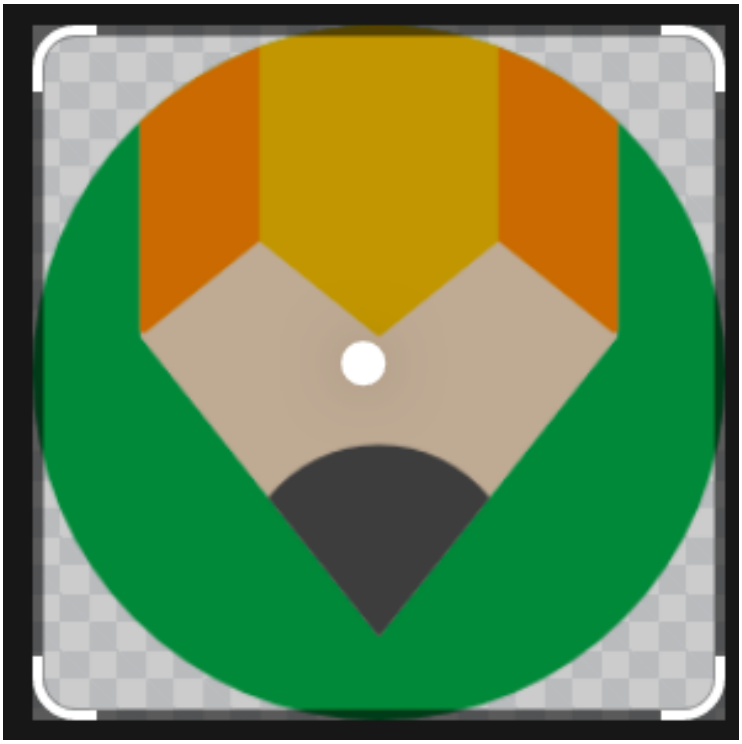
The
Shin-Chu-Mon Companion Dictation Book
Mathematics for 7th grade



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Vocabulary in English and Japanese

Review of elementary school pg4~9

数学用語

語句	意味	語句	意味
calculation	計算	congruent	合同な
integer	整数	area	面積
decimal	小数	the circumference of a circle	円周
fraction	分数	rectangle	長方形
multiple	倍数	triangle	三角形
factor	約数	trapezoid	台形
the least common factor	最小公倍数	rhombus	ひし形
the greatest common divisor	最大公約数	angle	角
double-figure	2桁の数	quadrilateral	四角形
remainder	(割り算の)余り	parallelogram	平行四辺形
word problem	文章題	intersection	交わった点
square	正方形	diagonal	対角線
equilation triangle	正三角形	enlargement	拡大図
permutation	場合の数	reduction	縮図
unit	単位	symmetrics figures	対称図形
average	平均	volume	体積
speed	速度	isosceles triangle	二等辺三角形
percentage	百分率	diameter	直径
relative amount	割合	cuboid	直方体
proportion	比例	cube	立方体

ratio	比（率）		
inverse proportion	反比例		

授業英語頻出用語

write	書く	fill in	うめる
find	～を求める ～をみつける	choose	えらぶ

Chapter 1 Signed number pg10~37

数学用語

語句	意味	語句	意味
positive number	正の数	inequality sign	不等号
negative number	負の数	commutative law	交換法則
natural number	自然数	associative law	結合法則
size of numbers	数の大小	power	累乗
number line	数直線	squared	2乗
absolute values	絶対値	cubed	3乗
addition	加法	exponent	指数
subtraction	減法	product	積
parentheses	parenthesis(かっこ）の複数形	quotient	商
multiplication	乗法	recipreca	逆数
division	除法	four arithmetic calculations	四則計算
		distributive law	分配法則

授業英語頻出用語

express	表現する	exclude	除外する
mark	マークする	include	含める

circle	○（印）	answer	答える
cross	×（印）	how many	いくつ？
calculate	計算する	when ~	～のとき
remove	外す、取り除く	comprehension test	確認テスト

Chapter 2　Algebraic expressions

pg38~63

数学用語

value	値	coefficient	係数
expression	式	combining terms	項をまとめる
cancel down	約分する	linear expression	1次式
dividend	割られる数	equality sign	等号
divisor	わる数	equality	等式
even numbers	偶数	left side	左辺
odd numbers	奇数	right side	右辺
denominator	分母	both side	両辺
numerator	分子	inequality	不等式
term	項	vertex	頂点

授業英語頻出用語

explain	説明する		

Chapter 3　Equations

pg64～91

数学用語

equation	方程式	the equation in terms of	～についての方程式
solution	解	sum	和
properties	性質(preperty)の複数形	profit	利益
linear equation	1次方程式	regularity	規則性
transposing the term　of ~	移項	right angles	直角
values for letters	文字の値	equilateral pentagon	正五角形
proportional expression	比例式		

授業英語頻出用語

solve	(問いを)解く	suppose ~	～と(仮定)するとき
check	精査する	if ~	もし～

Chapter 4　Proportion inverse proportion

pg94～117

数学用語

function	関数	point	点
variable	変数	origin	原点
y is a function of x	yはxの関数である	x-axis	軸
domain	変域	reflection	対称(な点)
y is proportional to x	yはxに比例する	graph	グラフ
constant of proportion	比例定数	hyperbola	双曲線
y is inversely proportional to x	yはxに反比例する	symmetric about ~	～について対称
coordinate	座標	intersect	交点

授業英語頻出用語

state	述べる		

Chapter 5　Plane figure

pg118~148

数学用語

line	直線	the axis of reflection	対称軸
endpoint	(線分の端の) 点	figure construction	作図
segment	線分	perpendicular bisector	垂直二等分線
ray	半直線	angle bisector	角の二等分線
midpoint	中点	isosceles right triangle	直角二等辺三角形
distance	距離	sector	おうぎ形
parallel	平行な	radii	radius(半径) の複数形
perpendicular	垂直な	central angle	中心角
are	弧	formula	公式
chord	弦	semicircle	半円
tangent	接線	rolling figures	転がる図形
tangent point	接点	loci	locus(軌跡) の複数形

figures that have line symmetry	線対称な図形	sets of points	点の集合
figures that have point symmetry	点対称な図形	locus	軌跡
translation	平行移動	circumcircle	外接円
rotation	回転移動	circumcenter	外心
center of rotation	回転の中心	incircle	内接円
point-symmetry rotation	点対称移動	incenter	内心
reflection	対称移動	draw ～	～を描く

Chapter 6　Space figures

pg149~171

数学用語

space figures	空間図形	vertices	vertex(頂点)の複数形
plane	平面	hexagonal prism	六角柱
be in a skewed position	ねじれの位置にある	n-polygonal prism	角柱
prism	角柱	pentagonal pyramid	五角錐
cylinder	円柱	hexagonal pyramid	六角錐
pyramid	角錐	n-polygonal pyramid	角錐
cone	円錐	net	展開図
face	面	hemisphere	半球
quadrangular prism	四角柱	convex polyhedron	凸面体 (凹みのない多面体)
quadrangular pyramid	四角錐	polyhedra	polyhedron(多面体)の複数形
base area	底面積	regular polyhedron	正多面体
lateral area	側面積	regular tetrahedron	正四面体

sphere	球	regular hexahedron	正六面体
solids of revolution	回転体	regular octahedron	正八面体
generatrix	母線	regular dodecahedron	正十二面体
edge	辺	regular icosahedron	正二十面体
pentagonal prism	五角柱	projection	投影図

授業英語頻出用語

name	名前を述べる	sketch	素描する

Chapter 7　Organizing and making use of data

pg 172~181

数学用語

class	階級	histogram	ヒストグラム
interval	(階級の)幅	frequency distribution polygon	度数折れ線
frequency	度数	relative frequency	相対度数
frequency distribution table	度数分布表	representative value	代表値
range	範囲(レンジ)	mean	平均値

授業英語頻出用語

organize	整理する	making use of	活用すること

Dictation J1C

Chapter 1 Signed numbers

Page 10 Introduction

Page 11

1. Going up five stairs is expressed as +5.
2. How to express quantities that have opposite properties.
3. Signs < and > are called inequality signs.
4. Inequality signs show the relative size between numbers.
5. On a number line, larger numbers appear to the right of smaller numbers.

Page 12

1. The relative size of 8 to 4 is 8 > 4.
2. Numbers on the number line become greater as they go up.
3. The relative size of -2 to -5 is -5 < -2
4. Mark the points representing these numbers.
5. Express the relative size between these numbers.

Page 13

1. The absolute value is the distance from the origin.
2. The absolute value of -5 is 5.
3. The absolute value of 7 is 7.
4. The result of addition is the sum.
5. Use a number line to add or subtract integers.

Page 14

1. Express the following with a + or - sign.
2. What does it mean to be 5 pieces short?
3. Do you know the natural numbers?
4. Do you remember how to find the absolute value?
5. Arrange the numbers in ascending order.

Page 15

1. The result of addition is called the sum.
2. The word simplify is a synonym for calculate.
3. We will use the number line to help us add.
4. Remember, positive numbers go to the right on the number line.
5. Negative numbers go to the left on the number line.

Page 16

1. Today we will look at some formal rules.
2. The sum of two numbers with the same signs is the sum of their absolute values.
3. Don't forget to keep the same sign of the two numbers.
4. The sum of numbers with different signs is the difference of their absolute values.
5. For this case, you take the sign of the number with the bigger absolute value.

Page 17

1. The commutative law states that order can change when adding.
2. Three plus seven is the same as seven plus three.
3. The associate law states that grouping can change when adding.
4. 3 + (7 + 4) is the same as (3 + 7) + 4
5. The commutative law is order and the associative law is grouping.

Page 18

1. The result of subtraction is the difference.
2. Subtraction means to add the opposite sign.
3. 4 – 3 means 4 + $^{-}$3 and the difference is 1.
4. 4 - $^{-}$3 means 4 + 3 and the difference is 7.
5. 0 - $^{-}$A equals A and A – 0 equals A.

Page 19

1. When doing addition and subtraction together, do the subtraction first.
2. Simplifying an expression is the same as calculating the expression.
3. If the sum of difference is positive, do not write the plus sign.
4. The commutative law means the order is not important.
5. The associative law means grouping is not important.

Page 20

1. Calculating with addition and subtraction.
2. First, change all the subtraction to addition.
3. Remember, subtraction means to add the opposite.
4. Then, group like signed terms together.
5. Next, remove the parentheses from the expression.

Page 21

1. Today we will review simplifying expressions.
2. Remember, sometimes we subtract when we add.
3. The definition of subtraction is to add the opposite.
4. We will also simply fractions and decimals.
5. I do not like to use fractions or decimals

Page 22

1. The result of a multiplication is the product.
2. The product of two numbers with like signs is positive.
3. The product of two numbers with different signs is negative.
4. The absolute value of any number is positive.
5. Absolute value means the distance from zero.

Page 23

1. The commutative law of multiplication states, 5 x 6 = 6 x 5.
2. Remember, the commutative law states order is not important.
3. The associative law of multiplication states, 6 x (5 x 7) = (6 x 5) x 7.
4. An expression with an even number of negative signs is positive.
5. An expression with an odd number of negative signs is negative.

Page 24

1. Three times three is the same as three squared.
2. Two times two times two is the same as two cubed.
3. A square is 2D and a cube is 3D.
4. If a negative number has an even exponent, it becomes positive.
5. If a negative number has an odd exponent, it stays negative.

Page 25

1. The answer of a division problem is the quotient.
2. The quotient of two same signs is positive.
3. The quotient of two different signs is negative.
4. Any number multiplied by zero is zero.
5. No number can be divided by zero.

Page 26

1. The reciprocal of 1/3 is 3/1.
2. The reciprocal of 4/7 is 7/4.
3. The reciprocal is also called the inverse.
4. A number times its reciprocal is one.
5. Division is the same as multiplying by the reciprocal.

Page 27

1. The reciprocal of 2/3 is 3/2
2. Use the reciprocal to divide by fractions.
3. Always take the reciprocal of the divisor.
4. Calculate exponents before anything else.
5. Calculate from left to right.

Page 28

1. Addition, subtraction, multiplication and division are the four operators.
2. There is an order for using operators.
3. PEMDAS is an acronym to remember the order.
4. P is for parentheses and E is for exponents.
5. MDAS is for the four operators.

Page 29

1. The distributive law can make calculations easier.
2. The distributive law means $a(b + c) = ab + ac$
3. The word distributive comes from distribute, which means to share.
4. We will use the distributive law for multiplication.
5. The distributive law can also be used backwards.

Page 30

1. Natural numbers are whole numbers greater than zero.
2. Whole numbers are natural numbers plus zero.
3. Integers are positive and negative whole numbers.
4. Rational numbers are all integers, fractions and decimals.
5. Irrational numbers are decimals that don't repeat and never end.

Page 31

1. Today we will review multiplication and division.
2. Remember we are simplifying expressions.
3. Do you remember the order of operations?
4. The definition of division is to multiply by the reciprocal.
5. Always be careful simplifying expressions with negatives.

Page 32

1. Three people A, B and C played a game.
2. The sum of their scores is 0.
3. When A got -6 points and B got 14 points.
4. So, how many points did C get?
5. Remember, we all have to write down steps to solving a problem.

Page 33

1. A table is a common way to store data.
2. How many centimeters taller is A than B?
3. Do you remember how to find the average?
4. A synonym for average is the mean.
5. Did you notice the comparative in today's lesson?

Page 34

1. Today's problem have signed numbers and tables.
2. Look at the higher or lower score than the previous time respectively.
3. We will base these problems on the tables given.
4. When the score of the third test is 75, answer the questions.
5. You need to sum numbers before finding their average.

Page 35

1. Today we will work on story problems.
2. Will have to break the problem into steps.
3. Problem 2 is called a magic square.
4. We will have an activity about making magic squares
5. The vertical and horizontal rows and the diagonal have to sum to the same.

Page 36 Comprehension Test

Page 37 End of Chapter problems

Chapter 2 Algebraic expressions

Page 38 Algebraic expressions

Page 39

1. The answer to a division problem is the quotient.
2. Multiply by the reciprocal instead of dividing.
3. Use a dot for the multiplication sign.
4. A variable is a number that can change.
5. A coefficient is a number that's multiplied to a variable.

Page 40

1. Do not write the times sign for algebra.
2. Write numbers before the letters.
3. If there are more than one letter, order them alphabetically.
4. A number that's multiplied to a variable is a coefficient.
5. A number by itself is a constant.

Page 41

1. We can multiply and/or divide numbers and variables.
2. A variable and a number written together without a sign is multiplied.
3. In algebra, ab means a times b and a/b means a divided by b.
4. Plus and minus signs are still used in algebra.
5. a+b is not the same as ab.

Page 42

1. Always write the negative in front of a fraction.
2. Remove parentheses when it is divided.
3. Keep fractions as improper fractions.
4. The coefficient can be a fraction.
5. Coefficients can be reduced in a fraction.

Page 43

1. Algebra's name comes from the Middle East.
2. Algebra was invented around the 800's
3. The coefficient is in front of the variable.
4. Algebra is like arithmetic but uses variables.
5. Variables can change their values.

Page 44

1. Today we will write algebraic expressions.
2. In algebra, we do not use a X for multiplication.
3. Instead of the X we use a dot or nothing.
4. We do not also use the division sign in algebra.
5. In algebra we use a backslash for the division sign.

Page 45

1. Today, we will study how to express costs and numbers.
2. We will use a variable to represent a certain number.
3. For example, I eat 2 bananas everyday.
4. So how many bananas do I eat in 5 days?
5. How many bananas do I eat in d days?

Page 46

1. Today, we will express averages and units.
2. One kilogram equals 1000 grams.
3. One kilometer equals 1000 meters.
4. One meter equals 100 centimeters.
5. One meter equals 1000 millimeters.

Page 47

1. Today we will express areas and volumes.
2. The formula for the area of a triangle is A = 1/2bh.
3. The formula for the circumference of a circle is C = 2
4. The area of a trapezoid is A = h(b1 +b2)/2.
5. Do you know how to find the area of a rhombus?

Page 48

1. Today we will learn how to express rates and speed.
2. There are a % of the 40 students absent today.
3. Do you remember that distance = speed times time?
4. Therefore, speed equals distance divided by time.
5. It took y hours to go x km by bike.

Page 49

1. Today we will find the value of an expression.
2. Plugging in a number for a letter is called substitution.
3. The result of the substitution is called the value of the expression,
4. When substituting a negative, enclose it in parentheses.
5. Find the value of 7p when p = 5.

Page 50

1. Today we will write expressions to indicate quantities.
2. Remember, the variable holds the quantity that is changing.
3. The number in front of the variable is the coefficient.
4. Sometimes, we can just use numbers to see the pattern.
5. The problems are difficult and take time.

Page 51

1. Combining like terms is how to simplify an expression.
2. First, combine the same letter variables.
3. Then, combine the constants.
4. We can add coefficients only if they have the same variable.
5. You are finished when only different variables and a constant remain.

Page 52

1. Today we will simplify expressions by collecting like terms.
2. Like terms have the same variable.
3. Like terms can have different signs and coefficients.
4. We put the variables in alphabetical order.
5. 2x + 4x - x + y can be simplified to 5x + y.

Page 53

1. A number in front of a variable is a coefficient.
2. Coefficients with the same variables can be added.
3. One part of an algebraic expression is a term.
4. A group of terms added together is a polynomial.
5. A term that is a coefficient and variable is a linear term.

Page 54

1. A negative number is the same as a positive number multiplied by negative one.
2. You can remove the parentheses when there is only addition outside.
3. Flip all the signs if the quantity is being subtracted.
4. When dividing a quantity, multiply by the reciprocal and distribute.
5. Group constants to help avoid order of operations mistakes.

Page 55

1. Today we will do various simplifications.
2. The first step is to remove parentheses.
3. Sometime we will have to use the LCM.
4. Look out for negative signs in front of parentheses.
5. You need to show all steps and work horizontally.

Page 56

1. Today we will have a review day of simplifying expressions.
2. Remember, that simplify is a synonym for calculate.
3. Look out for the negative signs in front of parentheses.
4. You will often use the distributive property to simplify.
5. Will we have to find the LCM to simplify fractions.

Page 57

1. Today we will use simplifying with algebraic expressions.
2. We will need to break up the problem into parts.
3. The verbs is and are often mean equal.
4. Make sure to include the units.
5. We will use the formula for the circumference of a circle.

Page 58

1. Algebraic expressions make calculations easier.
2. Simplifying an expression also simplifies our work.
3. Find patterns and turn them into an expression.
4. Variables are for numbers that can change.
5. The expression should equal the quantity we want to find.

Page 59

1. An algebraic expression is a group of variables, coefficients and constants.
2. Algebra is a tool to help us solve complex problems in a simple way.
3. The input in an algebraic expression is the variable.
4. The output is the answer after calculating with the input.
5. Check your expression by inputting different numbers.

Page 60

1. Today we will learn how to express quantities and inequalities.
2. An inequality uses the signs <,>, ≤ and ≥.
3. We have a right side and a left side.
4. Remember that ‘is ‘ divides the left and right sides of an inequality.
5. A number x plus 5 is less than twice x.

Page 61

1. Today we will use algebraic expressions to solve problems.
2. I have 10 stamps, some 80 Y and some 90 Y.
3. So, if I have x 80Y stamps how many 90 Y stamps do I have?
4. Hmm,if I have 5 , 80Y stamps, how many 90 Y stamps?
5. Ok, If I have x 80 Y stamps I must have 10 - x 90 Y stamps.

Page 62 Comprehension test

Page 63 End -of -Chapter problems

Chapter 3 Equations

Page 64 Equations

Page 65

1. An equation is equal on both sides.
2. Equations have variables written as a letter.
3. The solution is the value of the variable that makes both sides equal.
4. Finding the solution to an equation is called solving the equation.
5. A + 3 = 5 is an equation. Its solution is 2.

1. An equation is an algebraic expression with an equal sign.
2. An equation has a right side and left side.
3. Solving an equation means finding the value that balances it.
4. We solve equations by isolating the variable.
5. Isolating the variable means putting it alone on one side.

Page 66

1. We solve equations by isolating the variable.
2. Isolate means to put the variable by itself.
3. We isolate by doing the opposite operations.
4. Remember to do each operation on both sides.
5. Solving means finding the value that makes both sides equal.

Page 67

1. We solve equations by isolating the variable.
2. Isolate means to put the variable by itself.
3. We isolate by doing the opposite operations.
4. Remember to do each operation on both sides.
5. Solving means finding the value that makes both sides equal.

Page 68

1. Today we will move terms from one side of an equation to the other side.
2. When we move a term to the other side we must change its sign.
3. We are using either the addition or subtraction property of equalities.
4. We have to do the same operation to both sides of an equation.
5. Check your solution by putting it back in the variable.

Page 69

1. Today, we will solve equations with parentheses.
2. The first step will be to remove the parentheses.
3. We sometimes use the distributive property to remove the parentheses.
4. We can also remove the parentheses by division.
5. Remember, solving means to get the letter by itself .

Page 70

1. Solving an equation means finding the right value for a variable.
2. The right variable is the one that makes an equation true.
3. Isolating a variable means putting the variable alone on one side.
4. Do not use multiplication or division signs.
5. Any operation can be done if it’s on both sides.

1. Decimals in equations make them harder to solve.
2. We must change the decimals to integers.
3. Multiply all terms of the equation by 10 or 100.
4. Then each term will become an integer.
5. Now solve the equation like normal.

Page 71

1. When solving an equation that contains fractions.
2. You should first change them into integers.
3. By multiplying both sides by the LCM of the denominators.
4. LCM means least common multiple.
5. This is called canceling the denominators.

Page 72

1. Some equations have an equal sign and two equal ratios.
2. These are called proportional expressions.
3. Proportional expressions have one fraction on each side.
4. We can cross-multiply to solve a proportion.
5. Make sure the variable is on the same side.

Page 73

1. Today will solve many different types of equations.
2. Remember, we simplify expressions but solve equations.
3. We solve by undoing all the operations and isolating the variable.
4. We have lots of power when solving an equation.
5. Just remember that an operation must be done to both sides of the equation.

Page 74

1. Today we will look at problems about the values of letters.
2. Today's equations will have two different variables.
3. We will be given the value of one of the variables.
4. First, substitute the known value and solve for the other variable.
5. These equations take a few steps to solve but are not difficult.

Page 75

1. Consecutive integers are numbers in order like, 2, 3 and then 4.
2. We can write consecutive numbers using algebra.
3. Consecutive integers are x, x+1, x+2, etc.
4. Consecutive even integers are x, x+2, x+4.
5. Consecutive odd numbers are also x, x+2, x+4.

Page 76

1. We can use equations to solve word problems.
2. First decide what the question is asking.
3. Second, pick a variable for the unknown.
4. Third, write an equation with the variable.
5. Last, solve the equation and then check to see what is the answer.

Page 77

1. Word problems about overs and shorts.
2. Overs happen when we divide an item but have some leftover.
3. For example, if 6 people get 20 oranges, and each person gets 3 with 2 over.
4. Shorts would happen if the 6 people got 4 oranges each.
5. 5x – 4 could mean 5 oranges each with 4 short.

1. Word problems are often best solved using equations.
2. Consecutive integers are numbers in order.
3. A number more than another number means addition.
4. A number less than another number means subtraction.
5. Left over means there are more and short means there are less.

Page 78

1. Today we will look at problems about distribution.
2. Distribution means to divide items among a certain number of people.
3. There are 20 cookies and I give c cookies to my brother.
4. So, how many cookies do I have now?
5. First step, define the variable and then write the equation. Lastly, solve it.

Page 79

1. Today we will solve equations about age and average.
2. A man is 40 and his son is 8.
3. In how many years will the man be 3 times as old as his son?
4. We could make a table and just start a logical search.
5. However, using variables and equations is the best way.

Page 80

1. Today we will review different problems solved with equations.
2. The sum of three consecutive odd numbers is 63.
3. If the first number is x, what are the second and third numbers?
4. There are many problems using calendars.
5. Sometimes, it takes many tries to get the right variables.

Page 81

1. Today, we will look at problems about distance, speed and time.
2. We will use the formula- d = st.
3. You leave school at 3 pm and I leave 15 minutes later.
4. We both walk to the same station but I get there first.
5. How is it possible that I got there first?

Page 82

1. Today we will have problems about going around an oval.
2. Two people go around a pond in opposite directions.
3. When they meet, the sum of their distance equal the circumference.
4. Two people go around a pond in the same direction.
5. When one person overtakes the other, the difference of the two distances equal the circumference.

Page 83

1. Today we will have harder problems about distance, time and speed.
2. Sometimes we have people going in the same direction.
3. Sometimes we have people going in the opposite directions.
4. Sometimes, we have round trip problems.
5. We will use charts to help us organize the data.

Page 84

1. Today we will have problems about profit.
2. The cost price is what a store buys an item for.
3. The tag price is the cost price times the (profit rate +1).
4. The selling price can be Tag price minus the (1- discount rate).
5. Percentages are expressed in decimals or fractions

Page 85

1. Today we will study problems about salt water.
2. The amount of salt equals the amount of salt water times the concentration of salt.
3. The concentration of salt water equals the amount of salt divided by the amount of salt water.
4. We will have to make a chart to help us.
5. The chart will have rows and columns of percentages.

Page 86

1. Today we will look at problems about changes in numbers.
2. For example, the number of J1C girls increased by 10 % this year.
3. Or, the number of girls has decreased by 15 %.
4. The first step is to determine a variable and label it.
5. Then we can try to write an equation to solve the problem.

Page 87

1. Today, we will look at moving a point around a figure.
2. Point P moves from B to C on side BCat a speed of 2 cm per second.
3. We will want to know how the area of the figure changes.
4. We will use triangles and rectangles and a moving point.
5. These problems are difficult and take time to solve.

Page 88

1. Today we will look at problems about regular patterns.
2. Regular patterns are patterns that change in the same way.
3. We often use matchsticks to illustrate these patterns.
4. We will look at the pattern of change and try to write an expression for it.
5. For example, the perfect squares have a pattern.

Page 89

1. Today we will review solving different types of problems.
2. We will review the distance problems.
3. We will also look at the cost problems.
4. We will look at the problems with a moving point.
5. We will also look at changes in quantities.

Page 90 Comprehension test

Page 91 End- of- chapter problems

Page 92 How to solve inequalities

1. Today we will solve inequalities.
2. There are three main properties of inequalities.
3. One, If $a < b$ then $a + c < b + c$.
4. Two, if $a < b$ and $c > 0$ then $ac < bc$.
5. Three, if $a < b$ and $C < 0$ then $ac > bc$.

Page 93 How to solve inequalities

1. Today we will solve inequalities.
2. Solving inequalities is like solving equations but there are two main differences.
3. First, if we multiply or divide by a negative we have to change the inequality sign.
4. Second, if we flip the left and right side then we have to change the inequality sign.
5. Inequalities often have many solutions so we can use a number line to help.

Chapter 4 Proportion and inverse proportion

Page 94 Proportion and inverse proportion

Page 95

1. Today we will look at proportion and inverse proportion.
2. Letters that have different values are variables.
3. When y is a function of x, we know that every value of x has one value for y.
4. Express y in terms of x means solve for y.
5. An equation is a function if each x value gives exactly one y value.

Page 96

1. Today we will learn about domains.
2. The domain is simply what values x can be.
3. The range is what values y can be.
4. We will use inequality signs to represent these values.
5. When $x > 0$, x is positive and when $x < 0$ x is negative.

Page 97

1. Today we will use proportions to solve problems.
2. Y is proportional to x when y = ax.
3. The a is the constant of proportion
4. Solving for a we get y/x.
5. For a given proportion the y/x is a fixed value.

Page 98

1. Today we will use proportional expressions.
2. If y is proportional to x we can write y = ax.
3. We can find the value of a by substituting the values of x and y.
4. Remember that a also equals x/y.
5. Can you give an example of a proportion?

Page 99

1. Today we will look at inverse proportions.
2. When y is inversely proportional to y we know y = a/x.
3. In an inverse proportion, as x gets bigger y gets smaller.
4. In an inverse proportion a = xy
5. Can you give an example of an inverse proportion.

Page 100

1. Today we will look at more inverse proportions.
2. When y is inversely proportional to x, y = a/x.
3. For example, when x = 3, y = 1, Express y in terms of x.
4. Since we know it is an inverse proportion we can write y =a/x.
5. Next, we can write that 1 = a/3 and solve for a.

Page 101

1. Today we will look at both direct and inverse proportions
2. If y is neither a direct or inverse proportion mark an x.
3. How do we determine if a function is direct or inverse?
4. If y gets bigger as x gets bigger then what type of function is it?
5. If y gets smaller as x gets bigger then what is the type of function?

Page 102

1. The coordinate plane has an x and y axis.
2. An ordered pair is written as (x,y).
3. The Y coordinate is the vertical direction.
4. The X coordinate is the horizontal direction.
5. The coordinate plane has four quadrants.

Page 103

1. Consider a point P with the coordinates (a, b).
2. Reflecting P about the x-axis gives (a, -b).
3. Reflecting P about the y-axis gives (-a, b).
4. Reflecting P about the origin gives (-a, -b)
5. A midpoint is the average of the two x and y coordinates.

1.The coordinate plane has four quadrants.
2.The origin is a special point at (0,0)
3.Positive values go right and up.
4.Negative values go down and left.
5.The coordinate plane can be used to graph lines and functions.

Page 104

1. y=ax can be graphed as a straight line.
2. We can make a table of values to graph.
3. The a in the equation is the rate of change.
4. If a is positive, the line goes up and to the right.
5. If a is negative, the line goes down and to the right.

1. A linear equation forms a line when it is graphed.
2. Linear equations have a constant slope.
3. Linear equations can be written as Ax+By=C
4. When written like this, the equation is in standard form.
5. A linear equation can only pass through each axis one time.

Page 105

1. Today we will graph linear equations that are direct proportions.
2. We will look how y changes as x changes.
3. We will also graph these functions.
4. We will use a restricted domain shown in parenthesis.
5. The value in front of x is the rate of change.

Page 106

1. Today we will write the function given its graph.
2. We know that straight lines have the function y = ax.
3. So, how can we find a?
4. One way, we can substitute a pair of (x,y).
5. Another way, find the rate of change between two points on the line.

Page 107

1. Today we will graph inverse proportions.
2. We will use a table of values to generate points to graph.
3. We have to make sure to use positive and negative values.
4. The inverse proportion graphs get closer and closer to the axes.
5. Hyperbole is the name of these smooth curves.

Page 108

1. Today we will use an inverse graph to write the function.
2. Do you remember that y =a/x is the equation for an inverse function.
3. First step, use a point on the graph to find a.
4. Then we just substitute that value in the equation.
5. Remember, that a will equal x times y.

Page 109

1. Today will be a review day.
2. Can you find the reflection of a point about the x and y axes and the origin?
3. Can you find the midpoint between two points?
4. Can you find the translation of a figure?
5. Can you graph direct and inverse functions?

Page 110

1. Today we will look at problems that use direct and inverse functions.
2. We know that a triangle with area 50 has a height and a base.
3. What happens to the base as the height gets smaller?
4. Is the above a direct or inverse function?
5. A piece of wire weighs 60 g for 3 m long.

Page 111

1. Today we will apply coordinates and graphs to figures.
2. We can find the area of a triangle by putting a large rectangle around it.
3. Then we will have three smaller right triangles.
4. We can find the area of the rectangle and subtract the area of the small triangles.
5. Vertices of a triangle are the points where the sides intersect.

Page 112

1. Today we will work with parallelograms.
2. Do you remember the properties of a parallelogram?
3. We know that opposite sides are parallel, so have the same slope.
4. We also know that diagonals bisect.
5. Also, opposite angles are equal in a parallelogram.

Page 113

1. Today we will use graphs and figures.
2. If we have $y = 2x$, we can find y if we know x.
3. If we have $y = a/x$,we can find y if we know (x,y).
4. Graphs of proportional and inversely proportions are symmetric about the origin.
5. We will use a rectangle to help find the area of a triangle.

Page 114

1. Today we will use graphs and equations.
2. Do you remember that parallel lines have the same slope?
3. We will use the x and y coordinates.
4. Do you remember how to find the length of a segment?
5. The problems are very difficult.

Page 115

1. Today we will review applying coordinates and graphs to figures.
2. First, we will be given the vertices of a triangle.
3. We will be asked to find the area of a quadrilateral.
4. Do you remember how to find the slopes of perpendicular lines?
5. These problems are also very hard and take time.

Page 116 Comprehension test

Page 117 End - of - chapter problems

Chapter 5 Plane figures

Page 118 Plane figures

Page 119

1. A line that passes through two points is called line AB.
2. A portion of line AB that has two endpoints at A and B is called segment AB.
3. A portion of line AB that starts at A and goes towards and continues forever is called ray AB.
4. A portion of line AB that starts at B and goes towards and continues forever is called ray BA.
5. The halfway point of a segment is called the midpoint.

Page 120

1. A line goes on forever in both directions.
2. If two lines never intersect, they are said to be parallel.
3. Parallel lines have the same slope, or m in y=mx+b.
4. A 90-degree angle is called a right angle.
5. If two lines form a right angle, they are said to be perpendicular.

Page 121

1. A circumference is the distance around the outside of a circle.
2. A part of a circumference between two points A and B is called arc AB.
3. The segment that links the two endpoints of arc AB is called chord AB.
4. A line that intersects a circle at only one point is called a tangent.
5. A tangent to a circle is perpendicular to its radius.

Page 122

1. Today we will look at properties of symmetric figures.
2. Some figures have a line of symmetry and some do not.
3. The axis perpendicularly intersects the corresponding points.
4. It also divides them into equal parts.
5. Some figures have point symmetry that is the midpoint.

Page 123

1. Today we will look at the relationship between lines and angles.
2. Express the positional relationship between side AB and side DC.
3. Do you remember how to use the distance formula?
4. A tangent is a line that intersects a figure in exactly one point.
5. Do you remember a tangent to a radii of a circle form right angles

Page 124

1. A translation is when we slide a figure in one direction for a distance.
2. If we form line segments between translated points,
3. Those line segments will be of equal length and parallel.
4. Rotating a figure by an angle around a central point is called rotation.
5. The central point where they rotate is called the center of rotation.

Page 125

1. Today we will study the rotation of figures.
2. Moving a figure by turning it around a point is called a rotation.
3. The central point is the center of rotation.
4. Rotating a figure 180 degrees is called point-symmetry rotation.
5. All pairs of corresponding parts are equal distance from the center of rotation.

Page 126

1. A reflection is another type of figure transformation.
2. A reflection flips a figure over a line.
3. This line is called the axis of reflection.
4. The segments drawn between reflected points are all parallel.
5. The axis of reflection is a perpendicular bisector for these lines.

Page 127

1. Today we will explore figure transformation.
2. When we translate a figure C it's called C prime.
3. When we reflect a figure over the y axis x coordinate is the opposite sign.
4. Also, after the reflection the y axis does not change.
5. Translations and reflections are types of transformations.

Page 128

1. Today we will learn how to construct triangles.
2. There are three conditions that determine the shape of a triangle.
3. If we know the length of the three sides ,we can construct the triangle.
4. If we know the length of two sizes and the included angle , we can construct the triangle.
5. If we know the length of the one side and the two sizes of the angles at the end, we can construct the triangle.

Page 129

1. Today we will construct perpendicular bisectors.
2. A perpendicular bisector is pendicular to a segment and bisects it.
3. It is very easy to construct the perpendicular bisector of a segment.
4. First, just make a circle from each of the segment's endpoints.
5. Then connect the two intersecting points of the two circles.

Page 130

1. Today we will look at more constructions.
2. A perpendicular bisector cuts a segment in half and forms a right angle.
3. When you use a compass you are really making congruent triangles.
4. When you construct congruent triangles you get equal angles and sides.
5. From a point outside a line, construct a perpendicular bisector.

Page 131

1. Today we will construct angle bisectors.
2. Again we will use the compass to make equal segments.
3. These equal segments make congruent triangles.
4. Do you remember CPCTC?
5. These constructions are easy to do.

Page 132

1. Today we will do more construction to make some discoveries.
2. What do you think the bisectors of the angles of a triangle do?
3. Construct point P on side AC and equal distance from the other sides.
4. What is the difference between a ray and a segment?
5. You should discover some important ideas today.

Page 133

1. Today we will construct perpendicular lines.
2. First, we will construct a perpendicular line from a point on the line.
3. Second, we will construct a perpendicular line from a point not on the line.
4. Again, we are really constructing congruent triangles.
5. So, when we construct a congruent triangle why are the angles 90 degrees?

Page 134

1. Today we will bisect perpendicular angles.
2. Again, we will construct congruent triangles and use CPCTE.
3. When we bisect a 90 degree angle we get two 45 degree angles.
4. How can we construct a 225 degree angle?
5. How can we construct a 30 degree angle?

Page 135

1. Today we will construct circles.
2. Given three points A,B and C, construct a circle so they are on its circumference.
3. What do we know about the distance from the center O, to each point?
4. What do we know if OA equals OB?
5. We will use these facts to construct the circle.

Page 136

1. Today we will use symmetry and figure construction.
2. Point P and and line l are given in the figure.
3. We will want to construct point Q symmetric to point P on line l.
4. First, we will construct a line perpendicular to line l and pass through point P.
5. Then we will construct a circle that passes through the two points

Page 137

1. Today we will use transformation and figure construction.
2. We will be given two points and need to construct the axis of reflection.
3. The axis of reflection is the perpendicular bisector.
4. It is the perpendicular bisector of a segment that connects the two points.
5. So, we will construct the perpendicular bisector of segment AP.

Page 138

1. Today we will review figure construction.
2. FIrst,we will use a triangle and distance from vertices and sides.
3. Second, we will use a trapezoid.
4. Thirdly, we will construct an isosceles triangle.
5. Then we will construct a circle tangent to a ray.

Page 139

1. A sector is a part of a circle bound by two radii.
2. The angle between the two radii is called a central angle.
3. When two sectors have equal central angles, their areas are also equal.
4. The arc length is one part of the circle's circumference.
5. The arc area is one part of the circle's area.

Page 140

1. Today we will work with sectors and central angles.
2. First, we will consider a central angle and arc length 3 pi.
3. Remember a central angle equals the arc it cuts out.
4. We will need to use the formula for the area of a circle.
5. For example, find the central angle of a sector with radius 10 m and area 25 pi^2.

Page 141

1. Today we will look at areas of combined figures.
2. For example, we have a combination of a sector and a square.
3. We will find the area and circumference of the shaded region.
4. We will use the area and circumference formulas for circles.
5. We will subtract areas to get the solution.

Page 142

1. Today we will look at rolling figures.
2. For example, an equilateral triangle rolls 360 degrees to a line.
3. The triangle does not slide but rotates over the line.
4. Next, we will look at a rectangle that rotates over a line.
5. Lastly, we will look at a circle rotating around a square.

Page 143

1. Today we will review arc lengths and areas of sectors.
2. We will use combinations of sectors, circles and squares.
3. We will have a circle moving around a triangle.
4. The locus of points means all of the points.
5. The last problem is very difficult.

Page 144 Comprehension test

Page 145 End- of - chapter

Page 146 Sets of points

1. Today we will look at sets of points,incenter and circumcenter.
2. A set of points on a plane that are the same distance from point O.
3. Two sets of points on a plane that are the same distance from line l.
4. A set of points that are the same distance from two points.
5. A set of points that are the same distance from the sides of an angle.

Page 147 Sets of points

1. Today we will look at circumcenters and incircles of triangles.
2. The center of a circumcircle is the circumcenter.
3. The circumcenter is the intersection of the perpendicular bisectors of its three sides.
4. The center of an incircle is the incenter.
5. The incenter of a triangle is the intersection of its three angle bisectors.

Chapter 6 Space figures

Page 148 Space figures

Page 149

1. Today we will look at the relationship between lines and planes.
2. Three noncollinear points determine exactly one plane.
3. A line and a point not on the line determine exactly one plane.
4. Two lines that intersect determine exactly one plane.
5. Two parallel lines determine exactly one plane.

Page 150

1. Today we will look at the positional relationship between two lines.
2. Coplanar lines either intersect or are parallel.
3. Skewed lines are noncoplanar lines and do not intersect.
4. Edges of a cube are the sides of the cube.
5. We will also look at the edges of a prism.

Page 151

1. Today we will look at the positional relationship between lines and planes.
2. We will find all the edges of a cuboid.
3. We will find all the faces of a cuboid.
4. We will find faces that are perpendicular.
5. We will find faces that are parallel.

Page 152

1. Today we will look at the positional relationship between two planes.
2. If two planes are perpendicular to the same line they are parallel.
3. A triangular prism has bases that are triangles.
4. If two lines are parallel to the same line then they are parallel.
5. A number of faces will be perpendicular.

Page 153

1. Today we will look at the positional relationship between lines and planes.
2. We will look at the relationship between edges of a cube.
3. We will look at faces in a triangular prism.
4. We will also look at a regular hexagonal prism.
5. Do you remember what skewed means?

Page 154

1. A square pyramid has five faces, five vertices and 8 edges.
2. A cube has six faces, 8 vertices and 12 edges.
3. A pentagonal pyramid has six faces, six vertices and 10 edges.
4. Euler's formula is F + V - E = 2.
5. A n-gon has n + 2 sides, 2n vertices and 3n edges.

Page 155

1. Today we will look at nets of prisms and cylinders.
2. A net of a prism shows the figure in two dimensions.
3. The net of a triangular prism forms four rectangles and two triangles.
4. Net of a cylinder is a rectangle and two circles.
5. Nets can help us calculate the areas and perimeters.

Page 156

1. Volume of a prism is the area of the base times the height.
2. Volume of a cylinder is the area of the base times the height.
3. The area of the base of a cylinder is π times the radius squared.
4. The lateral area is the sum of the area of all the sides.
5. Surface area is the sum of all the faces.

Page 157

1. Circumference equals 2$\pi\pi$r.
2. Area of a circle equals $\pi\pi$ times radius squared.
3. Volume of a prism equals the area of the base times the height.
4. You must use $\pi\pi$ times radius squared to find the volume of a cylinder.
5. Surface area is different for different shapes.

1. A regular shape means that all edges or sides are equal length.
2. A prism is a solid with two identical bases and a height between them.
3. A cylinder is like a prism, but each base is a circle.
4. A cylinder is not a prism because its sides are not flat.
5. The lateral area is the height times the sum of the sides of the base.

1. A line with two endpoints is called a segment.
2. The halfway point of a segment is called the midpoint.
3. A tangent is a line that intersects a circle at only one point.
4. A tangent is perpendicular to the radius of a circle.
5. Translation, rotation and reflection are types of figure transformations.

1. A space figure is a three dimensional shape.
2. Edges, vertices and faces are parts of space figures.
3. Euler's formula says the sum of the faces and vertices is 2 more than the number of edges.
4. A prism has two bases and a lateral area.
5. The lateral area of a cylinder is the circumference times the height.

Page 158

1. Today we will look at nets of pyramids and cones.
2. The net of a pyramid depends on its base.
3. A pentagonal pyramid net is different from a triangular pyramid.
4. The net of a cone is a sector and a circle.
5. Nets of shapes are interesting to work with.

Page 159

1. Today we will look at the volume and surface area of pyramids.
2. The volume of a pyramid equals ⅓ base area times the height.
3. The surface area of a pyramid equals lateral area plus base area.
4. Sometimes it is hard to find the height of a pyramid.
5. The lateral height of a pyramid is the height of a face.

Page 160

1. Today we will find the volume and surface area of cones.
2. The volume of a cone ⅓ times the base area times the height.
3. The surface area of a cone equals the lateral plus the base area.
4. We will use the formula S = 1/2LR.
5. We will also use the formulas S= Π rR.

Page 161

1. Today we will again find the volume and surface area of cones.
2. The volume is easier to compute than the surface area.
3. Nets can help us see where the formulas come from.
4. We will also find a volume of solids with combined shapes.
5. We will also find a solid make by cutting a cone from a cylinder.

Page 162

1. Today we will find the volume and surface area of a sphere.
2. Spheres are three dimensional figures, so we have units cubed.
3. $V = 4/3\Pi r^3$ is the formula for the volume of a sphere.
4. $S = 4\Pi r^2$ is the formula for the surface area of a sphere.
5. We will also work with a combination of a hemisphere and a cylinder.

Page 163

1. Today we will work with solids and revolutions.
2. Solid of revolution is a solid created by revolving a figure around a line of as its axis.
3. The generatrix is the segment that revolves to make up a side face.
4. When a rectangle is rotated we get a cylinder.
5. When a triangle is rotated we get a cone.

Page 164

1. Today we will review the volume and surface area of various shapes.
2. We will review these shapes: prisms, cylinders, pyramids, cones and spheres.
3. We will also have a cone cut by a plane.
4. We will also look at a combination of two hemispheres.
5. We will also compute the volume of a solid that is revolved around an axis.

Page 165

1. Today we will see how to look at solids in different ways.
2. Regular polyhedra are convex polyhedra that have the following properties.
3. All the faces are congruent polygons.
4. The number of faces joined at any one vertex is the same.
5. There are five regular polyhedra: tetrahedron, hexahedron, octahedron,dodecahedron and icosahedron.

Page 166

1. Today we will look at projections.
2. We can look at the front view.
3. Or we can look from the top, top view.
4. This type of figure is called a projection.
5. We use solid lines for visible parts and a dotted line for hidden parts.

Page 167

1. Today we will use nets for cubes.
2. The net for a cube looks like a cross.
3. We will draw the nets by matching the vertices.
4. The net for a regular quadrangular prism has six shapes.
5. Do you remember that regular means all sides and angles are equal?

Page 168

1. Today we will look at cutting cubes.
2. A cross section results from cutting a cube.
3. We will use midpoints to make our cuts.
4. Next, we want to know what shape is created by the cuts.
5. The new shape could be a triangle or a trapezoid.

Page 169

1. Today we will look at various ways to look at solids.
2. How many edges does a regular dodecahedron have?
3. The figures at the right are the sketch and net of a cuboid.
4. Can you draw a net of a cone?
5. Can you trace a string around a cone?

Page 170 Comprehension test

Page 171 End-of - chapter

Chapter 7 Organizing and making use of data

Page 172 Organizing and making use of data

Page 173

1. We will organize data in a frequency table with two columns.
2. The first column is called the class which is a range of numbers.
3. The range of each class is called the interval.
4. The second column is called the frequency which is the data items.
5. The range of the data is the maximum value minus the minimum value.

Page 174

1. A frequency distribution can be expressed in a graph called a histogram.
2. A histogram has a series of rectangles whose widths represent each class.
3. The rectangle’s height represents its frequency in a histogram.
4. We will mark the midpoint on the top side of each rectangle.
5. A frequency distribution line graph is made by connecting the midpoints.

Page 175

1. The frequency of each class divided by the total frequency gives the relative frequency.
2. The relative frequency is usually given as a decimal.
3. We often use the same number of decimal points for each relative frequency.
4. You will be asked to fill in the blanks of a frequency table.
5. The relative frequency is used to compare each class.

Page 176

1. Today we will find the mean in a frequency distribution table.
2. The class value is the middle value of a class.
3. The mean = (sum of the class values times the frequency)/total frequency.
4. We will fill in the blanks with suitable numbers.
5. Find the mean and round it to one decimal place.

Page 177

1. Today we will look at the tentative mean.
2. Tentative mean seems to be close to the mean.
3. We can use the tentative mean to calculate the mean.
4. Mean = (tentative mean) + (class value - tentative mean times frequency)/Total frequency.
5. These problems will always give us the tentative mean.

Page 178

1. Today we will review using the median and the mode.
2. The median is the middle number of an ordered list of numbers.
3. The mode is the value that is most repeated.
4. If there is an even number of data points the mean is the mean of the two middle numbers.
5. Finding the mean and mode are measures of central tendency.

Page 179

1. Today we will look at approximate values and errors with significant figures.
2. An approximate value is close to the true value, perhaps a measured or rounded figure.
3. An error value is the approximate value minus the true value.
4. Significant figures are reliable digits from an approximate value.
5. Significant figures can be expressed in scientific notation.

Page 180 Comprehension test

Page 181 End- of - chapter problems