **in**·dex • blood **ves**·sel • **bron**·chus • **burn**·ing splint • **car**·bon di·**o**·xide • **chlo**·ro·phyll • con·**trac**·tion • **con**·trol ex·**pe**·ri·ment • de·**starch** • **di**·a·phragm • fire **tri**·an·gle	• food chain • **ga**·se·ous ex·**change** • **glow**·ing splint • **hy**·dro·gen· **car**·bon·ate • **in**·di·ca·tor • **i**·o·dine test • lime **wa**·ter • lung • **ni**·tro·gen • **no**·ble gas • **o**·xy·gen	• pho·to·**syn**·the·sis • pol·**lu**·tant • pro·**du**·cer • res·pi·**ra**·tion • rib • **so**·da lime • starch • tra·**che**·a • va·ri·e·**ga**·ted leaf • word e·**qua**·tion

Chapter 8 Making use of electricity

• **am**·me·ter • **Am**·pere • **bat**·ter·y • branch • **cir**·cuit • **cir**·cuit board • **cir**·cuit **di**·a·gram • **cur**·rent • **ear**·thing • e·**lec**·tri·cal shock	• e·**lec**·tron • fuse • in **pa**·ral·lel • in **se**·ri·es • in·su·**la**·tion • mains **soc**·ket • **ne**·ga·tive pole • **ni**·chrome • over·**load**·ing • **po**·wer	• re·**sis**·tance • **rhe**·o·stat • ring **cir**·cuit • short **cir**·cuit • switch • **ter**·mi·nal • **vol**·tage • Volt • Watt

Chapter 9 Space Travel

• force • ex·**ert** • ef·**fect** • **fric**·tion • **lu**·bri·cant • pre·**vent**	• in·**crease** • re·**duce** • **gra**.vi·ty • **ob**·ject • weight • mass	• **as**·tro·naut • con·**duc**·tion • con·**vec**·tion • ra·di·**a**·tion

Chapter 10 Common Acids and Alkalis

• **a**.cid • **al**·ka·li • di·**lute** • so·**lu**·tion • **lit**·mus **pa**·per	• **neu**·tral • u·ni·**ver**·sal **in**·di·ca·tor • cor·**ro**·sive • re·**act** • hy·dro·**chlo**·ric **a**.cid	• sul·**phu**·ric **a**.cid • **ni**·tric **a**.cid • **so**·di·um hy·**dro**.xide • po·**tas**·si·um hy·**dro**.xide

Chapter 11 Sensing the Environment

• **sti**.mu·lus • sense • re·**spond** • **cor**·ne·a • **re**.ti·na	• **pu**·pil • lens • **i**.ma.ge • vi·**bra**·tion • **fre**·quen·cy	• **me**·di·um • trans·**mit** • **de**.ci·bel

Glossary

Chapter 7 Living things and air

- air pollution index 空氣污染指數
- blood vessel 血管
- bronchus 支氣管
- burning splint 燃燒中的木條
- carbon dioxide 二氧化碳
- chlorophyll 葉綠素
- contraction 收縮
- control experiment 對照實驗
- destarch 脫澱粉
- diaphragm 橫膈膜
- fire triangle 火三角
- food chain 食物鏈
- gaseous exchange 氣體交換
- glowing splint 有餘燼的木條
- hydrogencarbonate indicator 碳酸氫鹽指示劑
- iodine test 碘液試驗
- lime water 石灰水
- lung 肺
- nitrogen 氮氣
- noble gas 惰性氣體
- oxygen 氧氣
- photosynthesis 光合作用
- pollutant 污染物
- producer 生產者
- respiration 呼吸作用
- rib 肋骨
- soda lime 鹼石灰
- starch 澱粉
- trachea 氣管
- variegated leaf 斑葉
- word equation 文字方程式

Chapter 8 Making use of electricity

- ammeter 安培計；電流表
- Ampere 安培（電流單位）
- battery 電池組
- branch 支電路
- circuit 電路；線路
- circuit board 電路板；線路板
- circuit diagram 電路圖；線路圖
- current 電流
- earthing （接）地；地線
- electrical shock 電擊
- electron 電子
- fuse 保險絲
- in parallel 並聯
- in series 串聯
- insulation 絕緣
- mains socket 電源插座；市電插座
- negative pole（電池）負極
- nichrome 鎳鉻合金
- overloading 使超負荷；使負荷過多
- power 功率
- resistance 電阻
- rheostat 變阻器
- ring circuit 環形電路
- short circuit 短路
- switch（電路的）開關
- terminal（電路的）接線端鈕
- voltage 電壓
- Volt 伏特（電壓單位）
- Watt 瓦；瓦特（功率單位）

Chapter 9 Space Travel

- force 力
- exert 施加
- effect 效應；結果
- friction 摩擦力
- lubricant 潤滑劑
- prevent 防止
- increase 增加
- reduce 減少
- gravity 重力；地球引力
- object 物體；東西
- weight 重量
- mass 質量
- astronaut 太空人
- conduction 傳導
- convection 對流
- radiation 輻射

Chapter 10 Common Acids and Alkalis

- acid 酸
- alkalis 鹼
- dilute 稀釋
- solution 溶液
- litmus paper 石蕊試紙
- neutral 中性的
- universal indicator 通用指示劑
- corrosive 腐蝕性的
- react 起化學反應
- hydrochloric acid 鹽酸
- sulphuric acid 硫酸
- nitric acid 硝酸
- sodium hydroxide 氫氧化鈉
- potassium hydroxide 氫氧化鉀

Chapter 11 Sensing the Environment

- stimulus 刺激
- sense 感覺
- respond 作出反應
- cornea 角膜
- retina 視網膜
- pupil 瞳孔
- lens 晶狀體；透鏡；鏡片
- image 影像
- vibration 震動
- frequency 頻率
- medium 介質
- transmit 傳送
- decibel 分貝

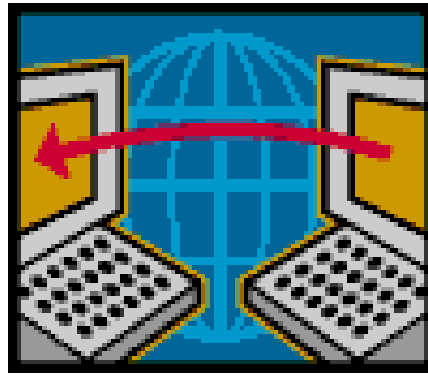
Useful expressions

Make up 組成	Air *makes up* the atmosphere surrounding the Earth. Matter is *made up* of atom.
Contain 包含; 含有; 容納	Air *contains* nitrogen, oxygen and other gases. Bottles *containing* lime water should always be stoppered. Breathed air *contains* more carbon dioxide. Cigarette smoke *contains* tar.
Carry out 實施; 執行	We can *carry out* simple tests to identify some gases. We need energy to *carry out* our activities. Green plants can *carry out* photosynthesis in sunlight. Grasshopper *carries out* gaseous exchange day and night.
From . . . to . . . 從…到…	Lime water changes *from* colourless *to* milky in carbon dioxide. The Air Pollution Index ranges *from* 0 *to* 500. The dry cell drives the free electron to flow in a fixed direction *from* the negative pole *to* the positive pole. Electrons that can move freely *from* one atom *to* another are called free electrons.
Fill . . . with 填滿; 裝滿	*Fill* the gas jar fully *with* water.
Go out (火)熄滅	The burning splint will *go out* in carbon dioxide.
Depend on 視...而定	Result *depends on* the size of the gas jar. The resistance of a wire *depends on* its length, its thickness and the material that makes up the wire. The size of the electric current flowing through an electrical appliance *depends on* its power and the voltage applied.
Arrive at 得出(結論)	How can you *arrive at* your answer from the result?

A piece of 一	How long is *a piece of* string? Put *a piece of* dry cobalt chloride paper onto the surface of a dry mirror.
A pair of	Hold the string with *a pair of* forceps. Use *a pair of* scissors to remove the outer rubber cover of an electric cable.
A … of	Take *a boiling tube of* oxygen and observe its colour. Noble gases is *a group of* colourless and unreactive gases. Use a dropper to put *a drop of* water on it. Add 5ml of hydrogencarbonate indicator into *a gas jar of* unbreathed air. In metals, there are *a large number of* free electrons.
According to 按照;根據	Complete the table *according to* the results in the experiment. The Air Pollution Index is divided into five levels *according to* the potential effects on health. Connect a circuit *according to* the circuit diagram on the right.
Give out 放出 (熱、光)	Heat energy is *given out* during burning. The 60W bulb *gives out* more light energy per second.
Make use of 利用; 使用	We can *make use of* the principle of the fire triangle to put out a fire.
Use up 用完; 耗盡	During photosynthesis, plants are *using up* carbon dioxide in air.
Occur	Gaseous exchange *occurs* inside the lung. Respiration *occurs* all the time inside living cells. A fire *occurred* as too many electrical appliances were connected to one main socket at the same time.
Break down	Food is *broken down* to release the energy we need.
Allow . . . to 允許	Substances that allow electricity to pass through are called electrical conductors. Substances that do not allow electricity to pass through are called electrical insulators.

Set up 建立; 裝配好	Set up a circuit to test whether the materials provided are electrical conductors or insulators.
Light up (使)光亮	When we switch on a lamp, the lamp lights up.
One of the . . . 其中一個	If *one of the bulbs* is removed, the circuit will become open. If the bulb in *one of the branches* is removed, the bulbs in all other branches will still light up. If *one of the paths* is damaged, there is still another path for carrying electric current.
React with 與……起化學反應	Glass does not *react with* acids or alkalis. Marble *react with* dilute hydrochloric acid to give off a gas.
Use . . . to measure 使用…量	We *use* a spring balance *to measure* the mass.
Come to rest 停止移動	A sliding puck *comes to rest* due to friction.
Act on 施於	The force of gravity *acting on* everybody by the Earth is the same.
In a state of 在狀態	In outer space, everything is *in a state of* weightlessness.
Slow down (使)減速	A parachute is used to *slow down* the space shuttle when landing.
In terms of 依據，按照	Acidity or alkalinity can be measured *in terms of* pH values.
Less likely 較少可能	Soap with a pH value of 5.5 is *less likely* to harm our skin.
In nature 本質上	Rainwater is acidic *in nature*.
Pass through 通過	The diagram shows the path of light *passing through* an eye.

Computer Literacy



Glossary

English	中文
absolute address	絕對位址
automation	自動化
browser	瀏覽器
cell	單元格
chart	圖表
client	客戶端
column	欄，直行
communications protocol	通訊協定
computer ethics	電腦倫理
computer network	電腦網絡
computerisation	電腦化
constant	常數
data analysis	數據分析
data sorting	數據排序
data subject	數據主體
debug	除錯
echo	回音
error	誤差，錯誤
file server	檔案伺服器
firewall	防火牆
homepage	主網頁，首頁
hyperlink	超連結
hypertext markup language (HTML)	超文本標示語言
Hypertext Transfer Protocol (HTTP)	超文本傳輸協定
image format	圖像格式

English	中文
instruction	指令
Internet Protocol (IP)	互聯網協定
Internet service provider (ISP)	互聯網服務供應商
intranet	內聯網
local area network (LAN)	區域網絡
logic	邏輯
network	網絡
network server	網絡伺服器
network structure	網絡結構
precision	精確度
primary key	主關鍵碼
privacy	私隱權
program debugging	程式除錯
range	範圍
relative address	相對位址
row	橫列，列
run	執行，運行
server	伺服器
sort	排序
sound file	音效檔
sound synthesiser	聲音合成器
spreadsheet	試算表
syntax error	語法錯誤
tag	標記
worksheet	工作表