SKHBBSS

S. 1 Bridging Handbook

(Mathematics)

Chapter 1 Basic Mathematics

Nouns	Verbs	Adjectives	Usage
natural number 自然數			1, 2, 3, 4, … are natural numbers.
whole number 整數			0, 1, 2, 3, 4, … are whole numbers.
even number 偶數			0, 2, 4, 6, … are even numbers.
odd number 奇數			1, 3, 5, 7, … are odd numbers.
addition 加法	add		2+3 = add 3 to 2
subtraction 減法	subtract		5-2 = subtract 2 from 5
multiplication 乘法	multiply		2×3 = multiply 2 by 3
division 除法	divide		6÷2 = divide 6 by 2
sum 和			the sum of 2 and 3 is 5.
difference 差			the difference of subtracting 2 from 5 is 3.
product 積			the product of 2 and 3 is 6.
quotient 商			the quotient of dividing 6 by 2 is 3.

Nouns	Verbs	Adjectives	Usage
lowest common multiple (L.C.M.) 最小公倍數			the L.C.M. of 6 and 8 is 24.
highest common factor (H.C.F.) 最大公因數			the H.C.F. of 48 and 54 is 6.
prime number 質數			2, 3, 5, 7, 11, 13, … are prime numbers.
composite number 合成數			4, 6, 8, 9, 10, 12, … are composite numbers.
prime factor 質因數			2 and 3 are prime factors of 12.
numerator 分子			$\frac{a}{b}$ a is the numerator.
denominator 分母			$\frac{a}{b}$ b is the denominator.
proper fraction 真分數			$\frac{7}{8}$ is a proper fraction.
improper fraction 假分數			$\frac{9}{8}$ is an improper fraction.
mixed number 帶分數			$1\frac{1}{8}$ is a mixed number.

Verbal Expressions and calculation in Mathematics

1. Find the answer of adding 60 to 10.

2. Find the answer of dividing 60 by 10.

3. Find the product of 60 and 10.

4. Find the L.C.M. of 18 and 27.

5. Find the H.C.F. of 18 and 27.

6. Convert the mixed number $2\frac{3}{8}$ into an improper fraction.

Answers

1. 70

2. 6

3. 600

4. 54

5. 9

6. $\frac{19}{8}$

Chapter 2 Directed numbers and the Number Line

Nouns	Verbs	Adjectives	Usage
positive numbers 正數		positive	+1, +9 and + 20 are positive numbers.
negative numbers 負數		negative	-1, -9 and -20 are negative numbers.
directed number 有向數			numbers with a + or - sign are directed numbers
opposite number 相反數			+5 and -5 are opposite numbers.
number line 數線			
origin 原點			The position of 0 on the number line.
ascending order 由小至大			1, 2, 3, 4, 5
descending order 由大至小			5, 4, 3, 2, 1

Verbal Expressions and calculation in Mathematics

1. Arrange the numbers 8, 3, 11, 7 in descending order.

2. Arrange the numbers 8, 3, 11, 7 in ascending order.

3. Find the answer of (-3)+(+8).

4. Find the answer of (-3)×(+8).

Answers

1. 11, 8, 7, 3

2. 3, 7, 8, 11

3. +5

4. -24

Chapter 3 Introduction to Algebra

Nouns	Verbs	Adjectives	Usages
Algebra 代數			Use symbols or letters to represent unknown values.
algebraic expression 代數式			2a+6 is an algebraic expression.
index notation 指數記數法			the index notation of 9x9x9x9 is 9^4
expanded form 連乘式			the expanded form of 9^4 is 9x9x9x9
base 底			for 9^4, 9 is the base.
index 指數			for 9^4, 4 is the index.
exponent 指數			for 9^4, 4 is the exponent.
Substitution 代入	substitute		substitute a by 3, 2a+6=2x3+6=12
Formula 公式			The formula for the perimeter of a circle is $P=2\pi r$
Variable 變數			In the formula $P=2\pi r$, r is a variable.
Constant 常數			In the formula $P=2\pi r$, 2 and π are constants.
Sequence 數列			1, 3, 5, 7, 9 form a sequence of numbers.
Term 項			The sequence 1, 3, 5, 7, 9 has 5 terms.
arithmetic sequence 等差數列			For the sequence 1, 5, 9, 13, 17, 21, ..., the difference between each term is 4. This is an arithmetic sequence.
general term 通項			For the arithmetic sequence 1, 5, 9, 13, 17, 21, ..., the general term is 4n-3
Function 函數			T=4n-3 T is a function of n.

Verbal Expressions and calculation in Mathematics

1. Simplify the algebraic expression a+a+a+a-2a.

2. Write down the index notation of 5x5x5x5x5x5

3. Write down the expanded form of a^5

4. Substitute a by 2 and find the value of $a+2a^2+3a^3$

5. Find the missing term n in the arithmetic sequence 2, 7, 12, n, 22, 27, ...

Answers

1. 2a

2. 5^6

3. a x a x a x a x a

4. 34

5. n=17

Chapter 4 Algebraic Equations in One Unknown

Nouns	Verbs	Adjectives	Usages
algebraic equation 代數方程			a+4=10 is an algebraic equation.
Unknown 未知數			a is an unknown in the equation a+4=10
Solution 解			The solution of the equation a+4=10 is a=6
Root 根			The root of the equation a+4=10 is a=6
	Solve 解		Solve the equation a+4=10
transposition of terms 移項			technique of moving terms from one side of an equation to the other side

Verbal Expressions and calculation in Mathematics

1. Find the unknown a of the equation 2a+6=14

2. Solve the equation 6a-5=13

3. Find the solution of the equation 3a/12=4

Answers

1. a=4

2. a=3

3. 16

Chapter 5 Introduction to Geometry

Nouns	Verbs	Adjectives	Usages
Geometry 幾何			Geometry is an important branch of Mathematics.
Straight line 直線			In the figure, BC is a straight line.
Curved line 曲線			Which line is a curved line?
End point 端點			AB is a straight line. Point A and point B are the end points.
Vertex 頂點			O is the vertex of ∠AOB.
Angle 角			The sum of all the interior angles of a triangle is 180◦
Round angle 周角			Round angle is 360◦ .
Straight angle 平角			Straight angle is 180◦ .
Right angle 直角			Right angle is 90◦ .
Acute angle 銳角			Acute angle is between 0 and 90◦ .
Obtuse angle 鈍角			Obtuse angle is between 90◦ and 180◦ .
Reflex angle 反角			Reflex angle is between 180◦ and 360◦ .

Nouns	Verbs	Adjectives	Usages
Parallel lines 平行線		Parallel	AB is parallel to CD.
Perpendicular lines 垂直線		Perpendicular	EF is perpendicular to GH.
Triangle 三角形		Triangular	We can classify triangles according to their sides or angles.
Equilateral triangle 等邊三角形			All sides of an equilateral triangle are of equal length.
Isosceles triangle 等腰三角形			Two sides of an isosceles triangle are of equal length.
Scalene triangle 不等邊三角形			All sides of a scalene triangle are of unequal length.
Convex polygon 凸多邊形			All interior angles of a convex polygon are less than 180°.
Concave polygon 凹多邊形			At least one of the interior angles of a concave polygon is greater than 180°.
Diagonal 對角線			The line segment joining any two non-adjacent vertices of a polygon is a diagonal.
Radius 半徑			The radius of the circle is 5cm.
Diameter 直徑			The diameter of a circle is twice the radius in length.

Nouns	Verbs	Adjectives	Usages
Circumference 圓周		Circumscribed 圓外接	The circumference of a circle is the product of 2π and the radius.
Polyhedron 多面體			Polyhedron is a solid enclosed by polygon.
Cuboid 長方體			A cuboid has twelve edges.
Cube 立方體		Cubical	A cube has six faces.
Prism 凌柱			The base of a prism is a polygon.
Cylinder 圓柱體		Cylindrical	Cylinder has uniform cross section.
Cone 圓錐體		Conical	Cone does not has uniform cross section.
Uniform cross-section 均勻橫切面			Prism has uniform cross section.
Isometric grid 等距方格			Draw the 2-D representation of the solid on the isometric grid paper.
Oblique grid 斜網方格			Draw the 2-D representation of the solid on the oblique grid paper.
Construction 構做	Construct		Construct an equilateral triangle of any size.

Verbal Expressions and calculation in Mathematics

1. In $\triangle ABC$, $\angle A = 80^\circ$, $\angle B = 75^\circ$, find the value of $\angle C$.

_____

2. How many vertices are there in a triangular prism?

_____

3. Refer to the following figures, which figure is a concave polygon?

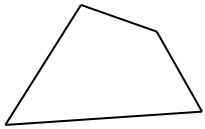


Figure 1.

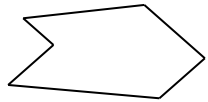


Figure 2.

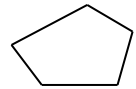


Figure 3.

_____

_____

4. What is the uniform cross-section of a cylinder?

_____

5. How many diagonals are there in a pentagon?

_____

Answers

1. $\angle C$ is 25°.

2. There are six vertices in a triangular prism.

3. Figure 2 is a concave polygon.

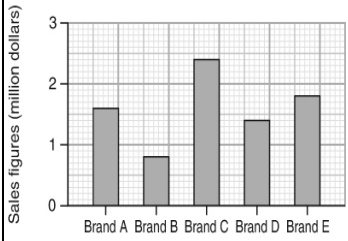
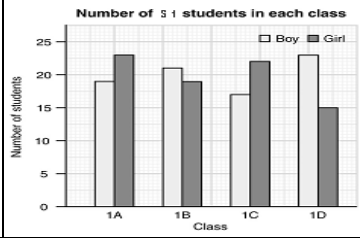
4. The uniform cross-section of a cylinder is a circle.

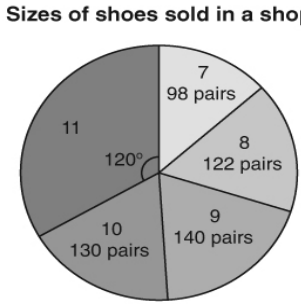
5. There are five diagonals in a pentagon.

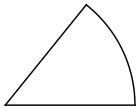
Chapter 6

Introduction to Statistics and Statistical Charts

Nouns	Verbs	Adjectives	Usages
Statistics		Statistical 統計學的	We can draw statistical diagrams to present the data.
Datum (singular) Data (plural) 數據			Read the following data. Favourite sports of F.1A students: Favourite sports — no. of stu Badminton 12 Basketball 18 Football 5 Volleyball 5
Discrete data 離散數據			The following are discrete data. No. of family members of 20 students: 5, 5, 4, 6, 4, 3, 2, 4, 3, 2, 3, 4, 7, 5, 3, 4, 5, 3, 3, 3
Continuous data 連續數據			The following are continuous data. Weights (in kg) of 12 members of a basketball team: 45.2, 56.0, 47.5, 44.6, 38.5, 40.3, 42.4, 45.3, 42.6, 51.4, 49.0, 51.5
Diagram 圖		Diagrammatic	He draws a diagram to explain his idea.
Graph 圖表		Graphical	This graph shows the favourite games of 180 students.

Bar Chart 棒形圖			The following <u>bar chart</u> shows the sales figures of 5 brands of camera. 
Compound		Compound 複合	The following <u>compound</u> bar chart shows the number of S1 students in each class. 
Trend 趨勢	Trend		The price of a mobile phone in the past 5 months are: $2800, $2700, $2640, $2500, $2380 The trend of the price is decreasing.

Nouns	Verbs	Adjectives	Usages
Increase	Increase 增加		This year: $400 Next year: $500 The price will <u>increase</u> in next year
Decrease	Decrease 減少		This year: $500 Next year: $400 The price will <u>decrease</u> in next year.
Broken-Line Graph 折線圖			The following <u>broken-line graph</u> shows the profits of a company from 2005 to 2009. 
Pie Chart 圓形圖			The following <u>pie chart</u> shows the sizes of shoes sold in a shop. 

<table>
<tr><th>Nouns</th><th>Verbs</th><th>Adjectives</th><th>Usages</th></tr>
<tr><td>Sector
扇形</td><td></td><td></td><td>Each slice of a pie chart is called a sector.
  </td></tr>
<tr><td>Digit
數位</td><td></td><td>Digital</td><td>In the number 478
Hundred digit is 4
Ten digit is 7
Unit digit is 8</td></tr>
<tr><td>Stem
幹</td><td></td><td></td><td>We take the ten digit as the “stem”.</td></tr>
<tr><td>Leaf
葉</td><td></td><td></td><td>We take the unit digit as the “leaf”.</td></tr>
<tr><td>Stem - and - Leaf Diagram
幹葉圖</td><td></td><td></td><td>The following stem-and-leaf diagram shows the IQ scores of a group of 18 students.
<table>
<tr><td>Stem (tens)</td><td>Leaf (units)</td></tr>
<tr><td>9</td><td>1 2 3</td></tr>
<tr><td>10</td><td>2 3 5 6 6</td></tr>
<tr><td>11</td><td>4 5 6 7 8 9</td></tr>
<tr><td>12</td><td>0 2 3 9</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Nouns</th><th>Verbs</th><th>Adjectives</th><th>Usages</th></tr>
<tr><td>Frequency
頻數</td><td>Frequent</td><td>Frequent</td><td>From the data,
“3cm” occures 7 times.
The frequency of
“3cm” is 7.</td></tr>
<tr><td>Distribution
分佈</td><td>Distribute</td><td></td><td>Complete the frequency distribution table.</td></tr>
<tr><td>Tally
劃記</td><td></td><td></td><td>The tally mark 𝍸 /// stands for 8.</td></tr>
<tr><td>Frequency Distribution Table
頻數分佈表</td><td></td><td></td><td>The following frequency distribution table shows the weights of 30 S1 students.
Table 1:
<table>
<tr><th>Weight (kg)</th><th>Tally</th><th>Frequency</th></tr>
<tr><td>31 - 35</td><td>𝍸</td><td>5</td></tr>
<tr><td>36 - 40</td><td>𝍸 ///</td><td>8</td></tr>
<tr><td>41 - 45</td><td>𝍸 𝍸</td><td>10</td></tr>
<tr><td>46 - 50</td><td>𝍸 //</td><td>7</td></tr>
</table></td></tr>
</table>

Verbal Expressions and calculation in Mathematics

1. Is the following discrete data or continuous data?
   " Lengths of some stamps"

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2. In the table, what is the trend of the population

Year	1990	1995	2000	2005	2010
Population (million)	5.8	6.3	6.7	6.9	7.3

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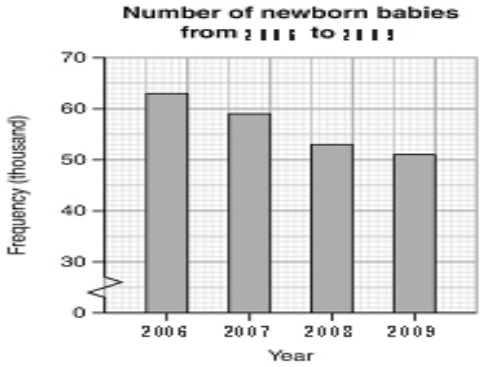
3. What is the name of the following statistical diagram?



Answers

1. It is continuous data.
2. The trend of the population is increasing.
3. Bar chart

Chapter 7 Percentages (I)

Nouns	Verbs	Adjectives	Usages
Percentage 百分率			A percentage is a fraction with 100 as its denominator(分母) $\frac{27}{100} = 27\%$
Increase 增值			Increase = new value – original value Original value = 80 New value = 85 Increase = 85 – 80 = 5
Percentage increase 百分增加			Percentage increase = $\frac{\text{increase}}{\text{original value}} \times 100\%$ Original value = 50 New value = 54 Percentage increase = $\frac{54-50}{50} \times 100\% = 8\%$
Decrease 減值			Decrease = original value – new value Original value = 85 New value = 80 Decrease = 85 – 80 = 5
Percentage decrease 百分減少			Percentage decrease = $\frac{\text{decrease}}{\text{original value}} \times 100\%$ Original value = 54 New value = 27 Percentage decrease = $\frac{54-27}{54} \times 100\% = 50\%$
Cost price 成本			The price that the shop pays for the product is called the cost price.
Selling price 售價			The price that the shop sells the product to its customers is called the selling price.

Nouns	Verbs	Adjectives	Usages
Profit per cent 盈利百分率			Profit per cent = $\frac{\text{profit}}{\text{cost price}} \times 100\%$ Cost price = \$100 Selling price = \$ 120 Profit per cent = $\frac{120\text{-}100}{100} \times 100\%$ = 20%
Loss 虧蝕			Loss = cost price – selling price Cost price = \$100 Selling price = \$80 Loss = \$(100 – 80) = \$20
Loss per cent 虧蝕百分率			Loss per cent = $\frac{\text{loss}}{\text{cost price}} \times 100\%$ Cost price = \$100 Selling price = \$80 Loss per cent = $\frac{100\text{-}80}{100} \times 100\%$ = 20%
Marked price 標價			The price which is marked on or attached to a product for sale (減價) is called marked price.
Discount 折扣			Discount = marked price – selling price Marked price = \$400 Selling price = \$350 Discount = \$(400 – 350) = \$50
Discount per cent 折扣百分率			Discount per cent = $\frac{\text{discount}}{\text{marked price}} \times 100\%$ Marked price = \$400 Selling price = \$350 Discount per cent = $\frac{400\text{-}350}{400} \times 100\%$ = 12.5%

Verbal Expressions and calculation in Mathematics

1. Dick weighted 56 kg six months ago. If he is now 7kg heavier, find the percentage increase in his weight.

2. Nancy got $960 as red pocket money during the Chinese New Year last year. This year, however, she only gets $840. Find the percentage decrease in her pocket money.

3. The cost of a house was $4800000 and it was sold at a loss of 7%.
   (a) What was the loss?
   (b) What was the selling price?

4. If a shopkeeper sells an article at $6, then the profit per cent is 20%. What will be the selling price of the article if the shopkeeper reduces her profit per cent to 10%.

5. The marked price of a toy car is $45 and it is sold at a discount of 20%.
   (a) Find the selling price and the discount of the toy.
   (b) If the selling price is now changed to $27, find the discount per cent.

Answers

1. The percentage increase in his weight is 12.5%.

2. The percentage decrease in her pocket money is 12.5%.

3. (a) The loss is $336000.

   (c) The selling price is $4464000.

4. The new selling price is $5.5.

5. (a) The selling price of the toy is $36.
   The discount of the toy is $9

   (b) The discount per cent of the toy is 40%.

Chapter 8 Approximate values and Numerical Estimation

Nouns	Verbs	Adjectives	Usages
Estimation 估算	Estimate		Find the population of Hong Kong by estimation. Estimate the population of Hong Kong.
Rounding off	Round off 四捨五入		Round off 4672 correct to the nearest ten. Answer: 4670
		Correct to 準確至	Round off 4672 correct to the nearest ten. Answer: 4670
		Nearest 最接近的	Round off 4672 correct to the nearest ten. Answer: 4670
Integer 整數			1, 2, 3, 4,5 … are integers.
Decimal 小數			165.4 is a decimal.
Decimal place 小數位			165.4 has 1 decimal place.
Approximation		Approximate 近似的	$13.9 ≈ $14 The approximate value of $13.9 is $14.
Strategy 策略			Rounding off is one of the Estimation Strategies.

Verbal Expressions and calculation in Mathematics

1. The number of students in a school is 1175, round off the number of students correct to the nearest hundred.

_____

2. Write down a decimal which has 2 decimal places.

_____

3. The price of a book is $48. What is the approximate price of the book?

_____

Answers

1. The number of students is 1200.

2. 3.75 (or other reasonable answers)

3. The approximate price is $50.

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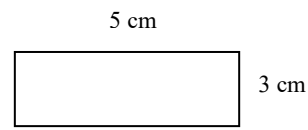
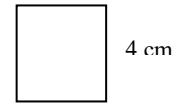
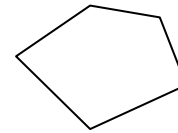
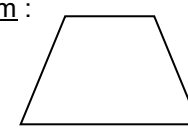
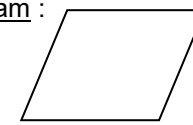
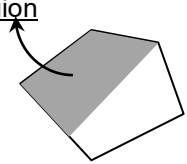
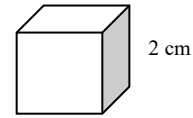
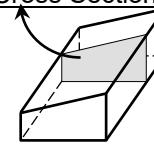
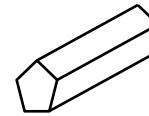
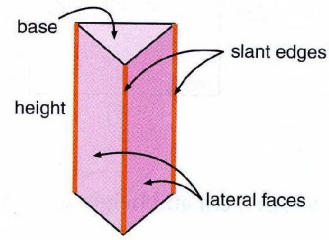
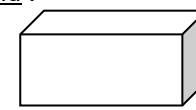
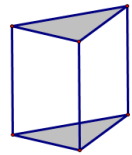
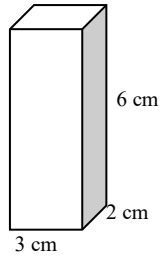
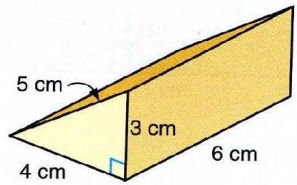
Chapter 9 Areas and Volumes (I)

Nouns	Verbs	Adjectives	Usages
Area 面積			 The area of the rectangle is $5 \times 3 = 15\ cm^2$.
Perimeter 周界			 The perimeter of the square is $4 \times 6 = 24$ cm.
Polygon 多邊形			 A polygon is a closed plane figure.
Rectangle 矩形			Rectangle : 
Trapezium 梯形			Trapezium : 
Parallelogram 平行四邊形			Parallelogram : 

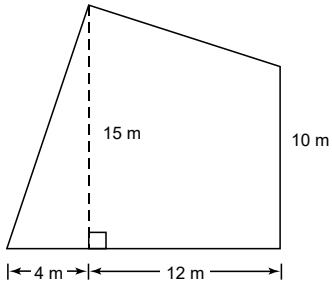
Nouns	Verbs	Adjectives	Usages
Shaded Region 陰影區域			Shaded Region 
Volume 體積			 2 cm The volume of the cube is $2 \times 2 \times 2 = 8\ cm^3$.
Cross Sections 橫切面		Uniform 均勻的	Uniform Cross Section 
Prism 棱柱			 A prism is a solid with a uniform cross section.
Base 底			
Height 高			
Lateral face 側面			
Slant edge 側棱			
Cuboid 長方體			Cuboid : 

Nouns	Verbs	Adjectives	Usages
Triangular prism 三棱柱			Triangular prism : 
Total surface area 總表面面積			 The total surfce area is (3×2 + 2×6 + 6×3)×2 = 72cm^2
Total area of all lateral faces 所有側面面積			 The total area of all lateral faces is 3×6 + 5×6 + 4×6 = 72cm^2

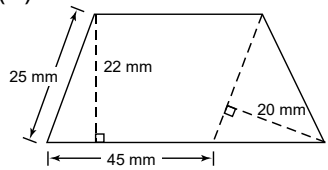
Verbal Expressions and calculation in Mathematics

1. Find the areas of the following figures.

(a)

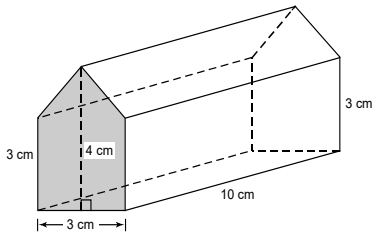


(b)

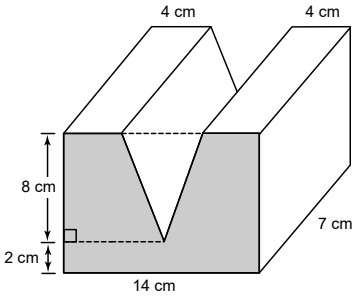


2. Find the volumes of the following solids with uniform cross-sections (shaded).

(a)

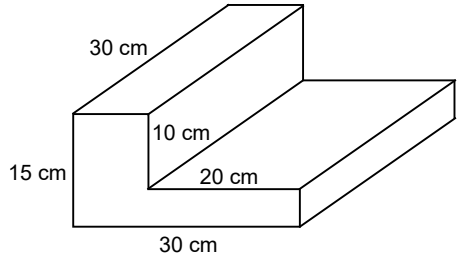


(b)

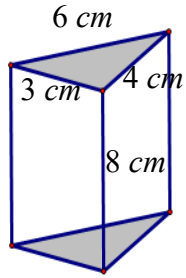


3. The volume of a cuboid is 37 800 cm^3. If the length and the width are 0.35 m and 200 mm respectively, find the height in cm.

4. Find the total surface area of the following prism:



5. Find the total area of all lateral faces of the following triangular prism:



Answers

1. (a) The area is $180m^2$.

   (b) The area is $1240\ m^2$.

2. (a) The volume is $105cm^3$.

   (b) The volume is $812cm^3$.

3. The height of the cuboid is 54cm.

4. The total surface area of the prism is $3200cm^2$.

5. The total area of all lateral faces is $104\ cm^2$.

Chapter 10 Manipulation of Simple Polynomials

Nouns	Verbs	Adjectives	Usages
Monomial 單項式			A monomial is an algebraic expression with only one term e.g. -3, $2a^2$, $3bt^3$
Coefficient 係數			$2x + 3xy^2 - 5y^3$ Coefficient of $x = 2$ Coefficient of $xy^2 = 3$ Coefficient of $y^3 = -5$
Polynomial 多項式			A polynomial can be a monomial or the sum of two or more monomials. e.g. $4x$, $2x + 4y + 5z$, $6t^3 + 7b^2$
Degree 次數			For $6y^2$, degree = 2 For $3x^3yz^2$, degree = $3 + 1 + 2 = 6$ For $2xy + 3x^3 + 4y^4$, Degree of polynomial = highest degree of all terms = 4
Constant term 常數項			The term does not contain any variable is called constant term. e.g. For $2xy + 3x^3 + 4y^4 + 5$, constant term = 5
Like terms 同類項			The terms that contain the same variable(s) to the same power(s) are called like terms. e.g. $2xy^2$, $4xy^2$

Nouns	Verbs	Adjectives	Usages
Unlike terms 異類項			The terms that does not contain the same variable(s) to the same power(s) are called unlike terms. e.g. $2xy^2$, $3x^2y^3$
Descending powers 降冪			Arrange $1 - x^4 - 10x + 5x^2$ in descending powers of x: $-x^4 + 5x^2 - 10x + 1$
Ascending powers 升冪			Arrange $1 - x^4 - 10x + 5x^2$ in ascending powers of x: $1 - 10x + 5x^2 - x^4$
Distributive law of multiplication 乘法分配律			Distributive law of multiplication : $a(x + y) = ax + ay$ $(x + y)a = xa + ya$
Expansion 展開式	Expand		Expand $3(a + 2b)$ $3(a + 2b) = 3a + 6b$ The expansion of $3(a + 2b)$ is $3a + 6b$.

Verbal Expressions and calculation in Mathematics

1. Which of the following algebraic expressions is/are polynomials?

   $2x + 3xy^2z$, -4, $6y$, $\sqrt{x}$, $\frac{4}{t}$

2. For the polynomial $-5y^3 + 6xy - 2$, find
   (a) the coefficient of xy
   (b) the number of terms
   (c) the constant term
   (d) its degree.

3. Arrange the terms of the polynomial $-3y + 4 - 5y^5$
   (a) in descending powers of y ;
   (b) in ascending powers of y.

4. Expand the following polynomial :
   (a) $3(2x + 6y)$
   (b) $(x + y)(x - 2y)$

Answers

1. $2x + 3xy^2z$, –4, $6y$ are polynomials.

2. (a) The coefficient of xy is 6.
   (b) The number of terms is 3.
   (c) The constant term is –2
   (d) Its degree is 3.

3. Arranged in descending powers of y: $-5y^5 - 3y + 4$
   Arranged in ascending powers of y: $4 - 3y - 5y^5$

4. (a) The expansion of the polynomial is $6x + 18y$.
   (b) The expansion of the polynomial is $x^2 - xy - 2y^2$.

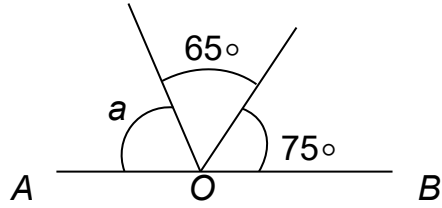
Chapter 11 Angles related to Lines

Nouns	Verbs	Adjectives	Usages
Adjacent angles on a straight line 直線上的鄰角			The sum of all the adjacent angles on a straight line is 180°.
Angles at a point 同頂角			The sum of all the angles at a point is 360°.
Common arm 公共臂			Adjacent angles are angles with a common arm.
Common vertex 公共頂點			Angles at a point are angles with a common vertex.
Vertically opposite angles 對頂角			When two straight lines intersect, the vertically opposite angles are equal.
Transversal 截線			A straight line intersects two straight lines is called the transversal of the two straight lines.
Corresponding angles 同位角			If two parallel lines are cut by a transversal, then the corresponding angles are equal.
Alternate angles 內錯角			If two parallel lines are cut by a transversal, then the alternate angles are equal.
Interior angles 內角			If two parallel lines are cut by a transversal, then the sum of interior angles is 180°.

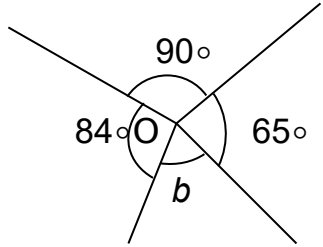
Nouns	Verbs	Adjectives	Usages
Supplement		Supplementary 互補	If the interior angles formed by a transversal and two lines are supplementary, then these two lines are parallel.
Reason 原因		reasonable	Is AB parallel to CD? Give the reason.
Proof 証明	Prove		Prove that AB is parallel to CD.
Bisection	Bisect 平分		The straight line CD bisects ∠AOB.
		Parallel 平行	If AB is parallel to CD, then a = b.
Intersection	Intersect 相交		AB intersects CD at the point E.

Verbal Expressions and calculation in Mathematics

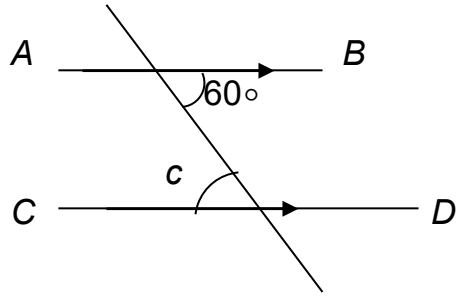
1. *AOB* is a straight line, find *a*.



2. Find *b*.

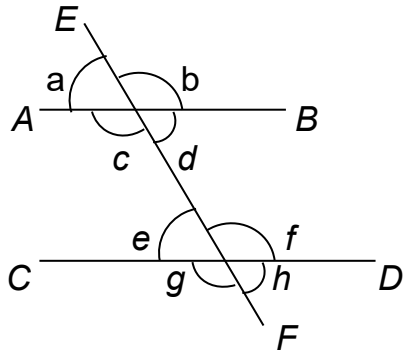


3.



If *AB//CD*, find *c*.

4.



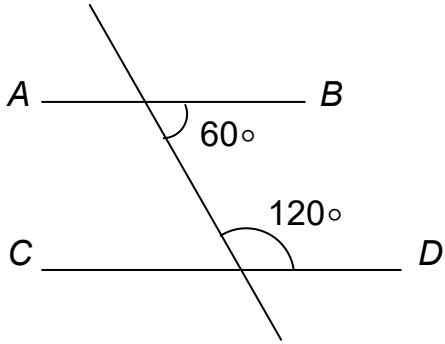
Refer to the figure , write down all pairs of corresponding angles, alternate angles and interior angles.

Corresponding angles : _____

Alternate angles : _____

Interior angles : _____

5.



Is *AB* parallel to *CD*? Give the reason.

Answers

1. 40°

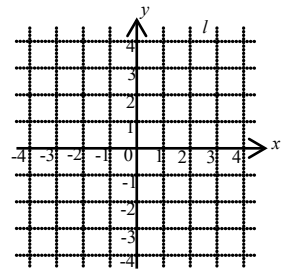
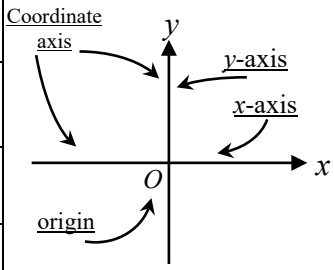
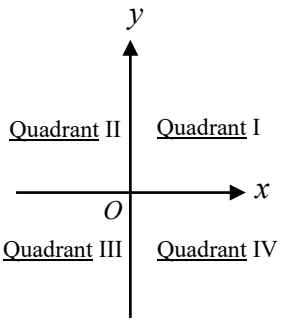
2. 121°

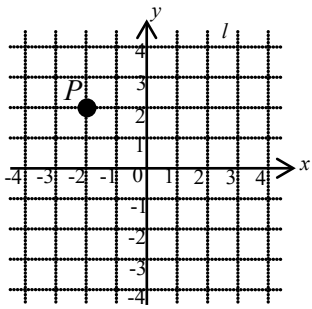
3. 60°

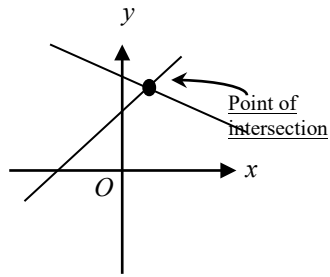
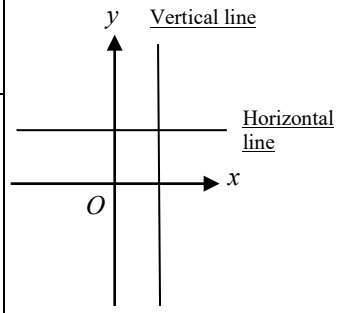
4. Corresponding angles: *a* and *e*, *b* and *f*, *c* and *g*, *d* and *h*.
   Alternate angles : *c* and *f* , *d* and *e*.
   Interior angles : *c* and *e*, *d* and *f*.

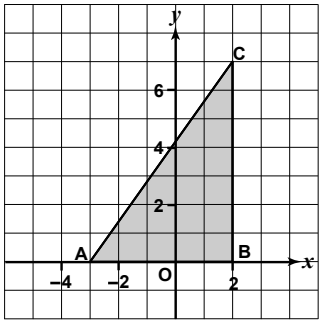
5. $\because 60° + 120° = 180°$ $\therefore$ AB //CD (int.$\angle$s supp.)

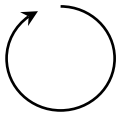
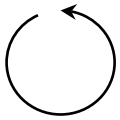
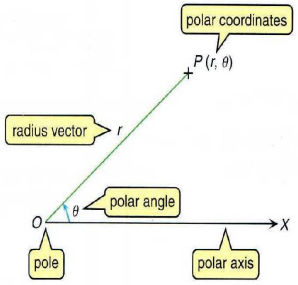
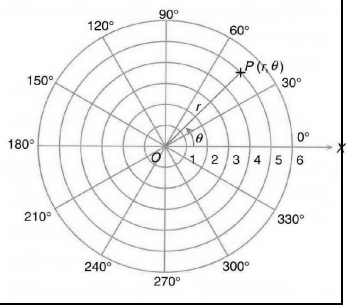
Chapter 12 Introduction to Coordinates

Nouns	Verbs	Adjectives	Usages
Ordered pair 序偶			A pair of ordered numbers is called an ordered pair. e.g. (1, 2), (3, –4)
Rectangular coordinate plane 直角坐標系統			Rectangular coordinate plane : 
Coordinate axis 坐標軸			
x – axis *x* 軸			
y – axis *y* 軸			
Origin 原點			
Quadrant 象限			

<table>
<tr><th>Nouns</th><th>Verbs</th><th>Adjectives</th><th>Usages</th></tr>
<tr><td>Coordinates
坐標</td><td></td><td></td><td rowspan="3"> 

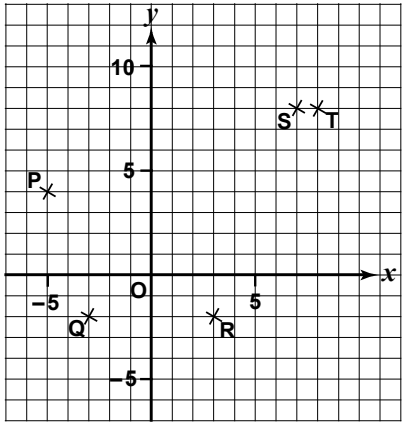
The coordinates of P are (-2, 2)
The x-coordinate of P is -2.
The y-coordinate of P is 2.</td></tr>
<tr><td>x-coordinates
x 坐標</td><td></td><td></td></tr>
<tr><td>y -coordinates
y 坐標</td><td></td><td></td></tr>
<tr><td></td><td>Plot
繪畫</td><td></td><td>Plot the point A(1, 2) on the coordinate plane.</td></tr>
<tr><td>Point of Intersection
交點</td><td></td><td></td><td> 
</td></tr>
<tr><td>Horizontal line
水平線</td><td></td><td></td><td rowspan="2"> 
</td></tr>
<tr><td>Vertical line
鉛垂線</td><td></td><td></td></tr>
</table>

Nouns	Verbs	Adjectives	Usages
Distance 距離			The distance between (1, 5) and (4, 5) is 4 – 1 = 3 units
Length 長度			A(3, –1), B(3, 4) The length of AB is 4 – (– 1) = 5
Area 面積			The area of ΔABC is $\frac{(2-(-3))\times 7}{2}$ = 17. 5 sq. units. 
Translation 平移	Translate		If *A*(2, 5) is translated to the right by 4 units, then the coordinates of its image *A*' = (2 + 4, 5) = (6, 5)
Reflection 反射	Reflect		If *B*(3, 5) is reflected about the y-axis to *B*', then the coordinates of its image B' are (–3, 5)
Rotation 旋轉	Rotate		If *C*(3,4) is rotated anti-clockwise about *O* through 90° to *C*', then the coordinates of *C*' are (–4, 3)

<table>
<tr><th>Nouns</th><th>Verbs</th><th>Adjectives</th><th>Usages</th></tr>
<tr><td>Clockwise
順時針</td><td></td><td></td><td><u>Clockwise</u>
direction:
  </td></tr>
<tr><td>Anti-clockwise
逆時針</td><td></td><td></td><td><u>Anti-clockwise</u>
direction:
  </td></tr>
<tr><td>Polar coordinate plane
極坐標平面</td><td></td><td></td><td rowspan="5">  </td></tr>
<tr><td>Pole 極點</td><td></td><td></td></tr>
<tr><td>Polar axis
極軸</td><td></td><td></td></tr>
<tr><td>Radius vector
極徑</td><td></td><td></td></tr>
<tr><td>Polar angle
極角</td><td></td><td></td></tr>
<tr><td>Polar coordinates
極坐標</td><td></td><td></td><td>The <u>polar coordinates</u> of P are (r, θ).
  </td></tr>
</table>

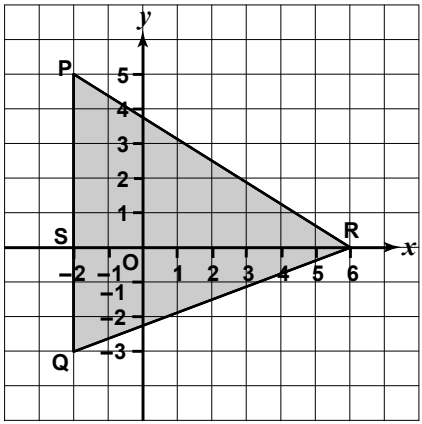
Verbal Expressions and calculation in Mathematics

1. Write dwon the coordinates of points *P*, *Q*, *R*, *S*, *T*.



2. Find the distance between the points *A*(–4, –2) and *B*(6, –2).

3. Find the area of the following figure.

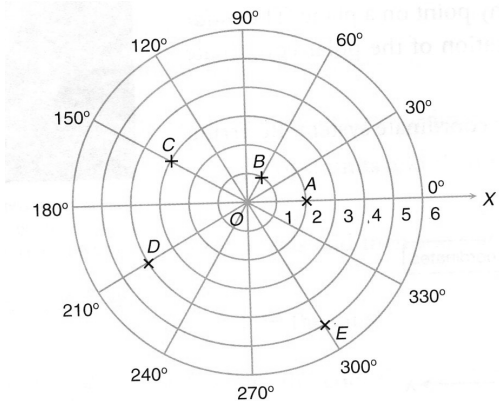


4. If $P(4, -2)$ is translated to the left by 5 units to P_1 find the coordinates of P_1.

5. If $P(-3, 4)$ is reflected about the y-axis and the x-axis to Q and R respectively, find the coordinates of Q and R.

6. If $P(-1, -6)$ is rotated anti-clockwise about the origin through180°to Q, find the coordinates of Q.

7. Write down the polar coordinates of A, B, C, D and E on the following polar coordinate plane.



Answers

1. The coordinates of P are (-5, 4)
   The coordinates of Q are (-3, -2)
   The coordinates of Rare (3, -2)
   The coordinates of S are (7, 8)
   The coordinates of T are (8, 8)

2. The distance between *A* and *B* is 10 units.

3. The area of the figure is 32 sq. units.

4. The coordinates of P_1 are (–1, –2).

5. The coordinates of *Q* are (3, 4).
   The coordinates of *R* are (–3, –4).

6. The coordinates of *Q* are (1, 6)

7. The polar coordinates of *A* are $(2, 0^0)$
   The polar coordinates of *B* are $(1, 60^0)$
   The polar coordinates of *C* are $(3, 150^0)$
   The polar coordinates of *D* are $(4, 210^0)$
   The polar coordinates of *E* are $(5, 300^0)$