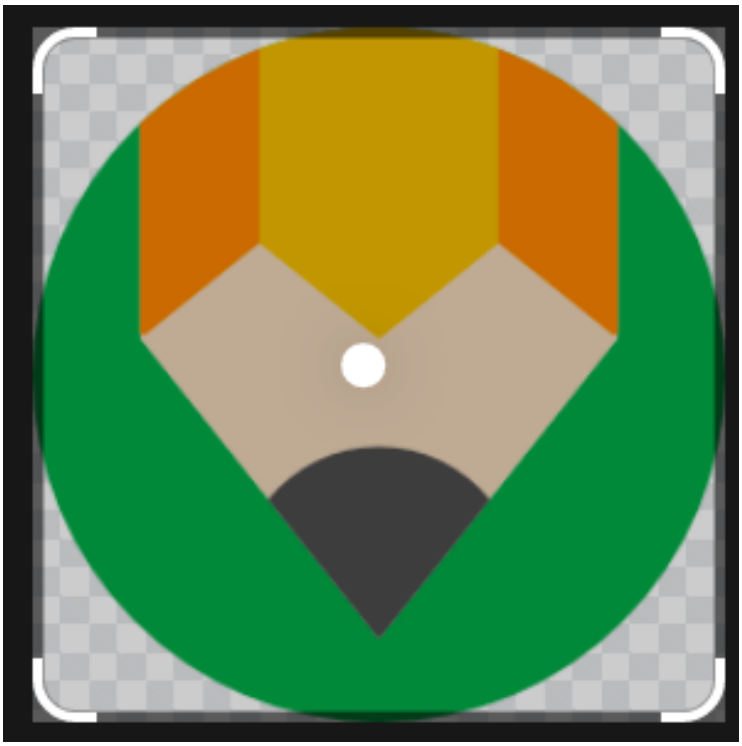
The
Shin-Chu-Mon Companion Dictation Book
Mathematics for 8th grade



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Chapter 1 Calculating with expressions

Page 6 Introduction

Page 7

1. 5x is a monomial because it has exactly one term.
2. Polynomials have terms of variables or numbers.
3. A term is a single number or letter.
4. Terms are separated by a plus or minus sign.
5. The degree of a monomial is the sum of its exponents.

Page 8

1. Today we will look at adding polynomials in two ways.
2. We simplify polynomials by collecting like terms.
3. We can use a vertical method or a horizontal method.
4. The horizontal method lets us like up the like terms.
5. Remember, when simplifying like terms only the coefficient changes.

Page 9

1. The definition of subtraction is to add the opposite.
2. The negative sign acts like a sign changer.
3. So, -(3a + 5) becomes -3a -5.
4. So, -(3a - 5) becomes -3a + 5.
5. Watch out for the negative sign and change all the s

Page 10

1. We can multiply and divide polynomials.
2. We will use the Distributive Law a(b + c) ＝|ab +ac.
3. When dividing make sure to divide each term..
4. The division sign means to multiply by the reciprocal.
5. The reciprocal of 2/3 is 3/2.

Page 11

1. The multiplication operation gives the product.
2. The division operation gives the quotient.
3. The sign of a number can be positive or negative.
4. One number zero is neither positive nor negative.
5. Signed numbers can be plotted on a number line.

Page 12

1. 1.We don't use a division sign but we use a fraction bar
2. 2. Collecting like terms is how we simplify variable expressions.
3. 3.We can use two different methods to simplify fractions.
4. 4. One method is to multiply the fractions by each term.
5. 5.The second method we use the LCM to simplify the expression.

Page 13

1. When dividing monomials, first divide the coefficients.
2. After dividing the coefficients, then divide the variables by subtracting the exponents.
3. $3x + 1$ is a binomial with a degree of 1.
4. $2x^2 + 2x + 1$, is a trinomial with a degree of 2.
5. We use simplify instead of calculate.

Page 14

1. When dividing monomials, first divide the coefficients.
2. After dividing the coefficients, then divide the variables by subtracting the exponents.
3. Remember divide means to multiply by the reciprocal.
4. Remember x divided by x equals 1.
5. Think the numbers are arithmetic and letters are algebra.

Page 15

1. Today we will explore multiplying and dividing fractions.
2. The definition of division is to multiply by the reciprocal.
3. When dividing monomials, first divide the coefficient.
4. After dividing the monomials, divide the variables.
5. Finally, collect like terms to simplify and put them in alphabetical order.

Page 16

1. The degree or a polynomial is easy fo find.
2. First, find the degree of each term by adding the exponents.
3. Then we find the term with the highest sum.
4. For example , the degree of x^2y^3z is 6.
5. The degree x^2y+x of is 3.

Page 17

1. Binomials have two terms separated by a plus or minus sign.
2. $3x^2y + 2x$ has a degree of 3.
3. We simplify expressions and solve equations.
4. Divide means to multiply by the reciprocal.
5. The monomial 5 has a degree of zero.

Page 18

1. When dividing monomials, use the fraction bar.
2. When multiplying and dividing monomials work from left to right.
3. Multiplying is a fast way to add.
4. Exponents or powers are a fast way to multiply.
5. Question 6 asked to give examples of monomials, binomials, and trinomials.

Page 19

1. Consecutive integers are x, x+1, x+2.
2. Consecutive odd or even integers are x, x+2 and x+4.
3. The multiples of 7 are 7, 14, 21 ……..
4. Consecutive multiples of 3 are 3x, 3(x+1), and 3(x+2)
5. An integer is a positive or negative whole number including 0.

Page 20

1. First step of factoring is to find the GCF.
2. A factor shared by all the terms of a polynomial is the common factor.
3. When we factor out the GCF we get the product of two polynomials.
4. The GCF is always a monomial.
5. Sometimes, we want to factor out the negative sign.

Page 21

1. Find the area of a triangle with base x and height y.
2. Find the volume of a cuboid.
3. Find the surface area of a cuboid.
4. If you rotate a triangle it becomes a cone.
5. The circumference of a circle is proportional to its radius.

Page 22

1. The sum of two consecutive integers is 27. What are they?
2. Two consecutive even integers have a sum of 26. What are they?
3. Two consecutive odd integers have a sum of 48. What are they?
4. The sum of three consecutive multiples of 7 is 357. FInd the smallest multiple.
5. The sum of three consecutive numbers is a multiple of 3.

Page 23

1. We can use algebra to make a math trick.
2. We use letters to make a rule for all integers.
3. Remember, the rule has to work for all integers.
4. How do we know a letter is a multiple of 3?
5. The sum of the digits of a multiple for 9 always adds to a multiple of 9.

Page 24 Comprehension test

Page 25 End -of- chapter problems

Page 26 -27 Review 2

Chapter 2 Simultaneous equations

Page 28 Introduction

Page 29

1. x - y = 5 is a linear equation with two unknowns.
2. Two or more equations with the same variables are called simultaneous equations.
3. The set of values that satisfy all equations is called the solution.
4. There are two natural numbers and their difference is 5.
5. Select the following pair of x,y values that solve these simultaneous equations.

Page 30

1. We can use addition or subtraction to solve simultaneous equations.
2. We will turn two equations with two unknowns to one equation with one unknown.
3. First, one has to find the variables with the same coefficient.
4. We might have to multiply to make coefficients the same.
5. Next, if the signs are the same we must subtract, or, if the signs have different signs we must add.

Page 31

1. Today, we will learn the substitution method to solve systems of equations.
2. Remember, we want to have one equation with one unknown.
3. First, we want to solve for one of the variables in one of the equations.
4. Next, we will substitute that value into the other equation.
5. Finally, we can solve that equation.

Page 32

1. Solving systems of equations with decimals or fractions.
2. If an equation has decimals, multiply by 10 or 100.
3. If an equation has fractions, multiply by the LCM.
4. Remember to multiply both sides of the equation.
5. After multiplying your equations they will still have the same solution.

Page 33

1. There are different types of equations.
2. Some simultaneous equations need to have parentheses removed.
3. Some simultaneous equations need to have fractions removed.
4. Some simultaneous equations must be rewritten.
5. Some simultaneous equations have no solution.

Page 34

1. Proportions can be changed to equations with two unknowns.
2. Cross-multiply to change a proportion to an equation.
3. Proportions are two fractions that are equal.
4. Simultaneous equations can have one solution, no solution or an infinite number of solutions.
5. Many real-world problems can be solved with simultaneous equations.

Page 35

1. Simultaneous equations can be in the form of A=B= C.
2. You can solve this type of system in 3 different ways.
3. You can solve the system by solving A = B and A = C.
4. Or, you can solve the system by solving for A = B and B = C.
5. Or, you can solve the system by solving A = C and B = C

Page 36

1. Today we will review solving simultaneous equations.
2. If one pair of variables has the same coefficient just add or subtract.
3. Sometimes, we have to multiply one or both equations by an integer.
4. Other times, we have to transform fraction or decimal to integers.
5. Furthermore, we might have to remove parentheses.

Page 37

1. Today we will use simultaneous equations.
2. We will have two pairs of unknowns in the equation but given one solution.
3. A solution is values that make both the equations true.
4. So, we first substitute the solution to have only one pair of unknowns.
5. Then, we will solve the system with one of our methods.

Page 38

1. The number 87 has a ten's digit and a unit's digit.
2. The value of this number is 8 * 10 plus 7* 1.
3. The original number can be written as 10T plus U
4. If the numbers are reversed the value becomes 10U + T.
5. A three digit number can be expressed as 100H + 10T +u

Page 39

1. Two kinds of cans, A and B, are bought in case of an earthquake.
2. The total cost of 20 A cans and 15 B cans is 9300 yen.
3. The total cost of 25 A cans and 10 B cans is 9000
4. Can you write equations for the facts in 2 and 3?
5. How much does each cost?

Page 40

1. Today we will use simultaneous equations about the number of things.
2. First, we need to pick two variables to represent the objects or people.
3. Second, we will write two equations with the variables.
4. Third, we will solve the system of equations.
5. Finally, we go back and answer the question.

Page 41

1. Today we will review using simultaneous equations to solve problems.
2. A three digit number can be written as HTU.
3. H stands for hundreds, T stands for ten and U stands for the units or ones digit.
4. Switching the digits, we get the new natural number UTH.
5. The value of a number is 100H + 10T + U.

Page 42

1. A boy rides his bike and his brother jogs.
2. If they start at the same point and travel in opposite directions.
3. After 50 minutes, the boy will catch up with his brother.
4. The boy will have completed one lap more than him.
5. What are the speeds of the boy and his brother?

Page 43

1. Today we will use simultaneous equations with speed, distance and time.
2. A boy rides a bike and his brother jogs around a circular pond.
3. The pond has a circumference of 4 km or 400 m.
4. If they travel in opposite directions how far do they travel when they first meet?
5. If they travel in the same directions what happens when the bike laps the jogger once?

Page 44

1. Today we will work with more distance, rate and time problems.
2. We will need to make a chart to help us organize the data.
3. Remember that D = RT - distance = rate times time.
4. We can have motion in the same direction or motion in the opposite directions.
5. We can also have round trip problems.

Page 45

1. Problems relating to salt water and mixing with water.
2. Suppose you want to make a solution of 800g that is 12% salt.
3. You want to use some 10% salt water and some 15% salt water.
4. How many grams of each solution should you mix?
5. Let x be the 10 % solution and y the 15% solution.

Page 46

1. Today we have problems relating to increases and decreases in numbers.
2. We will have to use percentages and decimals.
3. If there are 5% more students from last year, then we write 1.05x.
4. How do we write a 5% decrease in students?
5. You need to be careful about answering the question and not giving a value.

Page 47

1. Today, we continue to work on very hard word problems.
2. Mixture problems are difficult and we need a chart to help.
3. Remember, when we add pure water the amount of salt does not change.
4. We will have problems with vegetables and mass of iron.
5. The last problem is a work problem and work times time equals work done.

Page 48

1. Today we will solve problems with three equations and three unknowns.
2. FIrst, we will make two systems of equations with the three equations.
3. For instance, we match equation 1 and equation 2 and equation 1 and equation 3.
4. We then elimanage the same variable from both pairs of simultaneous equations.
5. Now, we have two equation and two unknowns and will substitute those back in to get the third value

Page 49

1. Today we will have more word problems with simultaneous equations.
2. I think the distance problems are the easiest as we can use a chart.
3. I think the mixture problems are the hardest because the chart is obtuse.
4. I think the admission problems are not too hard.
5. The work problems are easy if you follow the method.

Page 50 Comprehension test

Page 51 End -of- chapter problems

Page 52 - 53 Review Proportion and inverse proportion

Chapter 3 Linear functions

Page 54 Introduction

Page 55

1. A linear equation is a function represented as $y = ax + b$.
2. In a linear equation, a and b are constants but a cannot = 0.
3. A proportion relationship is a linear equation where $b = 0$.
4. Let y be the total cost of a 40-yen bottle.
5. Let x be the number of grams in the bottle.

Page 56

1. We are thinking about the graphs of linear equations.
2. Remember, linear equations look like $ax + by = c$.
3. We can find an infinite number of solutions to a linear equation.
4. Find at least ten solutions to a given linear equation.
5. Think about how each solution affects the graph.

Page 57

1. A horizontal line moves from left to right.
2. A vertical line moves up and down.
3. Is the x-axis a vertical or horizontal line?
4. Is the y-axis a vertical or horizontal line?
5. What do you think the graph of $y = 1$ or $x = 1$ looks like?

Page 58

1 A line with a positive slope goes up and to the right.

2. A line with a negative slope goes down and to the right.
3. We use a to represent the slope.
4. The slope is the rate of change from one point to another point on the line.
5. We define slope as the change in Y or the change in X.

Page 59

1. Y = ax + b is the slope intercept form.
2. The constant a is the slope of the line.
3. The constant b is the y-intercept of the line.
4. We can graph the line just by using the y-intercept and the slope.

5. We can also look at the graph of a line and write its equation.

Page 60

1. A line with a positive slope goes up and to the right.
2. A line with a negative slope goes down and to the right.
3. We use a to represent the slope.
4. The slope is the rate of change from one point to another point on the line.
5. We define slope as the change in Y or the change in X.

Page 61

1. We can look at the graph of a line and write its equation.
2. We will use the slope-intercept form- y = ax + b.
3. First, find the y -intercept of the line, that is b.
4. Next, find the slope which is the change in y over the change in x.
5. Finally, substitute the slope into a and the y-intercept into b.

Page 62

1. What do you know about parallel lines?
2. We want to find the equation of a line parallel to another line.
3. Do parallel lines have the same slope?
4. So, we can use the same slope to write the equation.
5. By the way, perpendicular lines have slopes that are negative reciprocals.

Page 63

1. Today we will write the equation of a line given two points.
2. One method, we can use $y = ax + b$ and set up and solve the system of simultaneous equations created.
3. There is also a second method, we can find the slope a.
4. Remember, slope equals the change in x over the change in y.
5. Then we can use the slope and a point to find b- the y intercept.

Page 64

1. What do you know about parallel lines?
2. We want to find the equation of a line parallel to another line.
3. Do parallel lines have the same slope?
4. So, we can use the same slope to write the equation.
5. By the way, perpendicular lines have slopes that are negative reciprocals.

Page 65

1. Today, we will write the equation of a line given certain conditions.
2. Remember, we will use $y = ax + b$ where a is the slope and b the y-intercept.
3. Also, we might need to find and use the slope- change is y / change in x.
4. Parallel lines have the same slope and we will use this fact.
5. Perpendicular lines have slopes that are negative reciprocals.

Page 66

1. $Ax + By = C$ will graph as a straight line.
2. Change this form into the slope intercept form and use the slope and y-intercept.
3. Do you remember how to graph $x = 3$?
4. Do you remember how to graph $y = 3$?
5. Do you remember how to find their slopes?

Page 67

1. Today, we will solve simultaneous equations with graphs.
2. The solution will be the point where the lines intersect.
3. Do you remember how to graph the equation of a line?
4. First, graph the y intercept and then use the slope.
5. Can you see a situation when this method might not work?

Page 68

1. Today, we will find the solution to simultaneous equations.
2. Do you remember, simultaneous equations are two equations with two unknowns.
3. Remember, we solved them by elimination or substitution.
4. Now, we will solve them by graphing them and finding their intersection.
5. The lines might intersect but they could be parallel.

Page 69

1. We will use linear equations to find areas of triangles.
2. We will determine the point of intersection of two lines.
3. B and C are the points where 1 and 2 intersect with the x-axis respectively.
4. We will need to find the base and height of the triangle.
5. These problems take many steps to solve.

Page 70

1. Today, we will find the area of a shaded area- a triangle.
2. We will need to find the x and y intercepts.
3. The x intercepts is when the value of y is zero.
4. The y intercepts is when the value of x is zero.
5. v

Page 71

1. In this chapter, we worked with linear functions.
2. Standard form is $Ax + By = C$.
3. Slope intercept form is $y = ax + b$.
4. We can graph equations using a, the slope and b the y-intercept.
5. We can find the solution to a set of simultaneous equations by graphing.

Page 72

1. Today we will pass a line from the vertex to the opposite side.
2. That line will bisect the area of the triangles.
3. Do you remember the midpoint formula?
4. We will want to find the equation of the line that bisects the area.
5. The equation $y = ax + b$ is very powerful.

Page 73

1. Today, we will find the equation of a line that passes through the origin.
2. We will use the point of intersection of two lines.
3. We will need to find the area of the triangles.
4. Finally, we need to write the equation of the line.
5. Again, we will use the formula $y = ax + b$.

Page 74

1. Today, we will find the length of segments.
2. We will need to find the coordinates of a point.
3. We will use that point to find another point.
4. Then we can find the length of that segment.
5. Then we can write the equation of the line.

Page 75

1. Today we will use the length of segments and squares to find equations.
2. We will use the properties of a square to write an equation.
3. In the following figures, find the coordinates of point P.
4. Express the y-coordinate of point P using t.
5. Express the x-coordinate of point Q using t.

Page 76

1. Today we will review finding the area of triangles.
2. This is a review section but still will not be easy.
3. We will use a system of equations to answer these questions.
4. We will use y = ax + b to help us.
5. These problems take many steps to solve.

Page 77

1. Today, we will use linear functions.
2. The length of a spring extension is proportional to the weight hung from it.
3. Remember, that y = ax is the equation of a direct proportion.
4. We will need to find the constant of proportionality.
5. We will also use a system of simultaneous equations.

Page 78

1. Today,we will use a moving point to find an area.
2. Counterclockwise means to move the opposite way around a clock.
3. We will look at an area that is changing.
4. As one area gets bigger another area will get smaller.
5. Again, we will use a system of equations.

Page 79

1. Today we will use linear functions to solve problems.
2. Point P moves x cm from A to B and then to C.
3. Express y in terms of x as point P moves.
4. We will also have a point moving around a rectangle.
5. We will also have a point moving around a trapezoid.

Page 80

1. Today we will use linear functions with time and distance.
2. Do you remember how to write a linear function given two points?
3. Do you remember how to write a linear function given a point and the slope?
4. We will need to graph two lines and find their intersection.
5. We will also need to look at a graph and write its equation.

Page 81

1. Today we will look at two pipes filling up a tank.
2. We will need to set up a set of simultaneous equations.
3. Do you remember how to set up work problems?
4. We will restrict the domain to a certain time duration.
5. A cuboid-shaped tank is being filled with two pipes A and B.

Page 82

1. Today we will review different types of problems using linear equations.
2. We will review proportional problems with gas milage.
3. We will have a point moving around a rectangle.
4. We will graph the relationship between x and y as point P moves.
5. We will also have a distance, rate and time problem.

Page 83

1. Today we do the class exercise with world problems and linear functions.
2. The first problem is a pipe problem and we will graph what is happening.
3. How many minutes after pipe A was opened did the water depth become 28 cm?
4. For the following domains of x, express y in terms of x.
5. We have finally come to the end of these difficult problems.

Page 84 Comprehension test

Page 85 End -of- chapter problems

Page 86 - 89 Review 4 Figures

Chapter 4 Parallel and congruent

Page 90 Introduction

Page 91

1. Vertical angles are formed by two intersecting lines.
2. Vertical angles have the same measurement.
3. A line that passes through two other lines is called a transversal.
4. Corresponding angles are on the same side of the transversal.
5. Alternate interior angles are on the same side of the transversal.

Page 92

1. Alternate interior angles are equal when formed by parallel lines.
2. Find the measurement of the given angle.
3. Remember to divide an angle with a third parallel line.
4. When you bisect an angle you cut it into equal angles.
5. The transversal is the line that cuts the two parallel lines.

Page 93

1. Interior angles are angles inside a triangle.
2. Exterior angles are angles outside a triangle.
3. An exterior angle equals the sum of the extreme interior angles.
4. The interior angles of a triangle equal 180 degrees.
5. Find the measurements of the exterior and interior angles.

Page 94

1. Today we will use the properties of triangles.
2. We will have to draw an extension to a segment.
3. We can then use the exterior angle theorem.
4. Do you remember that an exterior angle equals the sum of the remote interior angles?
5. We will also review classifying triangles by angles.

Page 95

1. Today we will use parallel lines and angles.
2. Do you remember that corresponding angles are equal?
3. We will have to draw lines that are parallel to the given lines.
4. We will use the theorem that vertical angles are equal.
5. Triangles are fun to work with with so many relationships.

Page 96

1. Find the sum of the interior angles of a pentagon.
2. A regular hexagon has 6 sides and six interior angles all equal.
3. An octagon has 8 sides and eight interior angles.
4. Find the measurement of angle x in the following polygons.
5. Can you find a formula to give the sum of the interior angles of a polygon?

Page 97

1. Exterior angles of a polygon are on the outside.
2. A vertex is where two sides of a polygon intersect.
3. In every polygon, the interior and exterior angles equal 180 degrees.
4. Fill in the blanks below to complete the table.
5. Can you find the sum of the exterior angles of any polygon?

Page 98

1. Bisect means to cut into equal parts.
2. Point D is where the bisectors of the angles intersect.
3. The sum of the interior angles is 2a + 2b +48 = 180.
4. Remember to use the exterior angles to find the interior angles.
5. Start with the given information and then use logic.

Page 99

1. Today we will find the measure of various angles and special shapes.
2. Find the sum of the marked angles in the following figures.
3. We will use the exterior angles theorem to find the exterior angles of a quadrilateral.
4. Do you remember that the sum of the exterior angles equals 360?
5. These problems look difficult but they are really quite easy.

Page 100

1. Today we will find interior and exterior angles of figures.
2. Do you remember the formula (n-2)*180 to find the sum of the interior angles of a polygon?
3. Do you remember the sum of the exterior angles is always 360?
4. Angles with the same notation have equal measurements.
5. These problems are fun to work hard but it takes time.

Page 101

1. Congruent figures can be put on each other with no overlap.
2. The equal sign with a third line means congruent.
3. The length of corresponding sides of congruent figures are equal.
4. The length of corresponding angles of congruent figures are equal.
5. Make sure that the corresponding parts match in the names.

Page 102

1. We have three ways to prove triangles are congruent.
2. SSS- three sides of one triangle equal three sides of another triangle.
3. SAS- if two sides and the included angle one triangle equal two sides and the included angle of another triangle.
4. ASA- if two angles and the included side equal two angles and the included side of another triangle.
5. If $\triangle CAT$ is congruent to $\triangle DOG$ then $\angle C = \angle D$.

Page 103

1. SSS is an acronym for side.
2. SAS is an acronym for side angle side.
3. ASA is an acronym for an angle side angle.
4. We need to find the condition to prove triangles congruent.
5. Congruent shapes can fit perfectly on top of each other.

Page 104

1. In the figure at the right the two pentagons are congruent.
2. Express congruence between the two shapes using ≡ sign.
3. We need to use theorems we proved before like, (n-2)180.
4. Which conditions for congruence were used to prove congruency.
5. Corresponding parts can be deduced from the shapes names.

Page 105

1. Today we will see how to set up a proof.
2. For each statement, we have a hypothesis and a conclusion.
3. Usually, the hypothesis follows the word ‘if’.
4. The conclusion usually comes after the word ‘then’.
5. We often see this statement, If p then q.

Page 106

1. The hypothesis is the given information.
2. We use the hypothesis to make logical deductions.
3. The conclusion is what we are asked to prove.
4. If $\triangle CAT \equiv \triangle DOG$ then C = D.
5. The if is the hypothesis and the then is the conclusion.

Page 107

1. How to prove two triangles are congruent.
2. First, identify the name of the two triangles.
3. Then use the given information to prove them congruent.
4. See what corresponding parts are equal.
5. Alway thinking of one of these: SSS, SAS or ASA.

Page 108

1.An angle bisector divides the angle into two equal angles.

2. Remember, when proving congruence look for equal corresponding parts.
3. Respectively means in the order they are listed.
4.When proving, we have to give reasons for each step.
5.We use definitions, rules and previous proofs as our reasons.

Page 109

1. Parallel lines do not intersect and are coplanar.
2. A transversal cuts the two parallel lines forming four special pairs of angles.
3. Corresponding angles are equal with one angle outside and one angle inside on the same side of the transversal.
4. Alternate interior angles are equal and are inside but alternate over the transversal.
5. Same-sided interior angles are supplements and inside and on the same side as the transversal.

Page 110

1. Today we will write formal proofs.
2. We will make a big T and put the statement on the left side.
3. The reasons will go on the right side of the T.
4. The first step is always to write the given information.
5. We can use definitions and theorems for our reasons.

Page 111

1. Today we will do even harder proofs.
2. Do you remember the ways to prove triangles are congruent?
3. Do you remember how to use CPCTE?
4. A square is a regular polygon so the sides are equal.
5. It is important to keep in mind what you are proving.

Page 112

36. An angle bisector divides the angle into two equal angles.
37. Remember, when proving congruence look for equal corresponding parts.
38. Respectively means in the order they are listed.
39. When proving, we have to give reasons for each step.
40. We use definitions, rules and previous proofs as our reasons.

Page 113

41. Start with the given information to make a proof.
42. We need to make statements and give the reasons for them.
43. Definitions are one type of reason.
44. Once we prove a statement it becomes a reason for other proofs.
45. An angle bisector cuts the angle into two equal angles.

Page 114

1. Today we will review working with proofs.
2. First, we will review identifying the hypothesis and conclusion.
3. Then we will work with triangles and proving angles equal.
4. Remember to start with the given.
5. Ask yourself, what facts do I need to prove the conclusion.

Page 115

1. Today we will work with even harder proofs.
2. When asked to prove two sides or angles are equal, think about congruence.
3. So we will be thinking about SSS, ASA and SAS.
4. We will have an equilateral triangle inside parallel lines.
5. Remember to start with the given and move to the conclusion.

Page 116 Comprehension test

Page 117 end -of- chapter problems

Chapter 5 triangles and quadrilaterals

Page 118 Introduction

Page 119

1. A definition is a clear statement of what the word means.
2. State the converse and tell if it is true.
3. What is the converse of If △ ABC is isosceles then it has two equal angles.
4. The converse is: If △ ABC has two equal angles then it is isosceles.
5. The converse of a conditional is not always true.

Page 120

1. Today we will look at properties of isosceles triangles.
2. Do you remember the definition of an isosceles triangle?
3. An isosceles triangle has exactly two congruent sides.
4. Can you prove that the base angles are equal?
5. We will have to draw an auxiliary line is a perpendicular bisector.

Page 121

1. Isosceles triangles have exactly two equal sides.
2. We can use isosceles triangles to prove other triangles congruent.
3. Fill in the blank belows to complete the proof.
4. M and P are the respective midpoints of sides PQ and PR.
5. Start with the given information to make a proof.

Page 122

1. Today we will use isosceles triangles to prove other conditions.
2. We will prove other triangles congruent and use CPCTE.
3. Then we will use SSS, SAS or ASA to prove triangles congruent.
4. We will need to figure out what triangles to prove congruent.
5. Often we will need to use the midpoint formula.

Page 123

1. We will do more proofs with isosceles triangles today.
2. The first proof we will use angle bisectors.
3. Again we need to look for one of the ways to prove triangles are congruent.
4. The third proof today has a lot of given information.
5. The last proof we will have to remember the properties of a trapezoid.

Page 124

1. Today we have four more proofs with quadrilaterals and triangles.
2. Sometimes we need to redraw the figure and break overlapping parts.
3. Then, it is easier to see what angles are congruent
4. The last problem has a trapezoid.
5. The more proofs you do, the easier they become.

Page 125

1. Today we have four review problems.
2. Do you remember that the converse is the reverse of the conditional?
3. The second problem we will use the properties of isosceles triangles.
4. Problem three is also about isosceles triangles.
5. The last problem has several properties we will use.

Page 126

1. Today we will have two more proofs with isosceles triangles.
2. Problem one is easy as all steps are given with some blanks.
3. Problem two also has all steps with blanks.
4. The last problem is about an equilateral triangle.
5. We will prove that all the angles of an equilateral triangle are equal.

Page 127

1. If a triangle is equilateral then all sides are equal.
2. Converse, If all sides of a triangle are equal then the triangle is equilateral.
3. Inverse; If a triangle is not equilateral then all sides are not equal.
4. Contrapositive; If a triangle is not equilateral then all the sides are not equal.
5. Only the contrapositive is always true if the conditional is true**.**

Page 128

1. Today we use properties of right triangles.
2. Problem three is easy and we just state which triangles are congruent.
3. Problem four is also easy as the steps of the proof are given.
4. Problem five shows how to break down overlapping triangles.
5. I don't think many people like to do proofs.

Page 129

1. HL(hypotenuse leg) is one way to prove right triangles are congruent.
2. HA(hypotenuse angle) is another way to prove right triangles are congruent.
3. The hypotenuse is the longest side of a right triangle.
4. The hypotenuse is always opposite the right angle.
5. Right triangles have very special properties.

Page 130

1. Today we will have four more proofs.
2. The first proof is easy because we are given steps with blanks to fill in.
3. In the second proof, we will prove tangents to a circle from a point are equal.
4. In the third proof, we will use the properties of isosceles triangles.
5. In the fourth proof, we will use perpendicular lines to prove segments equal.

Page 131

1. Today we will have two proofs using right triangles.
2. The first proof has many steps but we are given the steps.
3. The first proof also uses many properties of right triangles.
4. In proof two, we will use an isosceles right triangle.
5. We will prove two triangles are congruent and use CPCTC.

Page 132

1. Today we will have six proofs using right triangles.
2. In the first proof we will use the properties of squares.
3. In the third proof, we will use the radii of a circle.
4. In the fifth proof, we will use a rectangle and an isosceles triangle.
5. In the sixth proof, we will use two congruent squares.

Page 133

1. A parallelogram is a quadrilateral with both pairs of opposite sides are parallel.
2. Parallelograms have three special properties.
3. Both pairs of opposite sizes are equal in parallelograms.
4. Both pairs of opposite angles are equal in parallelograms.
5. Diagonals bisect in parallelograms.

Page 134

1. Today we will use parallelograms in our proofs.
2. Do you remember the main properties of parallelograms?
3. In a parallelogram opposite sides and angles are equal.
4. We can use these properties to prove triangles are congruent.
5. A and C intersect BD at points P and Q respectively.

Page 135

1. Today we have more proofs with parallelograms.
2. In the first proof, points E and F are placed on diagonal BD.
3. In the second proof, we are given a midpoint.
4. The third proof is difficult but the steps are given.
5. Proofs are difficult but just start with the given and use properties.

Page 136

1. Today we will have proofs with triangles and quadrilaterals.
2. Do you remember the diagonals of a parallelogram bisect?
3. We will also use vertical angles that are equal.
4. The second proof uses isosceles triangles.
5. The last proof we have use the segment addition postulate.

Page 137

1. There are five ways to prove a quadrilateral is a parallelogram.
2. You can show both pairs of opposite sides are parallel.
3. You can show both pairs of opposite sides are equal.
4. You can show both pairs of opposite angles are equal.
5. You can show that diagonals bisect.
6. You can show that at least one pair of opposite sides are both equal and parallel.

Page 138

1. Today we continue with proofs using triangles and quadrilaterals.
2. Do you remember the five ways to prove a quad is a parallelogram?
3. Do you remember the definition of a parallelogram?
4. If both pairs of opposite sides are equal then the quad is a parallelogram.
5. The second proof is similar to the first proof.

Page 139

1. Today we continue with three more proofs with parallelograms.
2. In the first proof, we will use congruent triangles to prove a quad is a parallelogram.
3. In the second proof, we will use the property that one pair of sides are both equal and parallel.
4. In the last proof, we will need to use many properties.
5. We will prove the diagonals of a parallelogram bisect.

Page 140

1. Today we will continue our proofs with parallelograms.
2. In the first problem we will find the measure of an angle.
3. In the second problem we will use some properties of parallelograms to find a segment length.
4. In problem two, we will use a property of parallelograms to prove diagonals bisect.
5. The fourth proof is very complicated as we will use parallelograms and equilateral triangles.

Page 141

1. Today we will be given some conditions and asked if they prove a quad is a parallelogram.
2. Do you remember the five ways to prove a quad is a parallelogram?
3. We will prove triangles are congruent and use CPCTE.
4. In proof seven we will use a trapezoid to help.
5. Do you remember the definition of a trapezoid?

Page 142

1. A square and rhombus have diagonals that are perpendicular.
2. A rectangle has diagonals that bisect.
3. A trapezoid has exactly one pair of parallel sides.
4. There are five ways to prove a quad is a parallelogram.
5. Parallelograms have 5 special features.

Page 143

1. Today we will study about special kinds of parallelograms.
2. A rectangle is a parallelogram with four right angles and opposite sides equal.
3. A rhombus is a parallelogram with four equal sides but no right angles.
4. A square is a parallelogram with all sides equal and all right angles.
5. Is a square also a rectangle and also a rhombus?

Page 144

1. Today we will prove a quadrilateral is a special type of quadrilateral.
2. In the first proof we will work with diagonals that are perpendicular.
3. In the second problem we will look at rectangles, rhombuses and squares
4. In the third problem, we will be given that diagonals bisect.
5. In the last problem we will prove a parallelogram is a square.

Page 145

1. Today we will work with parallel lines and area.
2. It is important today to read Let's learn the basics.
3. Look at points P and Q and the segment they form with A and B.
4. Looking at the diagram, If PQ//AB then $\triangle PAB = \triangle QAB$
5. If $\triangle PAB = \triangle QAB$ then PQ //AB

Page 146

1. Today we will look at changing shape without changing the area.
2. Look at the diagram and see that ΔABE has the same area as quad ABCD.
3. Notice that line l passes through point D and parallel to the diagonal.
4. Also, point E lies on the extension of side BC.
5. We can the add the area of the triangles formed.

Page 147

1. Today we will look at midpoints of the side of a triangle.
2. Look at the diagram, M and N are midpoints of the two sides.
3. When this is true we know that MN//BC.
4. We also know that MN equals 1/2BC.
5. The proof is written in the Study seminar.

Page 148

1. Today we will look at three last special proofs.
2. First we will prove ΔLMN is isosceles.
3. Next, we will prove that a quad is a parallelogram.
4. In the last problem, we will prove another quad is a parallelogram.
5. These proof are very difficult/

Page 149

1. Today we will prove properties of some special parallelograms.
2. First, we will prove that the diagonals of a rectangle are equal.
3. Next, we will prove that the diagonals of a rhombus intersect perpendicularly.
4. In proof four, we will prove a parallelogram is a rhombus.
5. A rhombus is a quad with four equal sides.

Page 150 Comprehension test

Page 151 end -of- year problems

Page 152- 155 Complements Functions and figures

Page 156-159 Complements Properties of Circles

Page 160-161 Review 5 Organizing and making use of data

Chapter 6 Probability

Page 162 Introduction

Page 163

1. Permutations are different ways an event can happen.
2. How many ways can four people line up?
3. Use a tree diagram to see all the possibilities.
4. Find the total number of unique sums.
5. 4!(four factorial) is 4*3*2*1 which equals 24.

Page 164

1. Combinations are like permutations but the order is not important.
2. Four example, A then B is the same as B then A.
3. I need a team of 2 people so the order doesn't count.
4. A group of 2 like Aki and Yoko can be made only one way.
5. A permutation is Aki then Yoko different then Yoko then Aki.

Page 165

1. Today we will calculate the number of ways an event can happen.
2. How many ways can we arrange the letters A,B,C and D?
3. We can make a diagram to see all the possibilities.
4. Or we can think, there are four ways to choose the first term.
5. Then there are 3 ways and then 2 ways and then one way.

Page 166

1. Today we will look at different ways to arrange objects.
2. How many ways can three books be arranged from four books?
3. We will also look at coin tossing.
4. It always helps to make a diagram with coin tossing problems.
5. We will also look at problems with some items are fixed in a place.

Page 167

1. Today we will look at the meaning of probability in an event that happens by chance.
2. The ratio or percentage that an event will happen is its probability.
3. The ratio is the times an event happens divided by all attempts.
4. When flipping a coin what is the probability of getting a tail?
5. If events are equally likely to happen then their probabilities are equal.

Page 168

1. Probability is the chance an event will happen.
2. To find a probability we first need to know how many total outcomes there are.
3. Next, we need to find how many events we want.
4. For example ,when we roll a die there are 6 total outcomes.
5. If we want to know the probability of rolling a six, the we have one event out of 6 or ⅙.

Page 169

1. Today we will look at the probability when rolling a pair of dice.
2. Look at the diagram on page 169.
3. Can you explain what it shows?
4. How many total possibilities are there?
5. What is the probability of rolling a 4?

Page 170

1. Today we will study dice probability and moving points.
2. Look at the diagram on page 170 - do you see the four vertices?
3. When we roll one dice the letter P moves counterclockwise the same number of vertices.
4. What do we need to roll to move point P to B?
5. What do we need to roll if we roll the die twice?

Page 171

1. Today we will use dice to affect other events.
2. For example, if we roll an even number an object will move to the right.
3. If we roll an odd number, the object will move to the left.
4. We also might move a point along the x or y axes.
5. When rolling one die there are six outcomes.

Page 172

1. Today we will think about the probability of picking different balls.
2. There are two red balls and three white balls in a bag.
3. When you randomly pick two of them at the same time, what is the probability they are both white?
4. We can make a sketch or a diagram to help find the probability.
5. We will need to discriminate between replacement and non replacement.

Page 173

1. Today we will look at probability with cards.
2. These cards will each have one number written on them.
3. We will pick two cards and place them next to each other.
4. Then we will have a two digit number.
5. Then we will want to find how many are multiples of 4.

Page 174

1. Today we will have questions about coins and probability.
2. When three coins are tossed at the same time what possible outcomes are there?
3. Making a diagram will be helpful to see all possible outcomes.
4. Does it make sense that there will be 2^3 different outcomes?
5. So, how many outcomes with 4 coins?

Page 175

1. Today we will look at events that cannot happen.
2. The probability that something will happen + it won't equals 1.
3. For example, the probability of rolling a 1 is ⅙ and not getting a 1 is ⅚.
4. Probability an event will not happen equals 1 - probability an event will happen.
5. What is the probability of not rolling a 5.

Page 176

1. Today we will review many types of probabilities.
2. We studied probability with cards, coins and dice.
3. We also studied probability with balls in a bag.
4. We also learn to make diagrams to help find probabilities.
5. Pascal was the first mathematician to think about probability.

Page 177

1. Today we will look at more complicated probability problems.
2. We will look at problems with linear graphs.
3. We will also look at problems with cards around a circle.
4. We will also look at problems with graphs.
5. Do you use probability in your own life?

Page 178 Comprehension test

Page 179 End -of -chapter questions